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ELECTRIC RAILWAY JOURNAL

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ELECTRIC RAILWAY JOURNAL

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With One Eye and One Clevis Parallel

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Every insulator is subjected to a test load before shipment.

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East Pittsburgh, Pennsylvania
Sales Offices in All Principal Cities of the United States and Foreign Countries

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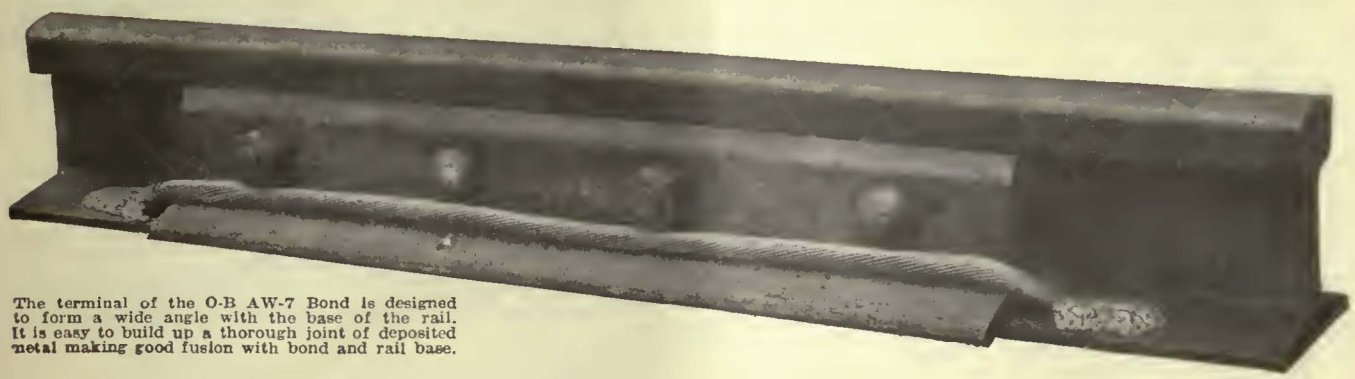
Westinghouse



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Form 1206A

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CLEVELAND, OHIO, MARCH 22ND, 1924.

TO ANY GENERAL MANAGER, OR CHIEF ENGINEER,
WHO HAS PAVED TRACK WITH CONCRETE UNDER TIES TO REPAIR.

IF YOU HAVE PAVED TRACK WITH CONCRETE UNDER TIES TO REPAIR, OR RECONSTRUCT, ALLOW US TO PRESENT COMPLETE METHOD OF SAVING PRESENT CONCRETE FOUNDATION. USED IN CLEVELAND, BALTIMORE, AKRON, DES MOINES, ASHTABULA AND TOLEDO AT SAVING FROM TWO (2) TO SIX (6) DOLLARS PER FOOT TRACK. WIRE ANSWER COLLECT.

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Local conditions govern each installation. Let one of our Engineers show you the benefits which Signals will produce for your Railway.

Union Switch & Signal Co.

SWISSVALE, PA.

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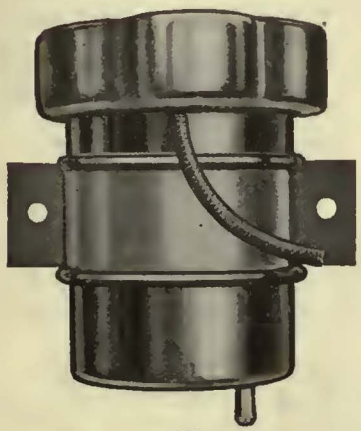

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LIGHTNING ARRESTER

This lightning arrester is small enough to be used on the most crowded pole or in any location in a car—yet—their high efficiency to insure full protection on trolley and feeder lines.

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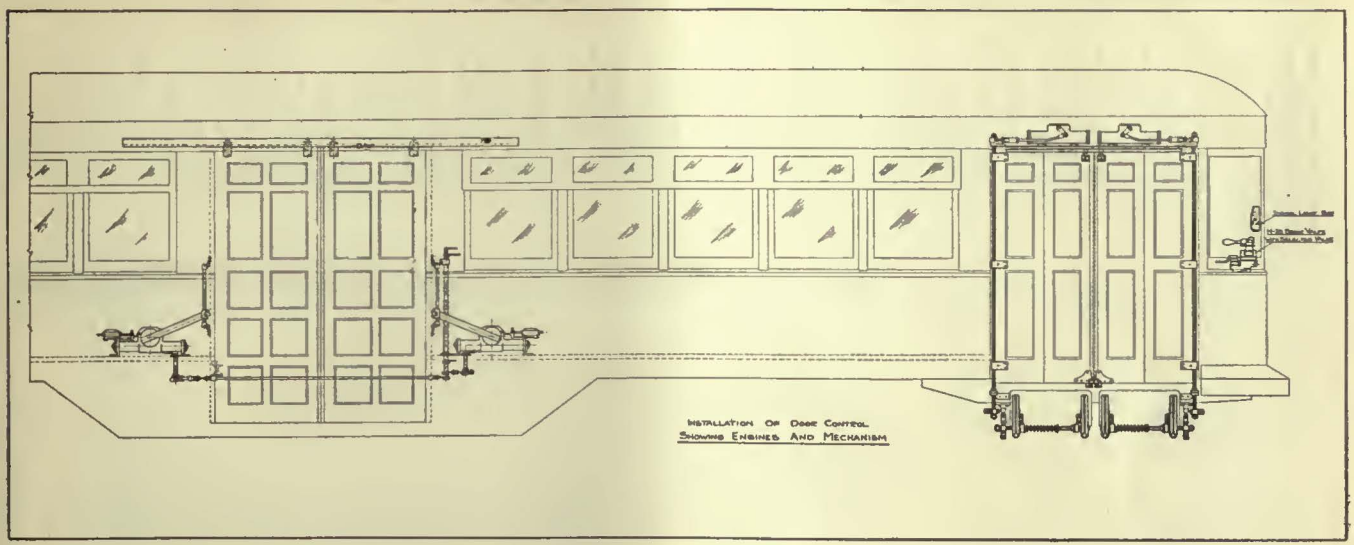

Progress goes by cycles

It used to be the one-man car

Some one phase or factor of the electric railway game is always to the fore in discussion, research and general attention. The echos of the one-man car controversy are still heard in the land.

But now it's— passenger interchange

And that's the next logical step since the one-man car idea has included the larger units. Provision must be made for door control by the second man, when the car is used for two-man operation. Door-ways must be made big enough to permit the unimpeded movement of larger groups of passengers. Operation of larger doors must be made easier, and safety must be ever maintained as a feature of first importance.

National Pneumatic engineers are leading in constructive thinking and practical development along these lines.

Our experts can help you on your problem.

National Pneumatic Company, Inc.

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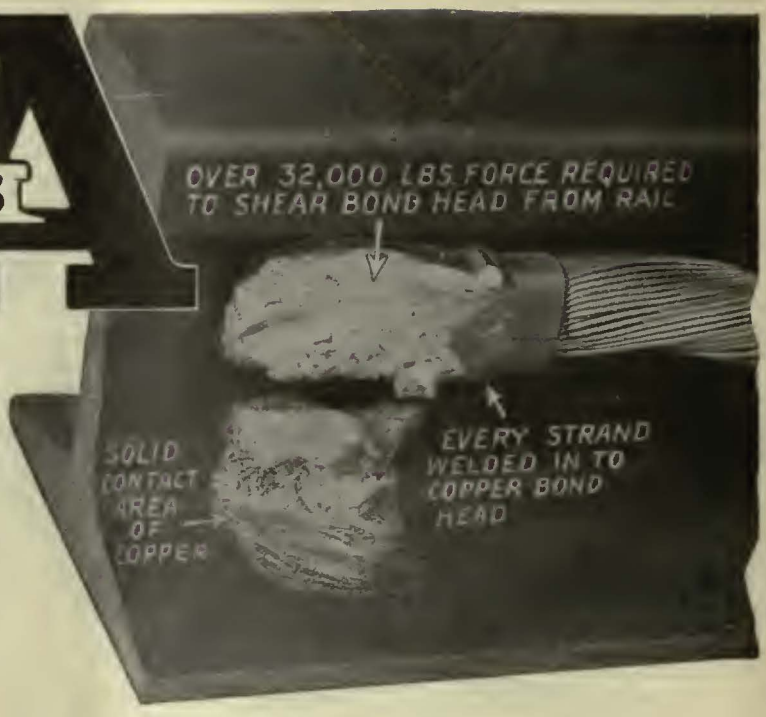
UNA RAIL BONDS



Photograph shows UNA Bond head removed after applying an equivalent of 32,000 lbs. direct shearing force. Note shear took place through bond head leaving the weld of copper to steel intact.

An Unbroken Path of Copper—From Rail to Rail

Rail Bonds must carry current—that's why they are made of copper—in that respect all bonds are alike.

But Bonds must be electrically connected to the rail — that's where they differ — that's the real point to think about in good bonding.

If the bond itself is copper, it's logical to weld that bond to the rail with copper. That assures the full carrying capacity of the bond with no extra resistance added to the bonds at the point of contact with the rail. That means an all-copper path from rail to rail.

That's the UNA Process of Bonding—simple and logical—35 seconds welding time applies one head of a 4/0 bond. The Bond head is held against the rail with a mold. The arc is struck—when the mold is full the bond is applied.

The weld is strong, 32,000 pounds direct pressure is necessary to shear it from the rail. Every strand carries its load because it is welded into the bond head. The area of contact of the copper weld to the rail is from 4 to 6 times the area of the bond; your factor of safety for 100 per cent bonding.

Una Rail Bonds of standard capacities are available in both laminated and cable types. Let us send you samples for your particular types of Rail Joint.

Rail Welding and Bonding Company

Cleveland, Ohio

UNA RAIL JOINTS

McGuire-Cummings Manufacturing Co.

Multiple-unit-control double-truck passenger car for two-man operation—Built for Georgia Ry. & Power Co., Atlanta.

The above shows type of cars built for the Georgia Railway & Power Co. of Atlanta. Succeeding advertisements will feature cars of the following types recently built by us.

1. **Light-weight, Double-truck Cars**
   One-man-two-man operation. Built for Des Moines City Railway Co., Des Moines, Iowa.
2. **Safety Cars for One-man Operation**
   With double doors. Built for Gary Street Railway Co., Gary, Ind.
3. **Center Entrance Cars**
   (Peter Witt type.)
   Built for the City of Detroit.
4. **Light-weight Suburban Cars**
   Built for Chicago & West Towns Railway Co.

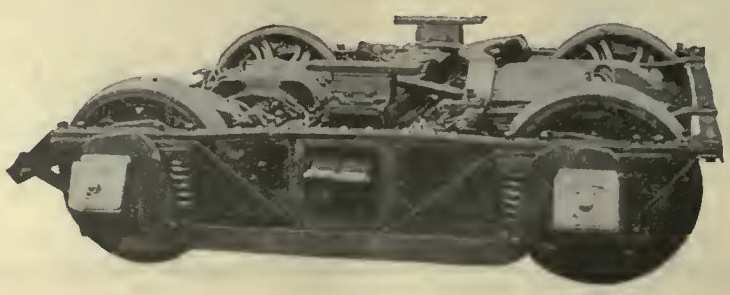
Our engineering department is at your service. We will be pleased to either submit specifications and drawings and to quote prices thereon, or we will submit proposals on specifications furnished.

McGuire-Cummings Manufacturing Co.

General Offices

111 W. Monroe St., CHICAGO, Ill.

McGuire-Cummings No. 62 motor truck for low car body for city service



Inside hung brake equalizer design, 26-inch wheels

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Rail bonds and bonding tools

Your Guide
to New and Better Standards

Another car is pulled in—motive power out of commission—inferior arresters have failed again. The engineer turns to his G-E Catalog and finds complete data on proper G-E Arresters which would have protected—and which will be installed.

Thus, the G-E Railway Supply Catalog guides electric railways in the *selection* of modern equipment—and supplies. Every road in this country has a copy; railway men regard it a great step toward more uniformly high standards.

Those, if there be any, who are not using their Catalog need only be reminded of the wealth of information it contains. Keep your copy near.

General Electric Company
Schenectady, N. Y.
Sales Offices in all Large Cities

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GENERAL ELECTRIC

New York, April 5, 1924

Electric Railway Journal

Consolidation of Street Railway Journal and Electric Railway Review

Published by McGraw-Hill Company, Inc.

HENRY W. BLAKE and HARRY L. BROWN, *Editors*

Volume 63
Number 14

'Tis the Spirit of Terry O'Toole, We Need

WHEN Terry O'Toole discarded the bricks in Erin and brought blarney to Americky, he laid the foundation for a public-be-pleased policy which embodied loyalty, service and sacrifice rather than duplicity, indifference and compromise. There were three beneficiaries when the earthly day of reckoning came—his employer, the public and himself.

There is a lesson for trainmen everywhere in the tale of Terry O'Toole, a one-man car operator in Loteda, Ohio. He ran the car, rang up the fares, helped patrons up the step, carried the babies, later depositing them in the mothers' laps, trained the fender to scoop up bodies which were on the point of landing in the next world, ran into a burning building to save his aged father and became the owner of two shares of the traction company's stock. All this he did and even more. He won the fair daughter of the president of the railway, and that terminated his fare-collecting days.

Unfortunately, Terry O'Toole can't be located for confirmation of the story. The Loteda Traction Company never employed a motorman of that name, for the Loteda Traction and Terry O'Toole are only screen realities in "Conductor 1492," produced by Warner Brothers. But an hour watching Terry at work will probably do trainmen more good than a score of service sermons and a billion booklets on courteous conductors.

With a good start and a definite objective Terry was sure to be a success, and a smiling one, too. His getting on in the world was an accomplishment in thought long before it was a reality. Back in the old country, when his father and grandfather were fighting (not discussing) whether they would send Terry to the United States or to Americky to try his luck, the hero of the plot was dreaming of trolleys, tracks and traffic. Terry knew the secret of success was service, civility and loyalty. Then, too, Terry liked his work. He knew that one used many more muscles to frown than to smile, and he didn't believe in working overtime. Though Irish enough to have a temper all his own, he never showed it. Rather did he show up his tempters and turn the tables, but never the trolley, on them. On one occasion, when all his passengers talked at him at once, he pulled down a shade on which was written "$50 Fine for Talking to the Motorman." With equal finesse did he spurn a lift in the vice-president's seven-passenger Cadillac, declining graciously with "No, thanks, I prefer my fifty-passenger car."

The lesson of Terry has been told many times in many ways. His methods are worth trying even if the measure of success is not often so great as was Terry's, for not every president's daughter can win a motorman. But every operator of a one-man car or a conductor on a two-man car can bring credit to himself, prestige to his company and satisfaction to his public. The trainmen are the real salesmen of service, with the company backing them up. The industry has another proof of this is in Terry O'Toole.

Saginaw Benefits by Car-Bus Franchise

CO-ORDINATION of car and bus, as exemplifield by the Saginaw operation under the new franchise which brought the trolleys back after two years cessation of service, perhaps offers a solution for the transportation agitations prevalent in some of the smaller cities today. Placing the bus under the management of the railway and giving the community a voice in the operation of the combined system has satisfied the people of Saginaw and resulted in unprecedented patronage during the first three months of operation, as noted in the article on page 531.

What has taken place during the last two years in Saginaw may be taken as indicative of what will occur in other municipalities if the street railway is forced to cease operation because of competition and too low a fare. The novelty of the motor-driven vehicle and the desire to have the latest mode of transportation has led to the tendency in many cities to refuse an increase in fares to the railway, but to permit competitive bus service, even at a higher rate than that asked by the car company. The service given by the trackless routes has been by "jitneys" and individually owned buses. This was the case in Saginaw, and while there was not a true test of organized bus transportation, nevertheless the two years of suspended car operation should have been ample in which to organize and demonstrate the feasibility of the bus for a city of that size.

The difficulty in Saginaw, as well as elsewhere, was that the city administration insisted upon a rate of fare so low that no responsible bus interests would undertake the service. It made a good political issue to do this. But when the people got tired of keeping the problem in politics, the public officials not only found that they would have to permit a fare higher than 5 cents, but that they could make a better bargain with the railway company than with any one else. In fact, it was the only way they could be sure the people of Saginaw would have adequate and dependable transportation. With politics displaced by common sense, the people readily approved the franchise and are now enjoying the benefits of a modern car-bus system conducted on the most economical basis.

"Personalize"

IN THE business world in general there has been no satisfactory substitute for personal contact, and the utility business is no exception. Elimination of the popular concept of the "soulless" corporation is one of the important results which may be accomplished.

In this connection it is gratifying to note the spirit that was manifested during the recent joint meeting of the Illinois railway, gas and electric associations in Chicago. The organization of a speaker's bureau to qualify employees for carrying the facts regarding the utility business directly to the people was indeed a long step in advance, and one which, if properly applied, has far reaching possibilities.

The word "personalize" aptly defines the desired objective; personalized relations between the management and employees on the one hand, and personalized contact between the utilities and the public, on the other. Adding this thought to the phrase used by the JOURNAL to express Mr. Budd's ideas as set forth in an interview with him last December rounds out an inspiring slogan:

"Modernize, Merchandize and Personalize"

Cleveland Railway Can Do It Best

BUSES have been proposed for use in Cleveland. One set of interests appears to be demanding certain rights whether or not the Cleveland Railway is willing to go into the bus business. Another set has gone on public record as desiring rights only if the local railway is unwilling or unprepared to operate buses. As for the railway, its position is quite clear. President Stanley has said that if the city craves buses the railway should be allowed to operate them.

One thing is certain. Buses can be expected to operate in Cleveland only at a fare which will insure a profit to the operators. In fact, the proposal of the People's Motor Bus Company contains a provision for a 10-cent fare. The apparent excuse behind this request is that a parlor car service—something between that supplied by the taxicab and the street car—will be furnished, and that largely for this reason the service will not compete with that of the railway. As a theory, part of that is all right, but in the case of the Cleveland Railway, under the present service-at-cost grant, the cost in fares to patrons would be only 6 per cent on the value of the capital required to be put into the system. Thus if the Cleveland Railway operated buses at a 10-cent fare and showed a profit, the excess over 6 per cent could be turned back to benefit the street car rider. Of course, some will ask why the bus rider should pay anything toward the cost of the ride on the railway. In a combined transportation system, the same answer applies to this question as to why the rider on a profitable car line should have to help to pay the deficit on the unprofitable lines.

Entirely aside from the question of whether the bus would serve a real public need in Cleveland the position of the railway is a sound one. The Cleveland Railway has functioned uniformly well in the interest of the public. There is no good reason why it should not do so indefinitely. If Cleveland wants to have buses the best way is to turn the bus operating rights over to the Cleveland Railway as this will make certain that the city will continue to secure in full the transportation benefits which it now enjoys. The greatest benefit of the bus will unquestionably come when it is operated by the same organization as the railway, so that it can be made to extend and amplify the service of the rail lines without the competitive results, if operated separately, which injure the prospects of both systems.

Interurbans' View of Billboards

THE announcement made a few days ago by the Standard Oil Company that it intended to discontinue the practice of billboard advertising where such signs deface attractive scenery is welcome news. Other large manufacturers have agreed to do the same. While the immediate object of this plan is to render the highways more attractive to automobilists, perhaps this program of removal will eventually extend to routes of the interurban railways and steam railroads. At present the unsightly billboards lining the tracks in many places are a source of annoyance and displeasure to passengers.

Advertising is a good thing in its place, but, like many good things, it can be done in the wrong way. Every manufacturer has a story to tell the public, and his prosperity depends to some extent upon the skill used in telling it. It is doubtful, however, whether advertising on a billboard located where it mars the beauty of a picturesque spot really promotes sales. A better place to advertise is in the advertising racks of electric railway cars and in stations, making use of the attractive cards that often display real art as well as present a selling appeal. Such advertising is not a transgression upon any one's outlook. As with newspaper and magazine advertising, it comes to the reader when he is in a receptive mood to receive information, and thus serve a useful purpose. But billboard advertising along the highways and railways is displeasing to many, and it sometimes constitutes an accident hazard as it cuts off a clear view.

If It's Worth a Picture, Make It a Real One

THESE days the electric railway industry is making use, as never before, of window posters, cards in the advertising racks and pamphlets for distribution to passengers. To brighten up the appearance of such publicity material, many companies have introduced pictures of their cars and other equipment. In so doing, some have had the good judgment to make the pictures accurate and lifelike, while others have carelessly presented unreal objects and labeled them cars, or whatever they were intended to represent.

If it is worth while to use a picture at all in publicity work, it is worth while to make it a real picture of the desired object. It is almost always a mistake to think, "The public doesn't know anything about that. People will never notice the difference." The public has hundreds of thousands of eyes, and includes many persons trained to accurate observation. Such people at once notice any inaccuracy in the railway company's advertising. There are also a great many people who perhaps do not know why a picture impresses them unfavorably, but who somehow subconsciously recognize that it is not as it should be. It is quite worth the cost to have a professional photographer take the pictures needed for publicity matter. The railway equipment will then be shown as it really is.

How Saginaw Has Co-ordinated Railway and Bus

Unified System of Transportation Result of People's Referendum—25 Modern Buses Operate on Three Routes Specified in 15-Year Franchise—Control of System in Hands of Public—Railway Equipment Rebuilt and Painted

Double-Truck, Two-Man Car Rebuilt for One-Man Operation and Equipped with Safety Car Devices

SAGINAW—no longer the recognized "Jitneyville" of America—has emerged from an unsuccessful two-year trial of exclusive jitney operation and has set up a new system of transportation service. Street cars and modern motor buses have been co-ordinated to furnish a complete transportation system to this city of 66,000 inhabitants. Supervised by the people, financed and managed by private capital, the arrangements insure adequate service and at the same time retain the stimulus toward economy which accompanies private enterprise. Routes, equipment and organization of the new Saginaw Transit Company are specified in the new 15-year franchise which was granted by an ordinance adopted by a three to one vote of the people in June, 1923, to become effective as soon as facilities could be procured and placed in service.

It will be recalled that two years ago the Saginaw-Bay City Railway Company ceased operation following the refusal of Saginaw to grant a new franchise which included an increase in fare. "Jitneys" and buses of every type and form thereafter attempted to give the local service, while numerous efforts were made to come to a settlement with the railway and later with some responsible organization to inaugurate a dependable bus system. But no one could be found to take a 5-cent bus franchise, and when a 10-cent bus franchise was submitted to the people it was turned down.

The local transportation in the hands of small companies and individuals with little or no responsibility became so bad that certain civic organizations, notably the Chamber of Commerce, finally undertook the work of finding a solution. The object was to develop a comprehensive transportation plan that would supply the city's needs and prove attractive to an operating company. An ordinance providing for a combination railway and bus system was prepared and passed by the City Council. This was submitted to the people and approved at a special election, whereupon the newly organized Saginaw Transit Company became the grantee of the franchise and took steps to start operation.

Financial Status

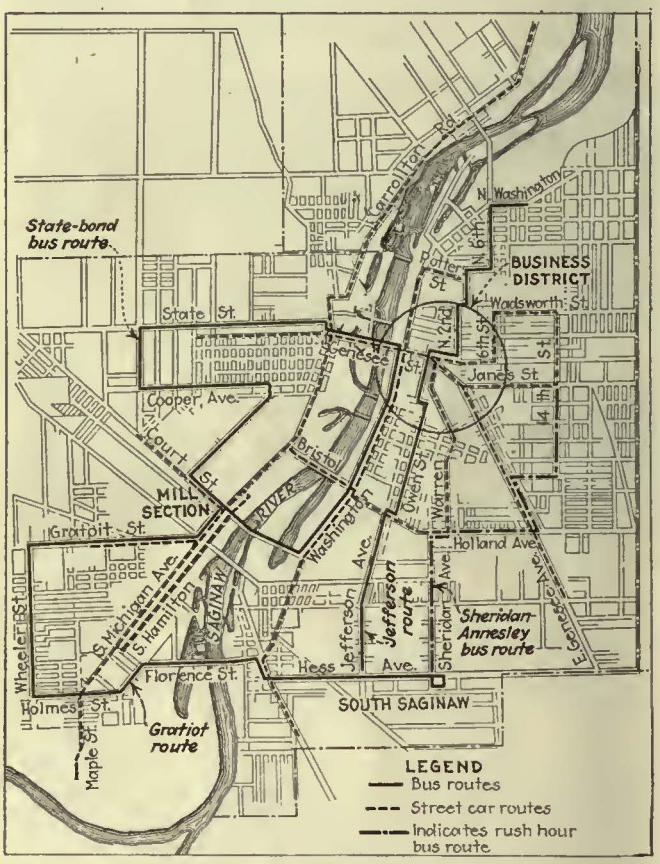
Purchase was made of the bankrupt Saginaw-Bay City Railway Company by the Commonwealth Power, Railway & Light Company in the name of the Saginaw Transit Company. The first mortgage bonds of the Saginaw-Bay City Railway Company were taken up by the new company, an equal amount at par of 5 per cent cumulative preferred stock being given in lieu thereof. The new company also took over the old underlying bonds of the former company, namely, the Saginaw Valley Traction Company, giving in return $500 worth of 5 per cent first mortgage bonds (1949) and one share of common stock for each $500 worth of old bonds. All other securities are in the hands of the holding company, with the exception of one share of preferred stock held by each of the directors of the

Saginaw Transit Company. The present distribution of securities of the Saginaw Transit Company is as follows:

	Issued and Outstanding	In Hands of Public	Securities Owned by Holding Company
First mortgage bonds, 5 per cent (1949)	$1,184,000	$564,000	$620,000
Note for car equipment	5,000	.....	5,000
Preferred stock, 5 per cent (cumulative)	1,479,000	981,000	498,000
Total	$2,668,000	$1,545,000	$1,123,000
Common stock (shares of no par value)	20,000	1,137	18,863

In evidence of good faith the new company was required to deposit $400,000 in the banks of Saginaw as a fund for rehabilitation work on the cars and tracks and for the purchase of motor vehicles.

When the people of the city approved the car-bus franchise under which the Saginaw Transit Company is operating, they placed their approval on a system



Map of Saginaw Indicates Car-Bus System Recently Placed in Operation

whereby two-thirds of the directorate of the company represent the public. Thus, six of the nine directors of the corporation are resident citizens approved by the Mayor and the two Circuit Judges of Saginaw County. These six, with three directors representing the security holders, have control of the management and policy of the company. All of these directors serve for fifteen years, the life of the franchise. The filling of vacancies which may occur from time to time is intrusted to the City Council in the case of the six representatives, and to the security holders in the case of the other three. The board elected C. S. Kressler as president and general manager of the company.

Before operation could be undertaken, the track, particularly the special work, had to be repaired and in places rebuilt. The old available cars, consisting of 21 Birney type safety cars, 7 double-truck converted one-man cars and 12 two-man, 40-passenger cars, were put through the overhaul and paint shop. The 12 two-man cars were rebuilt for one-man operation and equipped with safety devices. Every car was given a thorough overhaul, which included repairs and replacements to motors, trucks and bodies. "Traction" orange and "chrome" yellow exterior with black trim were used as the color combination. The orange is the predominating color, with yellow used between the belt rail and letterboard. The interiors were made equally pleasing by finishing the trim in mahogany and the ceiling in white enamel. Lettering is eliminated as far as possible and at the present time includes only an insignia below the center windows, the number on each side of the dash, and a sign stating "Please Have Fare Ready" near the door. All equipment, including the new buses, is painted in these same colors. The work of rehabilitating cars was carried out as rapidly as possible.

As operation of the railway began in November, only limited trackwork was possible. Further track rehabilitation will be undertaken in the spring.

In addition to the street car lines, all of which are about the same as before operation ceased, the company is required to operate three motor bus routes as specified in the franchise. For this service, ten White, Model 50, bus chassis with Bender, 25-passenger bodies and 15 Reo bus chassis with Fitz-John-Erwin 21-passenger bodies were purchased. As rapidly as equipment, buses and cars became available, the routes specified in the ordinance were taken over from the jitney operators. After operation on all routes had been established, the Council, acting in accordance with requirements of the ordinance, took the necessary steps to carry out the provisions restricting competition. Throughout the duration of the franchise, the Council has agreed to protect the transit company from competition.

A survey of industrial plants furnished the data which determined the location of these bus routes. On some streets these parallel the car routes. Through the business center of the city, the prospective passenger is given the choice of using a bus or a car. However, after leaving the transfer center at Washington and Genesee Streets, the bus and car take widely diverging routes, the bus covering portions of the city not served by the car.

Bus Routes Described

An example of this is indicated in the peculiar franchise route traversed by the so-called State-Bond buses, as shown on the accompanying map. It was found by checking that people living in the southeastern portion of the city traveled to business mostly in the heart of the city. Workers living in the northwestern portion of the city were largely employed in mills in the southwestern section. So a bus route laid out in the form of a triangle gave both these classes of people a more direct route than the car lines and supplied a load both outbound and inbound.

For the north and south traffic, the franchise specified a through bus route on Jefferson Avenue. This street passes through the business district and extends from the residence section on the north to the mill district on the south and is referred to as Saginaw's Fifth Avenue. The third route laid out to fulfill the requirements of the franchise is the Gratiot line, which starts at the junction with the State-Bond route and after traversing the southwestern suburban district terminates in the mill section of South Saginaw.

In addition, a rush-hour route known as the Sheridan-Annesley line was recently established to carry the workers in the mills of South Saginaw between the factories and their homes in east and southeast portions of the city. Several empty buses are waiting at the factories at quitting time to carry the workers homeward, while a like number of buses leave the northern terminal of the route on definitely scheduled time in the morning to transport the men to work. Very little transferring is done between these buses and the two or three car lines crossed en route, as the direct route of the buses serves the full needs of the riders.

During the month of February, 1924, a total of 861,210 revenue passengers and 161,522 transfer passengers were carried by the combined system. Of this number, 577,029 revenue passengers and 102,346 transfer passengers were carried by the street cars, while 284,181 revenue passengers and 59,176 transfer passengers were carried by the buses. These figures indicate that with 16 scheduled buses during the day and 25 in the rush hours, the bus system is carrying nearly one-half as many passengers as the car system with a schedule of 26 cars during the non-rush hours and 40 in the peak hours. From this it appears that each bus is carrying about four-fifths as many revenue passengers as each street car. Standees are allowed on both systems.

Twenty-five-Passenger, Street Car Type White Bus, Used on Car-Bus System of Saginaw

Headways on both rail and bus routes vary from 6 to 10 min. during the day, and schedules have been so arranged that connections are made between buses and cars at the terminals and intersections of routes. Service has been further improved by staggering the cars and buses along the streets traversed by both. Free transfer is given between the buses and cars, and the fare of 10 cents cash or four tickets for 25 cents is the rate on both.

MAINTENANCE

Maintenance of the vehicles, both cars and buses, is done on a mileage basis. Inspection, however, is given to each piece of equipment at least once a day. In this co-ordinated system, the bus is as important a factor as the car; therefore, enough vehicles have been provided to meet the heavy rush-hour service. During the day only 16 buses are operated, leaving nine in the garage for inspection, cleaning and repairs.

Provision has been made in a section of the old car-house for the storing and maintaining of the buses. This garage is approximately 50 ft. wide by 200 ft. long. The rails have been left in place and the floor level brought up to the face of the rail by filling in with cinders. A portion at the rear has been covered with a concrete floor and is used for inspection and repair purposes, the forward section serving as a storage area only. In an adjoining bay a wash rack has been provided where the buses are washed inside and out once a day. A battery-charging outfit occupies one corner of the garage at the rear, while a 50-ton wheel press is mounted in the opposite corner.

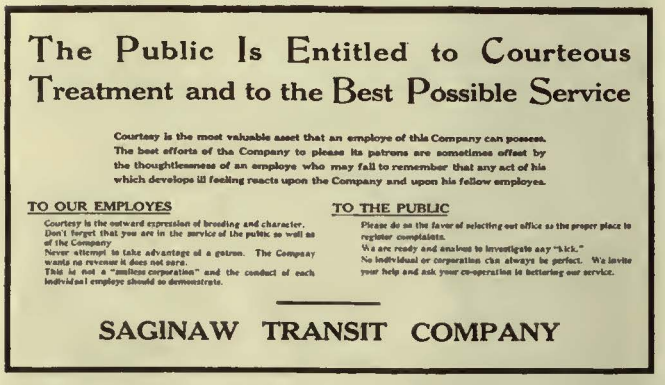
All maintenance work with the exception of tire repairs will be undertaken by the company in this garage and the railway machine shop. It was found advisable to have a local vulcanizing repair shop do all the tire work, which includes removing the tire from the wheel, vulcanizing and replacing the tire. During the three months of operation this work has amounted to approximately $40 per month. If the company had undertaken this work the cost to it would have been approximately $150 per month. An extra White and an extra Reo engine have been purchased and are kept in the storeroom, with a complete set of replacement parts for the Whites. This was not necessary with the Reos because of the adequate stock maintained by the local dealer.

When difficulty is encountered on the road by any of the buses, the driver immediately calls the garage. The garage foreman sends out the service truck and a replacement bus. The driver has been instructed to make no attempt to repair the bus he is driving, but to continue if possible to the terminal of his route, where he will take the replacement bus and continue his

trip. If it is merely tire trouble, the crew on the service truck will make the change. If it is some minor mechanical defect correction is made on the road, but if the trouble is found to be serious, the vehicle is towed to the garage. In any of these three cases, the bus is returned to the garage, where it is repaired and stored until needed.

Ample Gasoline Capacity Provided

Gasoline and oil records are very accurately kept by checking the quantities used against the speedometer mileage reading. To eliminate the necessity of purchasing gasoline on the road, the gasoline carrying capacity of the buses was increased. The 25-gal. tank on the Reo cars was replaced by a 35-gal. tank, and the tank on the White buses has been augmented by an auxiliary 16-gal. tank. These capacities make it unnecessary to replenish gasoline during an entire day's run. Two 8,000-gal. storage tanks have been buried in the ground adjacent to the garage and supply the vehicles with fuel through the customary measuring pump. The oil supply is maintained in drums and is furnished to the



Sample Window Poster Being Used in Cars and Buses to Set Forth Policies of New Company

vehicles in small quantities whenever necessary. However, a complete change of oil is made every 500 miles. Plans are being formulated for burning the old oil under the boiler used for heating the carhouse and garage.

Before starting on his run, each operator is supplied with $10 worth of tokens. He furnishes his own change. All fares are collected by means of a Johnson fare box. An operator's trip sheet is used to record the fare box readings, a space is provided for the opening and closing numbers, and settlement is made to the cashier on the basis of these readings. The register readings on the trip sheet are checked in the general office by means of a statement of register readings taken by a barn man during the time the vehicles are in the barns. This reading is entirely separate and independent of the readings taken by the car and bus operators.

The classification for bus accounting, tentatively adopted by the American Electric Railway Accountants' Association, is used. For the first three months of operation, the figures showed the operating expense to be 14½ cents per revenue bus-mile, exclusive of taxes, interest and depreciation. Depreciation on the buses has been figured at 33⅓ per cent, which makes the total life of the bus approximate 250,000 miles.

Keeping the public sold on its own transportation system has been the aim of the management in speeches given before local business organizations at noon-day luncheons. "Leave your car home" is the theme of these talks and of the advertisements run in the local papers. It is pointed out to the local merchant and business man that they are losing money on the space at the curb in front of their establishments if such space is used for parking purposes. Formerly, less than 25 per cent of the merchants left their cars home, but now more than 45 per cent do so, and in that way provide a convenient loading zone for their customers. Interesting figures from local retail merchants show an increase of 20 per cent in sales, while those who are located near the transfer corner report an increase in sales of 30 per cent since the movement was started.

Parking has been changed from a position of 45 deg. to the curb to a parallel position, and time limits have been strictly enforced. All streets upon which routes of the traction company operate have been made "stop streets." This has done much to eliminate collisions between private automobiles and the cars and buses of the company.

Concrete Poles Used Because of Ornamental Appearance

Although More Costly than Steel or Wood Poles, They Are Used by the Municipal Railway of San Francisco Because They Are More Sightly and Permanent

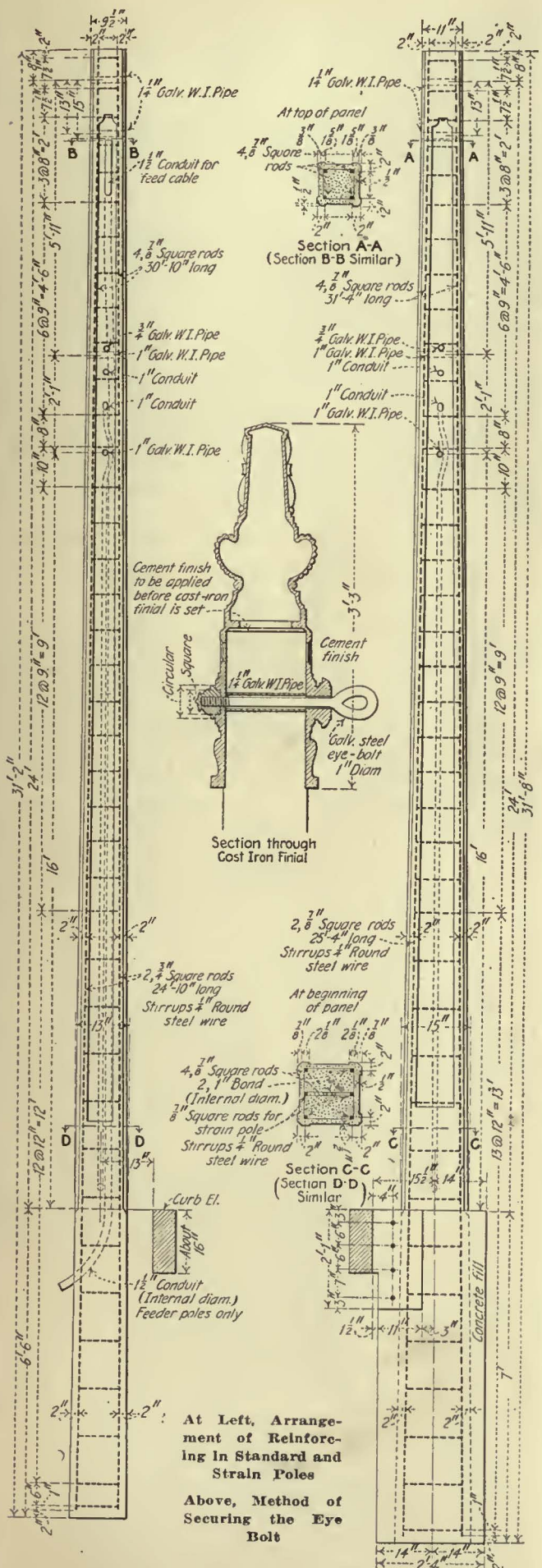
FOR a number of years the Municipal Railway of San Francisco has been using concrete poles to support its overhead construction. Various types have been tried, and although concrete poles are more expensive than steel poles in first cost they are favored by the railway on account of their ornamental appearance and because they require comparatively little maintenance once they are installed.

Forms for the poles are built as a series of horizontal troughs in which the poles are cast. The top surface is given a float finish. The poles are then covered with wet sand and are sprinkled with water every day. Wooden forms are very thoroughly wetted, particularly in the case of panel poles, so that the swelling of the wood will not crack off the corners of the pole along the edge of the panel. After the poles have been erected and finished, all exposed surfaces are painted with two coats of "Concreto" as manufactured by the Muralo Company, or some other equivalent concrete paint, of whatever color may be desired.

A concrete mixture in the proportions of 1-2-4 is used. The cement is carefully tested. At least 92 per cent by weight must pass through a sieve of 10,000 meshes to the square inch, and at least 77 per cent must pass through a sieve 40,000 meshes to the square inch.

Briquettes made from neat cement, after being kept one day in moist air and the remainder of the time in water, must develop a tensile strength per square inch as follows: After seven days 500 lb. and after twenty-eight days 600 lb. Briquettes made with one part cement and three parts sand and exposed in the same way in the neat tests must develop a strength of 200 lb. after seven days, and 300 lb. after twenty-eight days.

Pats of neat cement about 3 in. in diameter and ½ in. thick at the center, tapering to a thin edge, being kept in moist air at normal temperature for twenty-



At Left, Arrangement of Reinforcing in Standard and Strain Poles

Above, Method of Securing the Eye Bolt

four hours and then placed in water and raised to a temperature of 212 deg. F. in one hour and maintained at such temperature for five hours, and other pats kept, one in the open air and one in water, at a temperature of about 65 deg. F. for twenty-eight days must show no signs of distortion, blotching, cracking or disintegration.

Poles are erected by means of a movable derrick with sling. No special tests have been made of their strength, but those in service are satisfactorily carrying a load of 800 lb. at the eyebolt. Besides sustaining their legitimate load, concrete poles have stood up well in many automobile collisions. However, these poles are very heavy, weighing approximately 150 lb.

Type of Concrete Pole Used by Municipal Railway of San Francisco

per cubic foot and the railway has found that great care must be exercised in placing them in order to avoid setting up excessive stresses before they reach an upright position.

To increase the ornamental effect created by the concrete poles, a cast iron base is used. This was originally cast in one piece and was slipped over the top of the pole at the time of erection. Later, however, in order to facilitate the replacement of broken castings, these bases were made in two parts and bolted together. An ornate lighting fixture is placed on the upper part as these poles serve a combination purpose. In the accompanying illustration of a pole on Van Ness Avenue a temporary lighting fixture has been installed. Cast iron lamp brackets of a more elaborate design will eventually replace this temporary system. In 1918 the contract price for poles used by the Municipal Railway was $92 each for the standard poles and $110 each for the strain poles.

Twin City Starts Thrift Fund

Rapid Transit Company's Plan for Encouraging Savings Nearing Completion of First Year —Men Get Increased Life Insurance Besides 4½ per Cent Interest

TO ENCOURAGE its employees to save money, the Twin City Rapid Transit Company on April 1, 1923, introduced a thrift plan, and offered to give a life insurance policy to each employee who would begin and continue saving a part of his wages according to the plan. The amount of the life insurance policy thus offered varies with the length of service of the employee and his period of saving. Insurance policies in the sum of $500 are taken out by the company for all of its employees who have been in the service for six months or longer. This amount of policy is increased to $1,000 during the first year of saving to all employees who join the thrift fund and have been with the company for five years or less. It is increased to $1,100 if the employee has been with the company for six years, and to higher amounts by gradations up to the maximum of $2,000 for the man who has twenty years of service when he entered the thrift fund.

There is also a gradual increase in the amount of the principal of policy (up to the maximum of $2,000) with the length of time that the employee continues in the thrift plan. Thus, the man with one year or less of service in the company must continue his saving for five years to increase his policy from $1,000 to $1,100. Then it grows by $100 each year until the maximum of $2,000 is reached. The older man gains this maximum sooner. Thus, the man with ten years service reaches the $2,000 mark after only five years of savings, and the eighteen-year man after only three years of savings. The insurance is in addition to the death benefits.

The amount of saving required under the plan is 2 per cent of the wages of the employee, this amount to be deducted from the portion of his wages payable on the 25th of each month. The deduction from his wages for his dues in the benevolent association is made from the portion of his wages payable on the 10th of the month. The amounts for the savings fund thus obtained are deposited in one of the strongest local banks and draw interest at 4½ per cent, compounded semi-annually.

If any portion of the principal or interest is withdrawn by the employee during the first five years (except under conditions described below) his insurance automatically drops to $500, but after the fifth year his insurance policy remains at the point at which it reached when the deposits were withdrawn. Employees of sixteen years of service and more have to continue their savings for only one year to secure the same benefits. Employees placed on the pension roll are exempted from obligations to make future savings and may withdraw their savings without decreasing the face value of their policies. Exemption is also allowed to those who desire to apply their savings to the purchase of homes, as they may withdraw their deposits for that purpose without forfeiting any of their insurance. The case of special emergencies is taken care of by allowing an employee at any time to borrow from the company up to 90 per cent of the amount of his deposit, but he must pay 5 per cent on the loan, and it must be repaid in ten months after being contracted by deductions semi-monthly from the employees' wages. The purpose of charging ½ per cent more interest than that paid by the bank is to discourage applications for loans on the basis of the deposits.

Employees who leave the service have the privilege of leaving their deposits in the same bank, but in that case they will draw only 4 per cent instead of 4½. Employees leaving the service also have the privilege of continuing their life insurance policies without medical examination for the same amounts in any of the forms of policy customarily issued by the insurance company, except term insurance, and thereafter pay the premiums direct to the insurance company determined by the age at the time of leaving the service, but application to do so must be made within a certain time. In this way it is impossible for the employee to lose his life insurance after leaving the service because of inability to pass the examination. Various provisions are contained in the thrift plan to cover conditions of sickness, etc.

The plan has met popular approval on the part of the employees, and the aggregate savings under it from April 1, 1923, up to the middle of February, 1924, amounted to about $115,000.

The Car Riders Make the Pay Check Possible

A PUBLICITY slip distributed by the Olean, Bradford & Salamanca Railway, Olean, N. Y., was described in ELECTRIC RAILWAY JOURNAL for March 22, page 472. These slips are attached to all outgoing checks and are used to supplement a publicity campaign in the local newspapers. A line of type was omitted in the story referred to and the wording of these slips was on that account improperly given. The slip itself is reproduced below:

It Is the People
Who Ride on Our Cars That Make
This Check Possible

Red Call Lights Summon Inspectors

THE dispatcher at the carhouse of the Holyoke Street Railway keeps in close touch with his inspectors on the road by means of a system of call lights. Nine red electric lights are located at strategic points along the lines of the railway. To correspond with these there are also nine lights on the wall of the dispatcher's office and nine snap switches close at hand. By a turn of the wrist he lights simultaneously one of the lights on his office wall and a light located on a pole out on the system.

On the same pole as the red light there is also a telephone communicating with the dispatcher's office. As soon as any inspector sees the red light he immediately calls up the dispatcher. The particular advantage of this scheme lies in the fact that the red light can be seen for a much greater distance than the ringing of a telephone bell could be heard. As soon as an answer has been received from the point with which the dispatcher wishes to communicate he turns off the light again. In case no inspector answers the telephone and the red light continues to burn the car crews are instructed to telephone in before passing the point. This system enables the Holyoke Street Railway to reroute its cars in an emergency and delays have been avoided.

Rail Welding in Connecticut

An Especially Interesting Feature of the Connecticut Company's Track Is the Tilted Joint Plate and Base Plate, Adapted to Twenty-three Different Rail Sections— Precautions Adopted to Secure Good Welds

ALTHOUGH rail welding with the electric arc has been practiced on a commercial scale for more than a decade, it is only within the last few years that the subject has received the intensive study which it deserves. As it was a comparatively new field of endeavor, a great deal of individual experience had to be gained before those interested in rail welding could meet and discuss intelligently its problems. But out of the methods adopted and the results secured during the first years and through the war period, the principles of rail welding may now be regarded as more or less established.

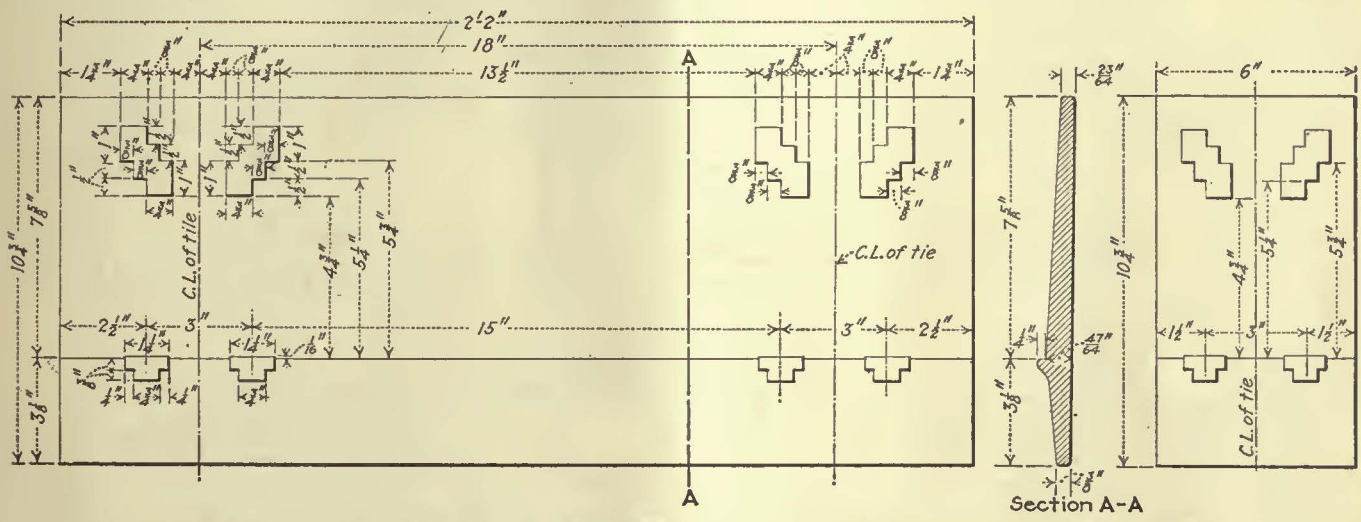
The experience of the Connecticut Company in electric arc welding has undoubtedly been that of hundreds of others. Commencing in 1914 with the resistance type of arc welder using metal electrodes, the work was confined to the surface welding of cupped rail joints. During the war the delivery of rail was curtailed. This condition required the purchase of additional welders to maintain track, and for the most part these welders were of the motor-generator type and capable of using both metal and carbon electrodes.

The first carbon welding by the Connecticut Company was done on joint splices in old rail, which had to be left in place when the street was paved. Obviously the combination of old rail, high carbon rolled plates, new welding machines and methods with which the operators were unaccustomed could hardly be expected to give a very high-class product. Nevertheless, much creditable work was done at this time, and the object of "tiding over" the war period was attained. With the resumption of easy deliveries of rail after the war, the use of the arc weld for rail joints received added impetus.

For many years the Connecticut Company has standardized for new work on three rail sections for its 805 miles of track owned and operated, and its 33 miles of track in and around carhouses. These standards are: The A.E.R.A. standard 5-in. 80-lb. A.S.C.E. tee, the 6-in. 100-lb. A.R.A. type "A" tee, and the A.E.R.A. 9-in. 134-lb. grooved girder. In the old track of the company, however, there are still to be found many varieties of rail sections, amounting to 150 in number. An account will be given of some of the improvements in the carbon arc welded rail joints adopted by the Connecticut Company, which it is thought will prove of interest.

Joint Plates and Base Plates

For the old rolled joint plates, there have been substituted machined plates with a lower carbon content. This change has resulted not only in a vastly improved fit between the plate and rail, but in greatly improving the conditions for joint welding. This change was a big step in the improvement of the joint and weld.



Standard Base Plate, on Left, and Tie Plate, on Right, Used Under Tee Rail by the Connecticut Company. These Plates Fit a Large Number of Rail Sections

The adoption at each joint in tee rail construction, of which the company has a large amount in paved street, of the base plate illustrated in the first drawing has also proved a definite step in increasing the strength of joint. The base of the rail in paved construction is seam-welded to this base plate. The tilted feature, which cants the rail inward to an inclination of 1 in 20, to increase the area of wheel contact on the rail and transmit the load symmetrically and directly over the center line of the web has been followed on the Connecticut company's lines for some years. Between joints the inclination of the rail is carried through by the use of intermediate tie plates of the same cross-section as the joint base plate, as shown in the drawing on this page. A feature of each of these plates is the staggered notching of the spike holes. This permits these plates to be used with twenty-three different rail sections, and the arrangement of the holes obviate the necessity for rights and lefts being kept in stock.

In the case of the 9-in. grooved rail, laid on steel ties, the steel tie becomes the base plate, and the rail is welded to it in the same way as to the base plate,

just described. As the steel tie is also welded to the opposite rail, the track is cross-bonded, rail to rail, at every joint, thus greatly improving the track return.

BOLTS IN GIRDER JOINT REDUCED TO TWO

In the 9-in. girder section illustrated, the number of holes required by the old bolted channel bars was twelve, in addition to four holes necessary for two concealed bonds. This made sixteen holes in all in each joint. In the new joint one hole in each rail has been found sufficient, provided two high-tension bolts are used and if the plate is of sufficient stiffness to overcome any chance of bending.

The welded seam furnishes the bond. In this big reduction in the number of holes, it is felt that another great improvement in the strength of the rail end has been made. The increased thickness of the plate provides a welding shelf for the top seam and also admits of a shorter plate without any reduction in the area in contact between plate and rail.

In the 5-in. and 6-in. tee rails, of which the greater mileage will be constructed, the company's standard joint drilling has been retained to permit the use of this type of joint in existing track if necessary. The size and shape of the holes in the plates, however, have been changed. The old slotted hole inherited from steam road practice, while necessary in open track to provide for considerable expansion and contraction, has been discarded in favor of the round hole where the track is to be embedded in pavement and so not subjected to a great range of temperature fluctuation.

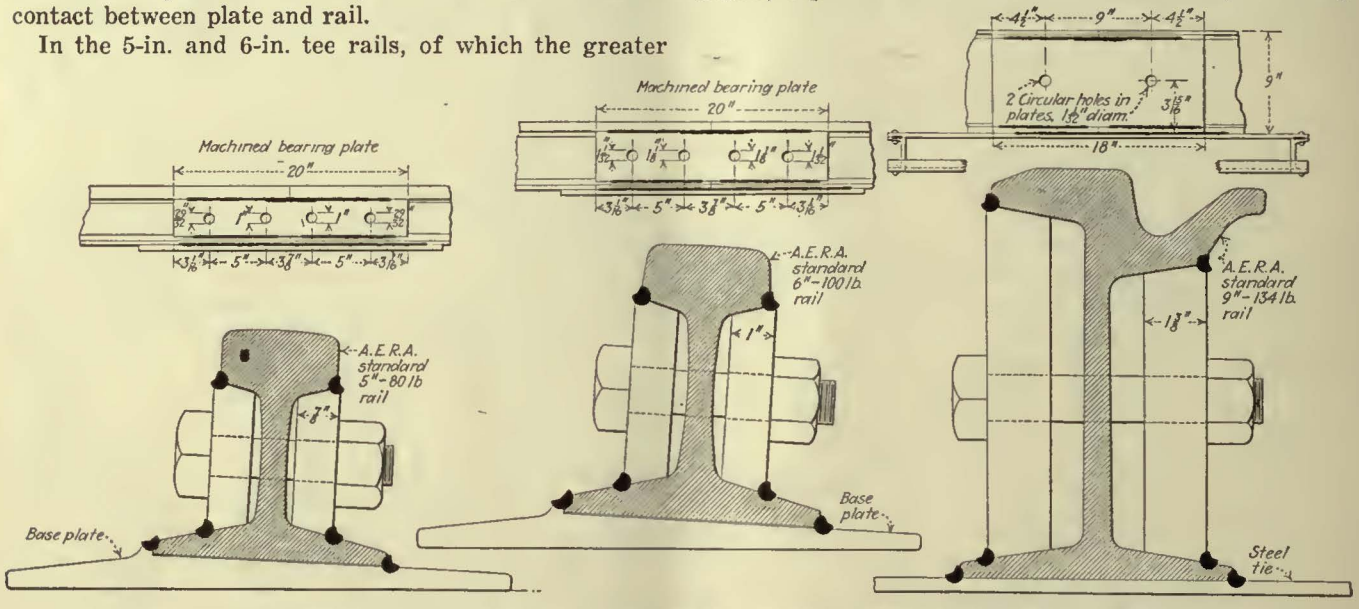
The object sought in the welded joint is to arrest entirely any longitudinal motion in the individual rails. When these joints are bolted up, the two outer bolts are first installed, requiring the rail ends to be tightly butted together. Machine bolts $\frac{3}{32}$ in. smaller than the hole are used. This size has been found to give a good tight fit in actual practice. In fact, in some cases, it has been necessary to ream the hole to get the bolt in. The two inner holes are made $\frac{1}{8}$ in. greater in diameter than the bolt to admit of easy entrance and to speed up the work.

METHOD FOLLOWED IN WELDING

Before a start is made to weld the seams, it has been found desirable to look first over the alignment of the joint in the track. This is particularly important on curves, since the order in which the seams are made can improve or upset the alignment. The first seam made has a tendency to push the rail away from the operator and change the alignment.

Of equal importance is the grade or vertical elevation of the joint, which should be checked up with a 3-ft. straight-edge before being welded. In the manufacture of rail there is a tendency for the rail end to drop, so that if this is found to be the case, the welding of the base seam first will have a beneficial effect in tending to raise the end of the rail slightly.

The location of the first seam to be welded is then preheated by passing a long carbon arc for a few seconds over it. The seams are then made with the carbon arc, using the "hand-fed" steel method, which has now supplanted the "laid in" method. The depth of the seam is such that it is at its deepest at the middle of the seam, tapering off at the ends to avoid undesirable craters. Close attention is also given to staggering all seams, top with bottom and side with side, including those on the base plates. This tapering and staggering and the other methods mentioned later are important factors in eliminating entirely broken rails due to crater notches. It is the practice on the Connecticut Company also to weld a second time for a few inches in the middle of the top seams, and correspondingly to break off for a few inches in the middle of the bottom plate seam. The completion of each seam weld is followed by post-heating with the long carbon arc, in the same manner as in preheating.



The Three Standard Rails of the Connecticut Company, Showing Location of Joint Welding Seams

HOW CONTRACTION STRAINS ARE AVOIDED

For some time it has been recognized that the welding of rail joints sets up a considerable contraction strain in the track as a whole, due to the work being done in warm weather. When the rail is at its maximum expansion, if the contraction strains are not guarded against and there is a drop in temperature on construction work which includes special trackwork within its limits, damage to the special trackwork is apt to occur if the welded joints and rail prove to be the stronger. To guard against this contingency, it is the practice of the Connecticut Company to leave the joint unwelded and the bolts tight in one end of the plate only where the welded track meets special work, even though it is to be paved up. Then this open joint is filled in

and welded in midwinter when the welded track is at maximum contraction.

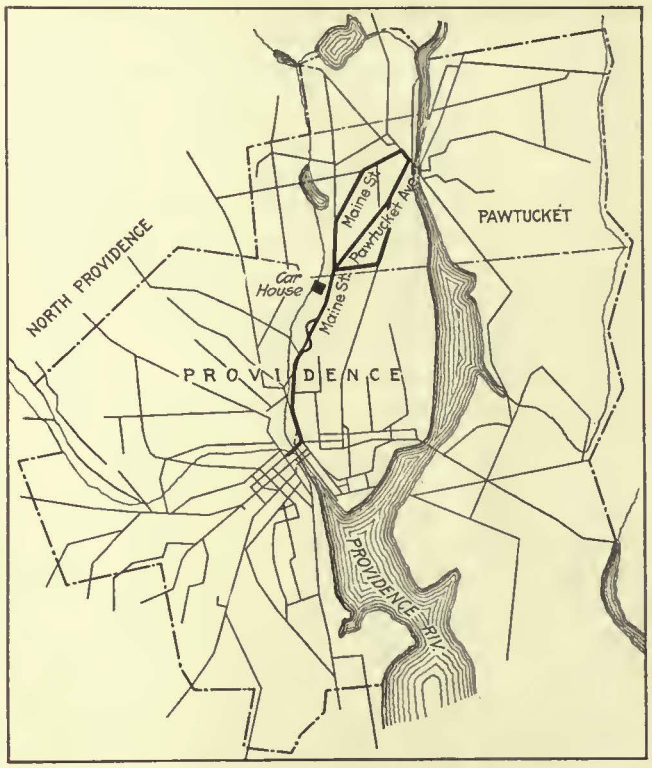
It would be possible to elaborate on many of the details that enter into the materials and labor involved in making these joints, such as the plates, bolts, welding steel and their chemical properties, carbon electrodes, fluxes, etc., as well as on the cleaning and setting up of the joints, the amount of current, speed of welding, etc. All of these are important factors in securing good results, but as the practice of the company in these details probably does not differ greatly from that of other companies, the mere mention of them must suffice at this time.

It is believed that these joints, which are economical in first cost, will prove in service that to all intents and purposes the process has produced a continuous rail in which joints are conspicuous only by their absence.

It is but fair to say that much of the credit for research work along this line can be attributed to the manufacturer. The instances of the co-operation between the engineer and the manufacturer, which have obtained during recent years in connection with welded rail joints, must be most gratifying to all concerned.

This work is under the immediate supervision of the three division engineers of the Connecticut Company maintenance of way department, M. M. Johnston, A. L. Donnelly and H. J. Tippet, who have developed several of the features in connection therewith.

This department reports directly to the vice-president and general manager, J. K. Punderford.



Special Turnouts Enable Express Cars to Pass Locals Between Providence and Pawtucket

Third Track Turnouts Save Nine Minutes Running Time

The United Electric Railways, Providence, R. I., Operates Express Service to Pawtucket on a Five-Minute Headway Over the Same Route as Local Service

ONE of the most heavily traveled routes of the United Electric Railways is from Providence to Pawtucket, a city of about 50,000 people lying immediately adjacent to the larger community. Inasmuch as a large part of the travel is through-riding from one city direct to the other, it was thought desirable to install express service. This was done in the latter part of last year by building passing tracks alongside the existing double tracks.

The route from Providence to Pawtucket follows North Main Street for about two-thirds of the distance. Just inside the city limits of Pawtucket, however, the service divides three ways. Some cars operate via Pawtucket Avenue directly to the heart of that city. Others branch off to the west and go in via Main Street, while still others follow a route to the east of Pawtucket Avenue. The greater part of the service follows Main Street and it was therefore quite feasible to operate the express service via Pawtucket Avenue provided some

Exchange Place Loop, Where Pawtucket Express and Local Cars Start

way could be found to enable the express cars to reach the junction immediately ahead of a local Pawtucket Avenue car rather than close behind one.

To do this it was decided to build a pair of passing sidings on North Main Street, about one-third of the way to Pawtucket. The passing tracks are staggered, that for inbound cars being just beyond that for outbound cars. On account of the moderate width of the street it was thought undesirable to have the four parallel tracks all together. The carhouse, which is just south of the junction and the Pawtucket city line, provides another place where the express cars can pass the locals. The relative position of these points is shown on the accompanying map.

Express service is operated on a ten-minute headway during the day and on a five-minute headway during the rush hours. Local service is on a five-minute headway throughout the day and the rush hours. In order to take care of the peak extra cars are double-headed with the ordinary local cars. In the afternoon rush hours express cars and locals start simultaneously from Providence with the express car leading. This car should then catch the local car which started five minutes ahead, either at the passing siding or at the carhouse. Shortly after passing these points the express car reaches Pawtucket Avenue and has practically a clear right-of-way from there into the center of Pawtucket.

The location of these three possible passing points, the recently built sidings, the carhouse and the junction, lying as they do comparatively close together, makes it unnecessary to designate any hard and fast passing point where the express car gets ahead of the local. The procedure is simply for the express to run as rapidly as possible without stops and to pass the local at the first available point. By this means the running time has been reduced from twenty-seven minutes, the present schedule for local cars, to eighteen minutes for the express. Riding between Providence and Pawtucket has increased considerably since the inauguration of express service. Apparently this has been accomplished with no loss whatever to the local traffic. The gain being derived entirely from new riders.

Trackless Trolley Experience on Staten Island

THE trackless trolleys have given satisfactory service on Staten Island, according to Grover A. Whalen, Commissioner of Plant and Structures, New York City, writing in the *American City Magazine*. The original lines installed by the city of New York from Meiers Corner to Linoleumville and Meiers Corner to Seaview Hospital, opened to the public in October, 1921, were equipped with the Atlas trackless trolley, arranged to seat thirty-two passengers and to carry a maximum of seventy. The motors are series wound and of 25 hp. each, connected together mechanically by means of a propeller shaft which extends to a worm gear to drive the rear wheels. The wheels of the car are 36 in. diameter of the cushioned rim, cushion tire type. This installation was described in ELECTRIC RAILWAY JOURNAL, Oct. 15, 1921, page 67.

These initial lines, according to Mr. Whalen, passed through the severe winter of 1921-22 without an interruption of traffic, even though the other means of transportation on the island were frequently interrupted on account of snow or sleet. In fact, service was so satisfactory that when the residents of Tottenville, at the southwesterly tip of Staten Island, expressed a desire for a cheap method of travel to the ferry at St. George, by means of which connection is made with Manhattan, it was decided to extend the St. George-Richmond division of the Midland line (city operated) to Tottenville by means of a trackless trolley. The distance from Richmond to Tottenville is approximately 10 miles.

The new line, opened Nov. 4, 1922, was described in ELECTRIC RAILWAY JOURNAL, Nov. 11, 1922, page 293. The overhead construction is the same type as that employed in the earlier trackless trolley systems on the island.

The first trackless trolley purchased by the city had unnecessarily high road clearances and too narrow wheel treads, says Mr. Whalen, and were somewhat uncomfortable on account of a side-swinging motion. The engineers of the Department of Plant and Structures studied the problem and evolved a trackless trolley bus which has a much smaller road clearance, so that only one step is needed for car entrance. It has a much wider wheel tread, eliminating side motion, and a long wheel-base, giving greater comfort in riding and an improved appearance. The vehicle power plant and general means for operation were not altered, as these proved very satisfactory in the original cars. The new type vehicles were built by the Brockway Motor Corporation and have given satisfaction.

Regarding cost of operation, Mr. Whalen states that it costs 25.6 cents per mile to operate the trackless trolley over the roads in Staten Island, and it costs about 33 cents per bus-mile to operate a gasoline bus of the same capacity over the same roads. These costs include every item, such as interest on first cost of the entire investment, depreciation and maintenance, power for operation, labor for operation, administration, etc.

An advantage of the trackless trolley, he says, is the psychological effect. The general public has learned that while a bus line may be operating to feed some real estate development, there is no assurance that it will continue after the property of the development scheme has been sold; in fact, the public has learned the contrary. The trackless trolley, employing a relatively expensive overhead construction, conveys the assurance that this transportation is of a permanent nature. The advantage over the ordinary trolley system is that the trackless trolley requires no expensive track construction, which at the present time for the ordinary trolley, Mr. Whalen states, may vary from $40,000 to $200,000 per mile, depending upon the territory through which the system is to operate and the type of track construction required. The absence of this track construction naturally reduces the first cost of installation very markedly, and therefore the fixed charges.

Special Sign Painted on Dash

ON THE passenger cars of the Harrisburg Railways the word "special" is painted directly on the dashboard under the right-hand platform window. Ordinarily a route sign hangs over this word, concealing it from public view. In an emergency when it is desired to operate some car "special" it is necessary only to remove the route sign and the proper designation then appears. It is said that this plan has proved very useful in emergencies by insuring the presence of a special sign on every car.

Association News & Discussions

Optimism Features Illinois Utility Meeting

Improvement in Spirit Attributed to Co-operative Effort—New Speaker's Bureau to Tell Utility Story in Local Talks Throughout the State—Railway Men Discuss Publicity, New Cars, Bus Operation and Track Construction

IN CONTRAST with similar meetings of only a very few years ago, the joint meeting of the Illinois gas, electric and electric railway associations, held at the Hotel Sherman in Chicago on March 26 and 27, was marked by a very obvious spirit of optimism. A record attendance at all of the meetings, a full program of timely and constructive papers, accompanied by animated discussions and favorable reports of relations with the public in various locations, were some of the outward evidences of the present spirit.

B. J. Mullaney, chairman at the dinner on Wednesday evening, called attention to the change which has occurred in the utility viewpoint during the past five years. "The atmosphere of this meeting;" he said, "is marked by a total absence of that tendency to cry about our troubles which tinged some of our comparatively recent past meetings." Contrasting the present conditions with those of only five years ago, he attributed the improvement to the birth of a new spirit of co-operation among the utilities themselves and to a determination on their part to face their difficulties with a united, constructive effort. Success in telling the utility story to the public, he named as one of the primary reasons for the improved conditions.

Reports from the chairmen of each of the ten pulbic service speaker's bureau districts into which the state has been divided indicated considerable progress in the work of organizing the utility men in each district and in the compilation of lists of schools, civic, business and social organizations to be addressed by speakers working under the direction of the bureau. As outlined by the various district chairmen, this new activity has been given a favorable reception in those instances where talks have been given. It was reported that the people of the state seem to be genuinely interested in the information which the utilities have to impart.

Selection and development of employees to make simple talks outlining facts about utility business was considered an important part of the local committee activity. Posting all employees on such facts relative to their business as would enable them to answer questions in their daily contact with friends and customers was also held to be an important phase of the work.

Mr. Mullaney pointed out the importance of co-ordinating this new local activity with the work of the Illinois Committee on Public Utility Information, and explained that the publicity work of that committee as carried on through the newspapers and schools is of very material importance in arousing public interest in utility affairs and in making local audiences receptive and ready to hear the story told by the speaker's bureau representatives.

Railway Meetings in Afternoon

Both morning sessions were joint sessions, devoted to the general interests of the three associations. In the afternoons each association met separately for the presentation and discussion of technical papers.

The Wednesday afternoon session of the Railway Association was taken up by the presentation and discussion of papers on "Educating the Public," by Luke Grant, and on "Education of the Employees of the North Shore Line," by C. G. Goodsell. These two papers are abstracted elsewhere in this issue, along with a written discussion by W. H. Sawyer, which in the absence of Mr. Sawyer was read by Mr. Mitchell, East St. Louis, Ill.

J. R. Blackhall, general manager Chicago & Joliet Electric Railway, commended the publicity and educational work of the North Shore Line and stated that the industry owed a debt of gratitude to the management for the outstanding example which this property has furnished of the results which can be accomplished through properly planned and directed work of this kind. Mr. Blackhall was in entire accord with the idea of giving service first and then following with proper publicity. The resources of the small property do not allow the degree of specialization which can be carried out in the organization of the larger properties, and for that reason, according to Mr. Blackhall, the duties incident to publicity and educational work must be shouldered by the officers on the small property.

From the standpoint of the results which can be accomplished, he said that this difficulty is more than offset by the close contact between the management and its men on the one hand and between the management and the community served on the other. He maintained that the most important requirement for success is a proper appreciation by the small property manager of the results which can be accomplished by proper cultivation of the right kind of contact with both the community and the men of the property.

Prompt attention to complaints, which generally require only small expenditures for removal of the cause, were cited as a method of obtaining big returns in the form of a friendly public attitude. Settlement of damage claims whenever this is possible, in place of litigation, was mentioned as another effective method of inspiring good will.

Mr. Blackhall indorsed the speaker's bureau work and stated that in his opinion the majority of the public is essentially fair, and if the local utility has done its part in rendering the best service possible under given conditions the public is willing to listen to the utility side of the story. He said that the proper kind of publicity, particularly that prepared by the committee on public utility information, has helped a great deal in obtaining increased rates and in pointing out to the public the effects of automobile competition on railway service. He showed how proper activity by utility managers has put this industry among the leading industries of the community, fast resulting in utility men being given a leading place and taking a leading part in the activities of community civic organizations—Kiwanis, Rotary and similar clubs.

Executives Have Required Educating

F. E. Fisher indorsed Mr. Sawyer's views that it has frequently been the railway executives who required the educating as much if not more so than the public.

D. E. Parsons stated that personal contact with complainants was a successful method of making friends. He said that by getting in touch with the author of a complaint, either in the company's office or through a personal call, a friendly spirit of co-operation can be engendered which in most cases makes a booster for the company.

W. S. Vivian discussed the employee educational work which is being carried on by the Midwest Utilities Company, and also cited examples of previous work which he had done in training inexperienced employees to speak before large audiences. Not only does this kind of work accomplish very satisfactory results from the standpoint of "getting the story over," according to Mr. Vivian, but it soon receives the very enthusiastic support of the employees themselves, who become keenly interested.

To illustrate the extent to which public utility managements have become educated on the need for proper contact with their public, Mr. Grant cited examples from his experience in newspaper work. He said that in some cases he had had difficulty in getting an audience with a utility executive to obtain a confirmation on a commendatory story which had come to a newspaper's attention.

Mr. Bosenbury advocated the Golden Rule as a safe policy in dealing with the public, and T. C. Roderick cited the value of frank statements through paid newspaper space in obtaining sanction of one-man operation in the tri-cities.

At the request of J. P. Barnes, chairman of the committee on co-operation with state and sectional associations, G. W. Welsh discussed briefly the activities of the new committees on city and interurban operation.

Motor Bus Operation

A paper by G. T. Seely on motor bus operation, which is abstracted elsewhere, opened the Thursday afternoon session. In the general discussion which ensued motor buses were held to have a place in the field of passenger transportation and to be particularly valuable for handling feeder service and for furnishing extensions to existing lines without the heavy investment required for additional railway construction.

Mr. Parsons advised close watch by railway men of the trucking activities which have followed the completion of hard roads, and stated that co-operation with the truck men would frequently result in inducing them to act as feeders to the railway lines. Mr. Roderick stated that two buses which are now in operation as feeders on the Tri-City property obviated the construction of an extension. These buses, he said, are being charged off on a depreciation basis of 250,000 miles, which at 50,000 miles per year will give an estimated life of five years. Charging the buses with a proportion of the railway overhead, on the basis of mileage, he estimates a total cost per mile of 18 cents.

In reply to a question, Mr. Seely stated that he favored buses of large seating capacity for city service, pointing out that the operating costs are not much greater than for smaller capacity vehicles, and the larger peak load capacity is very desirable.

Light-Weight Car Construction

H. H. Adams presented a paper on light-weight car construction, which is abstracted elsewhere. This was illustrated by lantern slides. Mr. Adams amplified his paper by a brief discussion on the automatic doors planned for use on the new Chicago cars. In relieving both the motorman and conductor of the duty of watching out for alighting passengers, these doors, he said, would give the trainmen more time for attention to their other duties and would thus lead to greater accuracy in the collection of fares and increased safety of operation. In addition, he said, the public would be given a favorable impression of improvement and progress by the use of these doors on the new cars.

J. M. Bosenbury pointed out that the problem of a great many interurban properties was to obtain light-weight equipment which would allow a more frequent service and increased speed. For smaller communities he held that the small single-truck type of one-man city car gave satisfactory results.

S. Clay Baker, engineer maintenance of way East St. Louis & Suburban Railway, East St. Louis, Ill., read a paper outlining some problems involved in the construction and maintenance of electric railway track. He said that to his mind "there are many problems confronting the way engineer of the future. With the scarcity and rapidly advancing prices of wooden ties, it seems to point to the use of a substitute which will require the use of concrete to obtain the necessary bearing value. Many properties are realizing the importance of this and are experimenting with the designs now available. Another argument in favor of the solid concrete type is the fact that the surface pavement has a very definite foundation that will withstand the excessive wheel loads of vehicular traffic. To develop the track of the future the principle of the resilient track structure cannot be lost sight of for past experience has led us to believe that this is the important factor in street railway track design.

"Another problem, and one which you now hear discussed by many engineers, is the subject of noise and vibration due to passing cars on a railway track. This is a growing demand of the future, and while it may be alleviated by the type of track structure in use, it may also be influenced by the design of the paving. The various block pavements previously laid with cement grout filler are now being installed with a bitulithic filler with noticeable results. This is especially true on ballasted type of construction where wood ties are used. The reduction of noise and vibration, to my mind, is a refinement of the future and will be taken into consideration in the track designs.

"I also believe it is well to call attention to the progress that has been made during the last few years in the standardization of track materials and the setting forth of recommended practice, thereby eliminating many problems confronting an engineer in determining the most suitable material or design to meet a given condition. This has been especially noticeable in bringing about co-operation with the manufacturers of track and equipment materials. Standard special work layouts may be purchased to meet all traffic conditions. Standard switch pieces, mates, frogs, etc., may be purchased for less than formerly due to the fact that the handling of shop details have been cut to a minimum. In the recommended standard rails there is a section designed to meet any traffic condition and the engineer adopting any one of them will find the particular design entirely suitable to meet his requirements. You can easily see that the way engineers of the future will find it an excellent policy to proceed along lines of recommended practices and thus be able to solve his own problems by the advice and experience of others in the industry perhaps more experienced than himself."

J. B. Tinnon, Joliet, Ill., said that it is frequently a serious problem to find the money with which to take care of needed reconstruction and maintenance of track, but it is most important that a way be found to keep the track in the best possible condition. In each case, he said, the construction adopted is a compromise between the requirements of vehicular and car traffic, and the car design plays a very large part in the results obtained from any type of track. He held that improvements in car design which will remove a part of the present large unsprung loads will do a great deal toward allowing the use of a type of track construction which will give good riding, reduction of vibration and long life.

Mr. Tinnon emphasized the advantages of utilizing standard materials and parts. He also stated that the practice of contracting construction work under proper inspection and supervision would merit serious consideration on many smaller properties where expensive hand labor was being used for such construction due to lack of proper machine equipment.

New Officers Elected

The report of the nominating committee was read by D. E. Parsons and resulted in the election of the following officers and executive committee for the ensuing year:

President, R. A. Moore, general manager Aurora, Plainfield & Joliet Railroad; first vice-president, J. F. Egolf, Aurora; second vice-president, C. F. Handshy, Springfield. Directors: W. C. Sparks, Rockford; F. J. McClure, Aurora; D. E. Parsons, East St. Louis; W. A. Baehr, Chicago; A. D. Mackie, Springfield; B. I. Budd, Chicago; J. R. Blackhall, Joliet; W. L. Arnold, Chicago.

At the dinner on Wednesday evening Floyd W. Parsons named customer ownership and consistent advertising as the two most important factors essential to the continued success of the public utilities. He pointed out the close dependence of the prosperity of industry in general on the utilities and painted a mental picture of the outstanding industrial progress which may be expected in the future.

Slotted Head Screws Standardized

A PAMPHLET giving tentative standard sizes of slotted heads for machine and wood screws has just been published by sub-committee No. 3 of the sectional committee on the standardization of bolt, nut and rivet proportions organized under the procedure of the American Engineering Standards Committee. The committee is anxious to have criticisms of these proposed standards before final drafts are submitted for approval. Copies may be obtained gratis by addressing C. B. Le Page, assistant secretary of standards, American Society of Mechanical Engineers, 20 West Thirty-ninth Street, New York, N. Y.

Philadelphia Section, A.I.E.E., to Discuss Electrification

RAILROAD electrification will be the subject of the April 14 meeting of the Philadelphia Section, A.I.E.E. The speaker scheduled is H. Van Buren Duer, electrical engineer of the Pennsylvania System. The Philadelphia Section, in anticipation of the large attendance, has engaged the ballroom of the Bellevue-Stratford Hotel for the meeting.

Light-Weight Double-Truck Car Design*

By H. H. ADAMS
Superintendent Shops and Equipment Chicago Surface Lines

IN TREATING the subject of light-weight double-truck cars the writer is taking advantage of some recent work along this line upon the Chicago Surface Lines and will confine himself largely to a discussion of the problems considered in developing the design of this group of cars that are about to be built. He desires it understood, however, that in the treatment of the light-weight car he is dealing with conservative design, in which strength has not been sacrificed at any point for the question of weight, and in some cases, where the comfort of passengers is involved, additional weight has been put into the car. Furthermore, in the design an effort has been made to produce a pleasing car, having good lines, which presents an attractive appearance inside and out, as it is believed that such a car is a real asset. This last result in the Chicago Surface Lines car has been accomplished without adding to the weight.

The proposed cars are to be of the double-truck, two-motor, plain arch-roof type, without bulkheads, and provided with pneumatically operated doors on each side of each platform, and so arranged that they may be operated as single units or in trains of two or possibly more cars. On one side of each platform an automatic exit door is provided.

The dimensions of these proposed new cars follow:

Length over bumpers	48 ft. 11 in.
Length over corner posts	32 ft. 9 in.
Length of platform	8 ft. 1 in.
Width over drip rails	8 ft. 6 in.
Width over side girders	8 ft. 4 11-32 in.
Height from rail to top of trolley boards	11 ft. 6 in.
Truck centers	22 ft.
Seating capacity (car body)	48
Seating capacity (platform)	6
Total seating capacity (single unit)	54
Estimated weight, completely equipped	38,000 lb.

In operating these cars in trains of two it is believed that a great advantage will be obtained by the proposed arrangement for loading passengers at the center of the train, so that the boarding passengers may enter at one general location, rather than to split up the loading points, as would be necessary in other types of cars. This decision as to the method of loading was arrived at after studying various loading problems in connection with surface car train operation, and it has been demonstrated that a more equal distribution of the passenger load is obtained by this method.

In considering the weight of a car in relation to the entrance and exit facilities, it is not believed that too much consideration should be given to the use of but one step between the car floor and the street level, as it has been found that where steps are reasonably low and comfortable and a landing platform (or what is termed in some cases reservoir capacity) of sufficient size is provided, the movement of passengers is accelerated, even though another step is imposed in the form of a riser, from the platform to the car body, or from a well in the center of the car to the car body.

Wheel diameters affect this question, and in some cases where 26-in. wheels are used it is possible to get a low step, and at the same time, by means of ramps, so to design the entrance and exit passageways that one step only is required between the street level and the main floor of the car. In the writer's opinion, however, this practice does not tend to produce as good design as that of the drop platform or the well depression in the center of the car.

The side girder construction of this car consists of plates of No. 12 sheet steel, 30 in. wide, reinforced at the top and bottom, to which are riveted U-shape steel posts. These posts are riveted at the top to a sheet steel letterboard. The whole side of the car from the bottom angle to the top plate forms the girder for the car body.

The side posts are made of No. 16 gage steel, formed into a U-shape, with the closed end riveted to the side girder sheet. The wood filler is inserted in the open end of this U and is 1¾ in. deep. The parting strips and pilasters are screwed to this wooden strip. This type of post was used in a lot of 45 double-truck, one-man cars that were built and placed in service about a year ago, and satisfactory results have been obtained from them up to the present time. (See ELECTRIC RAILWAY JOURNAL, issue of Jan. 14, 1922. A number of them have been damaged by collisions, but it has been found that repairs can be readily made, with little or no more expense than in the case of wooden posts. This U-shape post is lighter and stronger than any other type of metal post we have been able to design. It is 27 per cent lighter than the 1½-in. x 1½-in. T-post which is being used somewhat generally in car construction at the present time. Tests have shown that the U-shape post, in comparison with the T-post, has 12 per cent less deflection, figured in 1,000 in.-lb., of bending moment when applied in the transverse direction of the car body. When the bending moment is applied in the longitudinal direction of the car body the U-shape post has a deflection which is 76 per cent less than that of the T-shaped post. The figures for both weight and deflection are for complete posts, with wood fillers or covering.

The wood filler for the U-shaped post has been so designed as to be readily removed to permit painting of the posts on the inside.

Plywood, ¼ in., is to be used for the roof. This is screwed to the wooden carlines and made in three sections, with butt joints. This plywood roof, shaped to form, we find to be very stiff and lighter than the ⅝-in. roof made with poplar boards, and while the cost is approximately 90 per cent in excess of the cost of the ⅝-in. poplar finished roof board (material only), the labor of installing the plywood roof is less than that of installing the poplar. The total cost of the plywood roof installed exceeds that of the poplar roof by about $30 per car, but as there is a saving of approximately 200 lb. per roof, we believe that we are warranted in making the increased expenditure, hoping that with a more general use of plywood for this purpose the cost will be reduced.

By the use of plywood, which gives a stiffer roof construction, we are enabled to use a lighter steel carline, the dimensions of which are 1½ in. x ¼ in. This compares with a steel carline 1½ in. x ⅝ in. used with the poplar roof construction. This reduction in weight of the steel carline is included in the 200 lb. saving in roof construction weight.

Experience has shown that the roof covering of a car is something that needs special attention, and that the ordinary procedure of covering a roof with cotton duck laid in white lead and painted with roof paint does not necessarily make a tight roof covering. It has been found necessary to use either prepared roofing materials or to treat the canvas with a waterproof treatment, which permits the canvas to remain in a flexible, soft condition throughout its life. The use of white lead and the usual roof paints, when applied upon the untreated cotton duck, generally results in the cracking of the paint. This permits rainwater to work through the cracks and the seeping action seems to extend clear through the canvas. By the proper treatment of the duck, or the use of treated canvas, this difficulty is avoided.

Cast steel bolsters of I-beam section 10 in. deep in the center are used. The average weight of these bolsters is 520 lb. These bolsters are tested with a center load of 22 tons, with bolster supported at side sill supports.

The length of the platform used upon the Chicago cars is much longer than that of the average city car, extending 8 ft. 1 in. from the end sill to the outside bumper. The outside platform knees are formed of 8-in., 13.75-lb. channels, reinforced top and bottom with 2-in. x 2-in. x 5/16-in. angles. In addition, the web is reinforced at the point of support with a 7-in. x ½-in. x 32 5/16-in. plate.

It is desirable to keep the fiber stresses in the platform knees low, and it is the practice in Chicago to keep the stresses below 10,500 lb. per square inch. The point of maximum stress occurs at the end sill. The platform framing is designed for the use of radial couplers and ample cross bracing is provided.

Chicago's climatic conditions necessitate the use of a double floor for warmth, and in order to obtain this with as light a construction as possible the practice has been as follows. The lower floor is ⅞-in. thick fir, then a layer of 1/16-in. thick building felt, on top of which is laid a ⅞-in. maple floor. In the aisles the ⅞-in. maple floor is grooved to form the aisle mats. This makes a total thickness of floor of 1⅞ in., and while the weight is in excess of a single 1⅛-in. floor, it is necessary, as previously stated, for the local conditions, and illustrates a condition where weight is added to the car to provide for the comfort of passengers.

This design of car calls for two trap-door openings over each motor, with a space of about 8 in. of flooring between

*Abstract of paper presented before Illinois Electric Railways Association, at Chicago, March 26-27, 1924.

the trapdoors, which is built in solid between two tees. This 8-in. strip is built in so as to form a solid fastening for the motor cables and motor junction boxes, which are installed at this location.

The posts are spaced 29½ in. center to center, and the lower and upper sash are designed so as to permit the use of standard size glass, thus eliminating the necessity of glass cutting. The lower sash takes a glass 24 in. x 26 in. and the upper sash 14 in. x 26 in. In this connection, the writer desires to point out that these dimensions correspond with the recommendations of the committee on unification of car design, as presented to the American Electric Railway Engineering Association, in convention, October, 1922, which recommendations, it is understood, are to be reaffirmed this year, and he desires to show that this represents good practice in car construction, the Chicago Surface Lines having used them upon the last four groups of cars designed totaling 445 cars.

Each platform is provided with three sets of doors on each side, pneumatically operated and controlled in the following manner:

All doors swing outward. On the left hand side of the platform No. 1 end the three sets of doors are to be operated in unison from one door engine and are to be controlled from the conductor's door control valve, located in a conductor's door control stand. The corresponding doors on the right hand side of the No. 2 end of the car are to be operated in the same manner. On the right hand side No. 1 end the two sets of doors nearest the vestibule corner post are to be operated in unison from one door engine controlled by either the motorman's brake valve or the conductor's door control valve. The one set of doors nearest the body corner post are to be automatically operated by another door engine, by means of a treadle, and are put in operating position either by the motorman's brake valve or the conductor's door control valve. The corresponding doors on the left hand side of the No. 2 end are to be similarly operated. The piping is to be so arranged that three sets of doors on the right hand side No. 2 end may be controlled from the conductor's position at No. 1 end, and the corresponding doors on No. 1 end are to be controlled from the conductor's position at No. 2 end. This permits the remote control of these doors at terminals, or for use in the future at subway stations. In addition, the last-mentioned sets of doors on each platform are to be arranged with a street collector's valve, for operation from a position in the street, at congested points on lines or at terminals. The decision to install automatic doors on these cars was arrived at after careful study and a thorough trial on a group of 45 cars, which have been in successful service for a year or more. It was decided that automatic doors would facilitate the exit of passengers, both when the cars operate as single units or in trains of two or more cars.

The type of electrical equipment to be used; that is, whether four-motor or two-motor, affects the problem of weight, even though the total horsepower of the motors is practically the same. In other words, a car that is designed to operate at good motor efficiency equipped with two 60-hp. motors will weigh about 1,000 lb. less than if four 35-hp. motors are used. (This would be the size of the motors that would have to be selected as being the nearest in equivalent horsepower to the two 60 hp. motors). The four 35-hp. motors would, of course, give a surplus of 20 hp., or an increase of 16⅔ per cent. In addition to the saving in weight there will be a substantial saving in the initial cost of the electrical equipment by using two 60-hp. motors.

In analyzing some of the weights per horsepower, based upon the manufacturer's rating of the motors, and the light weight of cars, it is found that with four-motor equipments that were placed in service about 1907-08 the weight ran about 265 lb. per hp. This was with motors of the non-ventilated type that had armature speeds of approximately 635 r.p.m. at 600 volts. An analysis of recent four-motor equipments installed in Brooklyn, St. Louis and Boston shows 285 lb. per hp., or an increase of 7.55 per cent. These last cars are equipped with motors having, in the case of Brooklyn and St. Louis, armature speeds of approximately 1,125 r.p.m., and in Boston 1,236 r.p.m. at 600 volts.

In the two-motor equipments, it is found that some of the light-weight equipments designed and put in service in 1912-13 averaged around 300 lb. per hp., and at the present time, we find that an analysis of the two-motor equipment of the latest Philadelphia Rapid Transit Company's double-end car runs about 314 lb. per horsepower. The proposed Chicago Surface Lines car will run about 316 lb. This gives an average of 315 lb. per horsepower, which is a 5 per cent increase over and above the 1912-13 average. The latest design of two-motor equipments has armature speeds of from 725 to 770 r.p.m. at 600 volts.

The above illustrates that there has been a gradual tendency to increase the weight per horsepower based upon the light weight of the car. This has been brought about by the lighter weight, higher speed, ventilated type of motor.

From tests recently made with modern two-motor equipments upon a car weighing light 38,000 lb., in service where the schedule speeds have run as high as 12.5 m.p.h., with stops of approximately six per mile and of six seconds duration, it has been found that on these modern two-motor equipments the average temperature rise has run very close to 55 deg. C., showing that from the standpoint of heating the motors are capable of taking care of a load of at least 315 lb. per horsepower, without excessive temperatures. The above figures are based upon tests made in Chicago upon one of the fastest crosstown lines. The average passenger load during the tests was 37.

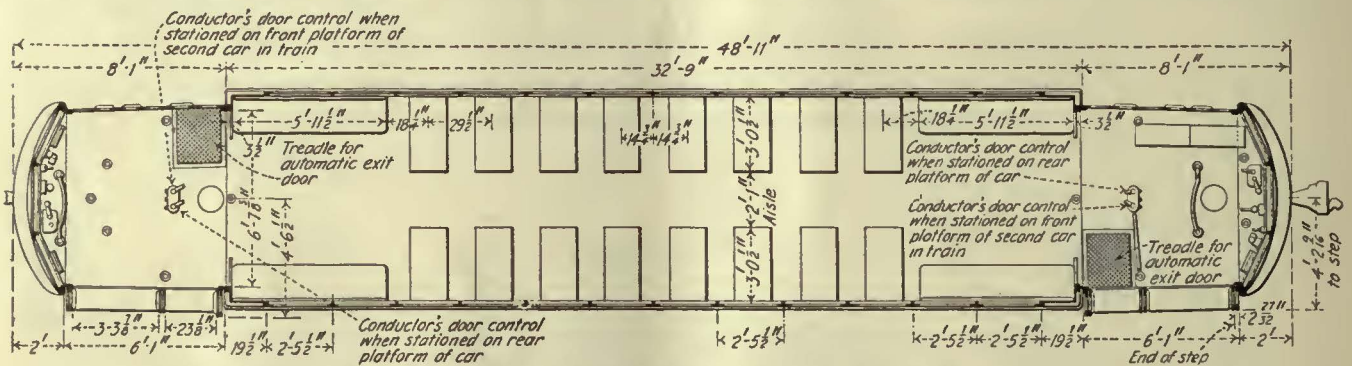
It is believed that in the selection of an equipment for light-weight city service cars serious consideration should be given to the use of the two-motor equipment, for the following reasons:

1. A two-motor equipment is lighter than the corresponding four-motor equipment of the same, or approximately the same horsepower.
2. The first cost is less per equipment.
3. Lower armature speeds.
4. The use of two large units instead of four smaller units.
5. Lower maintenance.

In considering the use of a two-motor equipment, due allowance has to be made for local conditions, as it is recognized that while these equipments may be operated in territory where grades as high as 5 per cent or even greater are encountered, for grades in excess of this a four-motor equipment would probably be desirable. A careful analysis should be made covering each condition before a final decision is reached.

The control equipment under consideration for use on these cars is the light-weight multiple-unit type.

We have specified on this group of cars a 10-in. x 12-in. brake cylinder, with an idea of equipping our cars so as to give a braking ratio not to exceed 1 to 10, in order to get the best possible results from the standpoint of a liberal range in the brake adjustments. This, we believe, will reflect itself in our



Floor Plan of Proposed One-Man, Two-Man, Multiple-Unit Cars for Chicago, for Use in Trains

power consumption, by permitting our brakes to be adjusted freer and, at the same time, operated with adequate safety.

The heating equipment to be installed in these cars consists of 22 heaters of 400-watt capacity at 500 volts, and two platform heaters of 1,200 watts each, making a total of 11.2-kw. capacity for the heaters. All heaters in the car body are under thermostatic control. The platform heaters are to be wired in series, under independent switch control. This gives a heating capacity of 4.6 watts per cubic-foot of contents.

In deciding upon the seats to be used in these cars, it has been determined to use spring cushion backs as well as spring cushions, in order to give added comfort. This is another item where weight has been added for the comfort of the passengers.

The trucks will be of the maximum traction type, with 63 per cent of the weight on the drivers. The diameter of the driver wheels is 28 in. and the pilot wheels 21 in. By using a maximum traction truck instead of the usual type for four-motor equipments, a considerable saving in weight is made.

The cars are to be provided with automatic car and air couplers. This equipment usually runs slightly less than 1,000 lb. per car. Electric jumpers will be provided between cars for carrying train line and bus line circuits.

The total weight of the car, completely equipped, is estimated at 38,000 lb., subdivided as follows:

	Weight in Pounds	Per Cent of Total
Bare car body	14,500	38.2
Trucks, complete with wheels and axles, but without motors and gears	10,200	26.85
Total electrical equipment	6,590	17.33
(Motors, lb. 5,000 13.10%)		
(Control equipment, lb. 1,590 4.18%)		
Air brake and piping	1,765	4.63
Hand brake, seats, heaters, registers, thermostats, conduit and fittings, destination signs and miscellaneous	3,965	10.41
Couplers	980	2.58
	38,000	100.00
Weight per foot, over all	776	

How the Motor Coach Can Be Utilized in the Transportation System*

By G. T. Seely
General Sales Manager Yellow Coach Manufacturing Company

SMOOTH, hard surfaced roads are essential to successful motor coach operation. Little progress was made from 1902 until the last few years, when the number of coaches has increased at a rapid rate because of the more rapid improvement in road conditions.

Quantity production has placed the private automobile within the reach of every one. The yearly production of passenger automobiles and trucks in this country increased from 485,000 in 1915 to 4,012,856 in 1923, or more than eight times. At the end of 1923 there were registered in the United States 15,223,658 automobiles and trucks, or on the average of one for every 7.2 persons.

With this rapid increase in the use of motor vehicles, there came a corresponding improvement in the condition and mileage of hard surfaced roads. While the advantages of good roads have always been apparent, the urge toward improvement and extension of hard roads became greater as the number of persons owning automobiles increased.

Owners desire paving in front of their homes to provide the opportunity to drive their own automobiles to and fro, irrespective of weather or time of year. They cheerfully pay license fees for the maintenance of roads and pavements. Practically all fire apparatus is now motor driven. In cities and villages, deliveries of nearly all such necessities as coal, ice, foods, building materials, etc., are made by motor trucks, made possible by good pavements. In 1923 there were registered in the United States a total of 1,767,515 motor trucks of all kinds, engaged in business enterprises or private hauling.

In the January, 1924, issue of *Bus Transportation* it was estimated that there were between 40,000 and 60,000 motor coaches of all types in service at the end of 1923 in the United States. At the same time there were 83,000 railway passenger cars in operation in this country. These figures show that in a comparatively few years the motor coach has become a most important factor in transportation, even though the number of vehicles thus used amount to approximately only three-tenths of 1 per cent of the total motor-driven vehicles in this country, or 3.4 per cent of the number of trucks in operation.

The essential difference between electric street car or interurban car operation and motor coach operation is that in cities electric cars require an expensive roadbed laid in paved street, or ballast, ties and rails constructed on a private right-of-way for interurban lines; while motor coaches require only a hard surfaced road, used in common by private individuals and the very large number of industrial and commercial vehicles daily engaged in business enterprises.

Motor coaches can make on the average schedule speed as high as or higher than the average street car or interurban line. They have a range in seating capacity from a small 12-passenger vehicle up to a double-deck coach, seating 67 passengers.

There are many electric railways that have miles of tracks that now need or soon will need rebuilding. In many cases these are single-track lines with passing tracks. The growth in traffic due to the growth of the city since the tracks were built makes double-track construction necessary, either now or long before new track would be worn out. In a situation like this the railway manager is faced with an expenditure of from $100,000 to $125,000 per mile of line for new track, a sum practically four times the original cost of one track, due to double track instead of single track, higher standard of costs and more substantial character of present-day track construction. In some cases a street is too narrow to permit double-track construction. A motor coach line has all the operating advantages of a double-track street car line and the only expenditure necessary is that for coaches and a garage.

As a city develops and expands, it has been necessary for the electric railway to extend its lines in very thinly-settled districts.

With such a useful tool as the motor coach, the railway company can agree to furnish service when pavements are built. Because of the universal use of the automobile and delivery trucks, hard surfaced pavements in a new subdivision are much more of an essential than formerly. The railway operator can logically refuse to put $50,000 to $60,000 per mile of single track in subsurface construction on a line that will not pay for years.

In many cities the standard distance between street car lines is from 2,000 ft. to 2,640 ft., this spacing being selected to minimize the expense of constructing the permanent roadway. This arrangement requires a long walk for persons living midway between lines. Wherever such lines require rebuilding, the transportation company may install motor coach service with routes much closer together, reducing the number of vehicles on any given street and reducing materially the average walking distance to and from the transportation line. This will reduce the time required for the journey between the origin and destination of the passenger. This added convenience will materially increase the number of passengers using the transportation lines and induce many to use a public vehicle rather than their own car, thus materially reducing street congestion.

It is possible to install motor coach service on residential streets where it would be impossible to secure the right to construct new street car tracks, because of the absence of objectionable noise from operation.

Electric railway companies may utilize motor coaches also to increase the schedule speeds of their service. One company operated a section of track several miles long from which several radiating lines branched off. Complaints had been received as to the low speed on these lines and the long time required for the trip to and from the center of the city. Motor coaches were employed to handle the local traffic on this section of the line, only a few stops being made by the street cars. Four to five minutes were saved by each street car, enabling a number of cars to be diverted to other uses. The savings more than paid for the addition of the motor coach service and all the patrons of the line were pleased.

In cases where an extension of an existing line is required, motor coaches can be employed to serve the new territory, also serving the outer portion of

*Abstract of a paper presented before joint convention of the Illinois Gas Association, Illinois State Electrical Association and the Illinois Electric Railways Association, Chicago, March 26 and 27.

the existing car line, and then running express with limited stops to the business center, saving time for the longer riders and, by relieving the street cars, either permit the removal of one or more cars, or provide additional seats for an increase in traffic.

Limited stop service with motor coaches can be employed in any section of a city served by a long car line with heavy traffic. This service can be routed on adjacent streets, relieving congestion on the car line and, by the faster speed, and reduced walking distance, increase riding. Service of this character performed with double-deck coaches presents the possibility in large cities of deferring the construction of subways or elevated railroads in territory outside of the business section, except perhaps in the very largest cities.

Years ago riding on electric cars purely for pleasure in the summer was an established practice. With the advent of the automobile this class of traffic practically disappeared. The motor coach offers the transportation company a new way of securing this pleasure riding, especially if double-deck coaches are used. In many cities, where private automobiles that have been laid up during the winter are put in service in the spring, there is a noticeable drop in street car revenue. The upper deck of a double-deck coach provides a means of pleasure riding that is fully taken advantage of on warm evenings, Sundays and holidays, by those who do not own automobiles and by those who do.

It has been generally considered that the double-deck coach has a field only in the larger cities, but I am confident that it will be demonstrated that double-deck coaches will be found to be a real means of selling transportation in cities with from 30,000 to 50,000 inhabitants. They will be of especial value where there is a lake, park, or place of amusement some distance from the center of the city.

Some electric railway officials feel that motor coach operation is something entirely different from their previous experience. As a matter of fact, practically the same transportation principles govern as in electric railway operation, and there are less operating difficulties because of the flexibility of the gasoline-driven vehicle.

Educating the Public*

By Luke Grant
Manager Publicity Department, Chicago, North Shore & Milwaukee Railroad

EDUCATION of the public is the most important phase of electric railway operation. Without the good will and co-operation of the public no electric railway, or other public service company, can be entirely successful. The truth of that statement is axiomatic. How to educate the public, however, is a real problem. No formula can be given for general application. Each community has its own peculiar problems and its interest is only passive, if it has any interest, in the problems of other communities.

In this brief discussion of the subject I mean to confine myself largely to one phase of the problem. I think it the most important phase. The objective I have in mind is to "personalize" a company. I use the term "personalize" because it seems the most appropriate to express the idea I have in mind.

Since the corporation first was formed to carry on business on a larger scale than was possible for the individual firm or partnership, it has been referred to as "soulless." Without the corporation, modern business could not be carried on, yet it is still spoken of as being "soulless," although less so than was the case a few years ago. Public sentiment is gradually changing, due to the better understanding of the fact that the corporation has developed a soul, or a spirit. In the case of the public utility, at least, it is a spirit of service. If a corporation does not wish to be referred to as "soulless" it must prove by its actions that it is not.

The inspiration for this soul, this spirit of service, must spring from the head of the corporation. It must permeate every department and be infused into every employee from the highest to the lowest. That accomplished, the "personalizing" of the company to its customers—the public—will follow as a matter of course, through the co-operative effort of all the employees.

To the patron of the electric railway the employee with whom he comes in contact is the personification of the company. He is the one who expresses the spirit of service or the reverse. If each employee with whom the passenger has contact makes a favorable impression, the effect is cumulative. He has "personalized" that company to the customer and he extends the contact to others. To illustrate what I mean I will cite one or two typical instances.

Typical Instances Quoted

A young mother, with a baby in her arms, is traveling on the North Shore Line from Chicago to Milwaukee. The baby is fretful and crying. The trainman approaches the mother in a sympathetic way, plainly indicating by his manner that he would like to be helpful if the mother could tell him how. She says the baby is hungry, but she has no way of warming its feeding bottle. "I believe I can have it warmed up," said the trainman. He went to the dining car, returning in a short time carrying the baby's bottle on a tray wrapped in a table napkin and handed it to the mother. The mother was grateful and offered the trainman a dollar bill. He declined the gift with thanks. "That is part of the service of the North Shore Line," he said simply, as he returned to his station on the platform of the car.

A significant point to that story is that it was neither the conductor nor the young mother who reported the incident. It was another woman passenger, a stranger to the mother and to the conductor, who wrote a letter to the editor of our company publication relating the story substantially as I have told it. She was so impressed that she felt she ought to commend the act of courtesy.

What has that story to do with the subject of this paper, "Educating the Public"? It has everything to do with it. The passenger who wrote that letter was given a more favorable impression of the company in five minutes than she would have obtained from reading newspaper advertisements every day for a year.

A traveling salesman boarded a train recently to go from Chicago to Milwaukee. It was early in the morning. He handed the conductor a mileage book and headed for the dining car. He ordered breakfast and when about to pay his check discovered that in his haste he had left his home without any money. He explained his position to the waiter. "That's all right, sir," said the waiter. "I'll pay the check and you can pay me on your next trip." The traveler did not wait for his next trip to pay that debt. He sent the amount—with something added—to that waiter immediately he reached home. The waiter proudly exhibited the letter he received. What impression did the traveler get of the company? It is safe to say that it was favorable and that he has told others about the incident.

One more incident and I am through with the human interest stories. A young man who works in Chicago and whose parents live in Milwaukee had spent the week-end with his folks. Returning, he had to take a train leaving at 5 o'clock in the morning. When about to purchase his ticket he discovered he did not have enough money in his pocket to pay the fare. He had friends in Milwaukee who would readily have cashed his check, but they were still abed. He bought a ticket to Racine, intending to get off there, get a check cashed and wait for a later train. He told the conductor of his dilemma. "I am not supposed to accept checks from strangers," said the conductor, "but I'll take a chance." The young man was very grateful. On reaching Chicago he wrote a letter to the editor of our company publication giving the details of the incident.

The thought may occur to you that these are isolated incidents and that the effect they have on the education of the public is infinitesimal, because the thousands of passengers daily carried on a railroad cannot be won over by such personal attention. The effect, however, is much greater than might be supposed at first glance, because it is cumulative. It is not alone the passenger receiving the attention that is favorably impressed. Others in the same car notice these things, they speak of them after leaving the car. When such incidents occur day after day, when they come to be recognized as a fixed policy of a company, such a company has traveled a long distance on the road to the education of the public.

I have dealt with only one phase of the education of the public; that is, "personalizing" a company through its employees. There are other phases on

*Abstract of paper presented before the Illinois Electric Railways Association, Chicago, March 26-27, 1924.

which my time does not permit discussion. I wish, however, to make one more point before concluding.

Under public regulation the electric railway, or other utility company, has no secrets. Its cards are always on the table, face upward. Educational work should be directed toward driving home that fact. Where there is secrecy, there is sure to be more or less suspicion, and suspicion grows into distrust. Nothing is gained by withholding information about a public service company from its customers. I do not mean that it is necessary for a company to broadcast every intimate detail of its business. The public has no interest in such details. But the public is interested in a general way in the operation of a company that is supplying it with an essential service, and the more information of that character given the better it is for the company.

Every utility company wishes to have the confidence of its customers. It must therefore take its customers into its confidence, and by its fair and square dealing with them convince them that it really has a soul, a spirit of service.

Educating the Management*

By W. H. Sawyer
President East St. Louis & Suburban Railway

THE word "education" is a most misused word. We not only misuse the word itself but we use it in a sense which is detrimental to ourselves, to our associates, and to our business. I have heard many tell how we must educate the public, how we must educate our associates—wrong, all wrong. Who are we who are on such a high plane that we can educate all others? Education is all right, but education begins at home, begins with ourselves. It is not our business to educate others. We have no right to seek to educate others.

The only basis on which we have any right to educate others is in the sense that we have a right and a duty to impart information to others. But to teach them, train them, discipline them, tell them what they can do, what they must do, is not within our province. It would be far better to discuss the education of executives, of engineers, of transportation men, of publicity men. If properly educated ourselves we may then be able to impart knowledge to others which will be helpful to us and to them. The problem, therefore, is how best to educate ourselves, not how best to educate the public or our employees.

Due to lack of education we ourselves have been to blame for a large portion of the ills which have befallen the electric railway industry in the past. The electric railway man's duty is, first, to give service, efficient, satisfying service; second, to give the public, our customers, facts, all the facts regarding our business. The executive who is not following this plan today displays his lack of education, and is the one who needs to be educated.

In order that you will not misjudge my remarks I want to say now that the electric railway executive of 1924 has already acquired a considerable education and appreciates the fact that his education is not complete and that he must acquire a better education so that he may be better able to conduct his business. The great big majority of electric railway executives today are not trying to educate their public, because this is not their duty nor their right. What we are doing today, and doing far better than was ever done before, far better than any one even five years ago thought it was possible to do, is to give real service and real facts.

Doing these things as we are now doing them has brought about a most favorable reaction. Electric railways are as a result giving better service, carrying more people, and what is of most importance, our electric railways are in better repute, less criticised, and less open to criticism than ever before. Never before have we received the co-operation from the public that we are now receiving. We have a right to be proud of what has been accomplished. But what has brought about this result? Not the education of the public, but our own acquisition of education.

Our customers are entitled to the facts concerning our business. The best way to give these facts is through publicity in the advertising columns of the newspapers. If we follow this general plan we need not worry about the education of the public. All we need do is to follow along the trail blazed by Britton I. Budd, and then we will not have to meet and talk about the education of the public.

Now, just a word along similar lines regarding the education of our employees, our associates. All that I have said regarding the necessity of educating ourselves instead of the public applies equally well to the so-called education of our employees. We must meet our employees also from a 1924 standpoint. We must recognize that our employees, our associates, must have a pride in what they are doing and in what we are doing. We must recognize that they are our associates and part of our business. We need their co-operation, but we need not go out educating them. We, ourselves, must perform in such a way that we merit their confidence, and so that they appreciate that our interests are mutual, then we will receive their co-operation. They do not need education, but will fall into line when we conduct ourselves so it is easily recognized that it is to their interest to co-operate with us. We must be human, we must be fair, and we must recognize the part they play in this big industry of ours.

None of us have reached the point in our own education that we are in the best position to do all the things that we should do for our associates. It does us good to gather together like this and talk over the things which have been accomplished toward bringing about co-operation from our associates.

There is one little thing we have done down our way that has been very helpful in bringing about co-operation. Some years ago we had street cars that were swept at times and washed at times. We had motormen and conductors that were at times courteous and helpful to our customers, but a lot of the time things were not as they might have been. But those men were not to blame that their customers were not always treated courteously, because in the past we executives and operators were satisfied to give this kind of service. I did not try to educate these men but I tried to gain their co-operation, and I believe I am succeeding. I did not go out and damn them because the cars were not clean. I did not go out and damn them because they were not courteous and helpful to their customers (we never even called them customers in the old days, they were just people that rode street cars, rode street cars because they had to ride them).

Our first step was to get a true picture of just what we were doing. In order to do this I hired, so to speak, half a dozen people, whose work required their riding the cars a considerable portion of the time, to report to me what they saw when they rode our cars. I explained to these people what we were trying to do and then asked them to tell me if we were doing it. I asked them to pay particular attention and give me detailed information concerning those men who did something better than the average. If they saw a conductor or motorman do an especially courteous act I wanted them to be sure and tell me about it and give me all the details. Whenever I received a report of an especially courteous or helpful act I immediately wrote the conductor or motorman a personal letter, telling him of the report I had received and "as a slight token of my appreciation of his helpful attitude" I inclosed a $5 bill. The $5 did not buy that man; my writing him a commendatory letter did not change him from black to white, but it did do this—it let that man know I wanted to co-operate with him to give satisfying service, and it also let him know that I appreciated he was part of our big industry.

As time went along I kept telling the public about these courteous acts and about how these men were trying to be courteous, and about the pride I had in them for being courteous. We got to the point that I asked the public, invited the public, begged the public to tell me what they saw on the street cars. I told them I wanted criticisms if they had any, but I particularly wanted them to tell me whenever they saw any of our men doing something especially helpful. In the course of time I received a real response from our customers. I got to the point that I did not have to pay people to tell me of helpful acts; our customers did it voluntarily. Why? Because we were performing; because we were doing the things that bring about satisfying service, and because we were going to our

*Abstract of a paper presented before the Illinois Electric Railways Association, Chicago, March 26-27, 1924.

public, our customers, and talking to them through newspaper advertisements telling them what we were doing, and what we were trying to do. That is why we got a response from them. They knew what we wanted to do; they knew that what we wanted to do was mutually helpful and were willing to co-operate with us.

About the same time that we started what some people would call a courtesy "campaign"—I never call any of them "campaigns," a campaign means something that you do for a short time—a whirlwind affair; we also took another hold of ourselves in regard to clean cars. We doubled the force in the car-washing shop; we washed our cars twice as often; we washed windows in between car washings, so we washed windows four times as often. We then put a broom on each car and asked the conductor or motorman to sweep the car at the end of the run. Of course they did not all do it right off; they were not used to sweeping out cars—some of them said they were not porters. We did not damn them if they did not do it, but whenever we found an especially clean car I wrote the man a letter and sent him a $5 bill. They commenced to have a pride in keeping their cars clean; they commenced to want to keep their cars clean. Of course, they do not now all keep their cars as clean as we would like to have them, but a lot of them do. One thing is sure—they are practically all doing a better job than they used to do.

Now these are two things, two small things, that we have done down our way to bring about better public relations and better employee relations. We have tried to more nearly satisfy our customers by cleaner cars and more courteous and more helpful platform men, and at the same time have materially increased the co-operation from our associates. This was brought about by the education of ourselves. There are many other little things that we have done down our way in which we have a real pride. Do not misunderstand me, we down our way are not educated; we still have a lot to learn, but until we more nearly perfect our own education we are not going to complain of the lack of education on the part of our customers or our associates.

Education for the North Shore Line Employee*

By C. G. GOODSELL
Educational Director Chicago, North Shore & Milwaukee Railroad

IN OUR educational program for employees of the Chicago, North Shore & Milwaukee Railroad we began with the laborer out on the right-of-way. This was in 1921, and as this work of teaching these men English, citizenship and trackwork began to attract attention the inquiry came from other employees as to why not educational work for them? A trainman inquired about an opportunity to learn to speak better English. Another wanted to know what he should study to be in readiness for some advancement. A merchandise dispatch agent asked about getting a better knowledge of freight traffic. In one department an official stated that not a foreman could make a rough shop drawing which would give one any conception of what he had in mind. Many other evidences indicated the need of a company-wide educational program.

It was about a year ago that the educational service of the road was finally extended to employees of all departments by the appointment of a new educational committee and the enlarging of the field of service of the educational director to cover the broader work. About this time a letter went out under the signature of Britton I. Budd, president of the road, encouraging the educational efforts of the employees and stating that the company would be glad to share the expense where any was incurred in pursuing courses which would better equip one for work with the road.

As a result of this indorsement of the educational movement by the management a great many employees began to think about the matter of education and many inquiries were received. In a few months 150 interviews had been held with the supervisory force and employees desiring more education and much valuable data relative to the needs of our employees was secured.

Immediately steps were taken to meet these needs through outside educational institutions or our own classes as the conditions warranted and as a result the following subjects have been studied by our employees during the year: Air brakes, arithmetic, acetylene welding, accounting, blue print reading, shop drawing, railway surveying, public speaking, English, electricity, freight traffic, freight car repair, foremanship, mechanical drawing, office management.

Short courses were conducted by the company in air brakes, blue print reading and shop drawing, English and public speaking. Private instruction has also been given in electricity, mathematics, sheet metal drafting and shop drawing. Arrangements were made last fall with the public evening schools in Milwaukee and Kenosha, Wis., for our employees to attend classes even though they were not residents of these cities. We also have students in evening classes at Northwestern University School of Commerce, Armour Institute and De Paul University in Chicago and a commercial business college at Waukegan, Ill. Home study courses are being taken by a few of our employees through the Railway Educational Bureau of Omaha, the Milwaukee School of Engineering, LaSalle Extension University and others. Over 200 employees have been enrolled in our own classes during the year and about seventy enrolled in outside institutions.

An experiment in educational clubs is being made which looks attractive. A track foreman's club, an office boys' club and a public speaking club have been tried so far. Some difficulties enter into the problem in the case of the boys' club, but the two others indicate that more educational clubs may prove a successful part of our program.

We hardly need say that the easiest part of this educational program is the enrollment of the students. The real work comes in keeping the man "at it" until he has completed something. As you know, over 90 per cent of those enrolling in correspondence school courses in this country never complete them and our crowded city evening schools usually find they have plenty of room for more students after a few weeks of hard work. This is no argument for abandoning the task, however; it simply means that the average man is naturally a "quitter" and that he needs help. It means that some one is needed on the job for the express purpose of helping the average man get the education he needs for the job he is holding or for the better one ahead.

Most of the programs laid out for the education of the man in industry are not attractive enough to hold him. The work is often not elementary enough for the average and usually the courses cover so long a period that he is discouraged before he starts. We have often heard officials say, "If the man hasn't the stuff in him to stick to a course of study and complete it, let him go. I stuck and I didn't have half the chance this fellow has had." Now, as a matter of fact, we have no business "letting him go." It's the average man that makes up the great army of our employees, and when we let him go we simply say we are going to cripple along with an inefficient, untrained force and a high labor turnover. Better say, "We'll find the difficulty and remedy it." Too little time and thought has been spent on this problem.

Some one has said, "Carter's Little Liver Pills never would have had half the sale if they had been Carter's Big Liver Pills." So it is with education. Small doses, and if necessary sugar-coated, will get results never secured from long courses offered in an unattractive form. But I hear some one say that a short course does not amount to shucks. I differ absolutely with that statement. A short course does amount to a great deal. In the first place even one hour a week for ten weeks may put a man on the road to bigger and better things if the right kind of a man is teaching him. It gets a man out of his rut. He begins to get a vision of the things beyond. He begins to feel the joy of mastering something. If the course is a practical one, as it usually should be, each lesson gives him something which he sees will come in handy on his present job or the job ahead. It often is the means of getting him interested enough to dig up the technical books he has stowed away at home and make them a live source of information. It literally takes that man out of the class of the "standstills" and puts him in the "go aheads."

There is another effect also which should not be overlooked. That man

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immediately begins to think a little more of himself, to stand a little straighter, to feel a little more as though life was worth living. You show me a bunch of men in your employ who are studying some practical subject together, no matter how simple or short the course may be, and I'll show you a bunch of men who are making for a better spirit; they'll be boosters rather than knockers.

We are now working on short courses to be offered on our property which will be so related to each other that a man may take a single short course in blue print reading, shop drawing, shop arithmetic, air brakes, principles of electricity, car wiring, electrical signals, motors, etc., or he may take a combination of several of these subjects, using two or three nights a week, so that he will in the course of time have a large amount of technical knowledge which will apply to conditions as they exist on our property.

This will be, we believe, training of a grade within the reach of the average man. The man with a very limited education and only ordinary perseverance but able to give good service may develop into a valuable man to the company and a better provider for his family.

New England Club Has Usual Rousing Annual

NEARLY five hundred attended the annual banquet of the New England Street Railway Club at the Copley Plaza Hotel, Boston, March 27. As is customary at this meeting, the only business transacted is the election of officers late in the afternoon. The evening banquet is given over entirely to prominent speakers from outside the railway field. This year the club was particularly favored. Those who accepted places on the program were the United States Senator from New Hampshire, the Governor of Massachusetts and the Mayor of Boston.

President Ralph D. Hood delivered a brief address on the activities of the club, which has had one of its most active years, then introduced former Massachusetts State Senator Robert M. Washburn, who acted as toastmaster and certainly made the most of his opportunities.

United States Senator George H. Moses spoke briefly on the spirit of suspicion and innuendo which obsesses Washington at the present time. As chairman of two investigating committees and a member of a third, he commented that he thought he could speak with authority on the low character of some of the testimony that has been taken in these investigations. Incidentally, the toastmaster made a good deal of humor at the expense of the Senator on the character of the testimony and the personnel of the investigating committees, which the Senator seemed thoroughly to enjoy.

The Senator spoke pointedly about the tax situation. He said that six states pay 62 per cent of the entire burden of the federal government, and that obviously all representatives of the less populous states vigorously oppose any measure that would tend

to bring about a more equitable distribution of the taxes. He said the dollar-for-dollar plan of building roads, whereby the federal government contributes a dollar for each dollar the state puts in, looks upon its face to be very meritorious. Actually, however, it means that the six heavily taxed states pay a large share in the road programs of other states. As he put it, it makes the progressive states pay for the backward ones. For example, New Hampshire pays a federal tax of $23 per capita, but on the dollar-for-dollar program it gets back 89 cents in federal money, and in order to get that it has to tax itself practically another 89 cents. Another state which draws $3.25 per capita of the federal funds pays $8,000,000 less than does New Hampshire, and another draws $1.86 and pays only one-half the federal tax that New Hampshire does.

Governor Channing H. Cox made a brief but stirring speech to the effect that our republic, with all its faults, is the most glorious success of any form of government that has ever been set up.

Mayor James M. Curley had to disappoint the convention at the last minute, but he was ably represented by Mark Sullivan, who extended the welcome of the city. The last speaker on the program was the Rev. William Porter Niles, essayist.

New Officers Elected

The following officers were elected for the ensuing year:

President, T. H. Kendrigan, superintendent and claim agent Manchester Street Railway, Manchester, N. H.

Vice-presidents: For Massachusetts, L. D. Pellissier, Holyoke; Connecticut, J. K. Punderford, New Haven; New Hampshire, L. E. Lynde, Dover; Vermont, T. B. Jones, Burlington; Maine, Fred R. Gordon, Portland; Rhode Island, Edward A. Brown, Newport.

Secretary: John W. Belling, Boston, Mass.

Treasurer: Fred F. Stockwell, Cambridge, Mass.

Executive Committee: Ralph D. Hood, Charles H. Wood, W. W. Field, Howard F. Fritch, George H. Martin, George H. McFee and H. M. Flanders.

Suggestion 2,396,453. A music box attached to the "coin catcher" to keep the cash customers contented.

Southwestern to Have Good Railway Program

THE Southwestern Public Service Association will hold its annual convention at New Orleans, La., on April 22-25, at the Roosevelt Hotel. The program this year contains an unusual number of papers and discussions of interest to electric railway men. The program also comprises sessions and subjects for the gas and electric men. Of particular interest to the railway men are the following items on the program:

Tuesday Morning

"Prone Pressure Method of Resuscitation," by Samuel H. Reid, Bureau of Safety, Chicago.

Wednesday Morning

"Why Street Car Rides Vary Widely in Cost in Different Cities," by J. W. Welsh, executive secretary American Electric Railway Association, New York.

"Proper Financial Structure of a Public Utility Company," by W. C. Lang, assistant comptroller Electric Bond & Share Company, New York.

Wednesday Afternoon

"The Relations of the American Electric Railway Association to the Regional Association," by J. W. Welsh, executive secretary American Electric Railway Association.

"Operation and Maintenance as Basis of Public Relations," by A. B. Paterson, vice-president New Orleans Public Service, Inc.

"Education and Development of Employees with Reference to an Understanding of the Fundamentals of the Railway Business," by G. H. Clifford, vice-president Northern Texas Traction Company, Fort Worth.

Thursday Morning

"The Street Railways and the Public," by W. H. Sawyer, president East St. Louis & Suburban Railway, East St. Louis, Ill.

"Employee Training for Better Public Relations," by S. M. Kennedy, vice-president Southern California Edison Company, Los Angeles.

"A Giant Awakened," by Alexander Forward, secretary-manager American Gas Association, New York.

Thursday Afternoon

Transportation Division

"Training of Inspectors," by W. W. Holden, superintendent of transportation San Antonio Public Service Company.

"Schedule Making and Organization of the Schedule Department," by T. H. Owens, Dallas Railway.

"The Relation of Types of Cars to Character of Service," by R. Meriwether, general manager Dallas Railway.

"Accident Prevention," by W. A. Robertson, superintendent of railways, Eastern Texas Electric Company.

Public Relations Division

"Railway Advertising," by C. J. Crampton, Dallas Railway.

"Participation in Public Activities," by W. E. Wood, manager Houston Electric Company.

Mechanical Division

"Use of Electric and Acetylene Welding in Shops," by Walter Silvus, Texas Electric Railway, Dallas.

"Shop Organization and Practice in Connection with Maintenance and Extension of

Equipment," by V. W. Berry, general superintendent Northern Texas Traction Company, Fort Worth.

"Rapid Wear of Carbon Brushes on Ventilated Motors," by F. J. Bennett, Houston Electric Company.

Maintenance of Way Division

"Various Types of Track Construction with Reference to Costs of Paving," by R. G. Tabor, Northern Texas Traction Company, Fort Worth.

"Types of Joints and Methods of Installation," by G. W. Smith, San Antonio Public Service Company; R. B. Fehr, Rail Welding & Bonding Company, Cleveland, and others.

"Creosoting and Other Methods of Preserving Ties and Poles," by E. E. Boehme, International Creosote & Construction Company; J. P. Logan, National Lumber & Creosote Company, and others.

"Cast Steel and Alloy Steel vs. Manganese for Special Work," by E. B. Ledwisle, Lorain Steel Company; James H. Budd, Bethlehem Steel Company, and others.

"Crossings—Type, Paving and Foundation," by B. H. Taylor, Houston Electric Company.

Accounting Division

"Use of Machines in Accounting Work," by F. J. Gannon, assistant treasurer Northern Texas Traction Company, Fort Worth.

"Obtaining Car Mileage," by W. R. Burns, Dallas Railway.

"Transportation Pay Roll Accounting," by A. D. Dufour, New Orleans Public Service, Inc.

FRIDAY MORNING

"Building in the Public Mind the True Conception of Utilities," by E. F. Wickwire, vice-president Ohio Brass Company, Mansfield, Ohio.

"Relation of Bus Operation to Street Railways and the Outlook for the Future," by W. B. Tuttle, president San Antonio Public Service Company.

"Methods Employed for Elimination of Car Pull-Ins and Relation to Service," by R. M. O'Brien, New Orleans.

American Association News

Legislative Activities in Washington

American Association Committee on National Relations Busy Presenting Point of View of Electric Lines on Three New Bills—Suggestions Made for Guidance of I. C. C. on Application of Section 15a

THE committee on national relations of the American Electric Railway Association made an appearance at a hearing on March 29 before the Senate interstate commerce committee on the Howell railway labor bill, S. 2646. In a word, this bill provides that the present wages and present working conditions shall continue in effect. If a revision is desired, thirty days' notice must be given to one of the several boards that would be set up by the bill, and can be made only upon approval by this board. The electric railways are specifically included in the bill and its effect would be to bring adjustments under a national board. It might result in forcing electric railway employees into the steam railroad brotherhoods.

Charles L. Henry, chairman of the national relations committee; Frank Karr, Pacific Electric Company; R. R. Bradley, Chicago, North Shore & Milwaukee Railroad, and W. V. Hill, San Francisco, appeared for the electric railways. A short but specific statement setting forth the position of the electric railways with respect to such a proposal was presented by Mr. Karr. Just after he concluded, D. R. Richberg, counsel for the organized steam railroad employees, addressed the Senate committee and said that the proponents of this bill did not desire that the electric railways should be included, if such railways and their employees did not so desire; that in the light of former legislation they had concluded that it was proper to put the electric railways in, but the latter might be removed from the bill without any opposition on the part of those pressing this bill for passage.

HEARING ON STEEL CAR PROPOSAL

Representatives of the association made an appearance in Washington on March 20 before the Senate interstate commerce committee on the proposed Dennison bill, H. R. 4107. The Dennison bill is known as one "for the protection of persons employed on railway baggage cars and railway express cars." It has been substituted in the House for Senate bill S. 863. It provides that carriers, specifically including interurban and suburban railway companies irrespective of whether steam or electrically operated, shall use only baggage and express cars after July 1, 1926, which are constructed of steel or have a steel underframe, and that after this date all new cars must be constructed of steel, subject to the approval of the Interstate Commerce Commission.

The bill is designed primarily to apply to steam carriers, but the committee on national relations felt that the electric railways should appear and point out that the conditions it was sought to correct did not exist in the electric railway field. At the hearing Charles L. Henry made a short statement for the electric railways and introduced H. A. Mitchell, vice-president and general manager San Francisco-Sacramento Railroad, Oakland, Cal., who made a statement. Others in attendance representing electric railways were Frank Karr, San Francisco; E. H. Maggard, Petaluma, Cal., and W. V. Hill, San Francisco. The committee finally indicated that the proposition to require all steel cars in baggage and express service would be confined to Class A steam roads, and main line service in particular.

ANOTHER SIMILAR BILL INTRODUCED

While it appears that the House bill referred to above will not affect the electric lines, another bill, S. 1499, has been reported to the Senate without a hearing in committee, which involves the electric railways. This bill passed the Senate with but slight opposition on March 28. It prohibits the use of wooden cars. Senator Harris, its author, was asked by Senator King whether it would prohibit the operation of wooden cars on interurbans. Senator Harris replied that it would not, but in answer to another question he stated it would not permit electric lines to use wooden cars between steel cars. This would prohibit electric lines from operating a wooden car in the same train with a steel or a steel underframe car.

RULES SUGGESTED AS TO APPLICATION OF SECTION 15A

At the close of the hearing on March 19 before the Interstate Commerce Commission in Washington on whether Section 15a of the interstate commerce act should be applied to interurban railways (see ELECTRIC RAILWAY JOURNAL for March 29, page 511) Commissioner Potter requested J. V. Norman, counsel for the Interstate Public Service Company, to endeavor to obtain the approval of as large a number of the interested parties as possible to general rules which would automatically place many carriers without Section 15a. The idea was that such rules would relieve the commission from the individual consideration of many carriers. During the hearing Mr. Norman had proposed certain rules in his testimony. He stated that these rules were to be considered as general rules which would exclude from further consideration a large number of companies, but that it was not to be understood that companies not excluded thereby were inferentially within the act.

After the hearing was concluded, a meeting was held of all present and there was a long discussion of rules that might be proposed. All those present agreed on Rule 1, as stated below, as a proper one, but many of them were unwilling to subscribe to it as a proposal coming from the electric roads for fear that the commission might receive the impression that the companies not excluded by the application of the rule were inferentially within the provisions of the act.

No agreement whatever could be reached on a proposed second rule, as stated below, principally because the meeting could not agree on the phraseology, but also because such a rule might be so applied as to exclude from the operation of the act some companies which desired to come within its operation.

The two rules discussed were as follows:

Rule 1. No electric interurban railway is "engaged in the general transportation of freight" within the language of Section 15a unless it exchanges freight traffic with steam carriers under through routes and joint rates.

Rule 2. An electric interurban railway which interchanges freight traffic with steam carriers, as provided in Rule 1 above, is not within the provision of Section 15a unless it holds itself out to handle the same general classes of freight in the same general manner as steam carriers.

In view of the considerations already stated, the meeting decided not to propose any rules to the commission, but authorized Mr. Norman to convey to it the information that while all agreed that Rule 1 is a proper rule they were unwilling to propose it for the reasons stated above.

Maintenance of Equipment

Truss Braces Rebuilt Car

AN UNUSUAL method of bracing the car body has been adopted by the Holyoke Street Railway in rebuilding for passenger service a mail car which formerly operated between Northampton and Springfield. Two triangular iron castings are used on each side as vertical compression members of a truss, with a steel strip as the tension member. One casting is placed beside the second window post from each end of the car. A steel strip ⅜ in. thick and 1½ in. wide is fastened beneath the frame at the corner post and runs up over one triangular support, continues parallel to the floor of the car, then over a similar support at the opposite end, and down under the other platform floor. Two trusses of this sort are used in this reconstruction, one on each side of the car.

A Truss on Each Side of the Car Prevents Platforms Sagging

New Platforms Added to Old Cars

IN THE conversion of some of its older cars to the prepayment type the Union Street Railway, New Bedford, Mass., has extended the car platforms. This was done by making a clean transverse cut at the bulkhead and removing the platform. The old platform and dash were used again in the rebuilt car, an 18-in. section being inserted at the bulkhead. The platform knees on these cars are of wood, reinforced on either side by steel plates. Extensions to the plates were bolted on and an 18-in. wood block inserted to fill the hole.

The end bulkheads were taken out to facilitate the use of the prepayment plan on this type of car. Convenient grab handles were placed in the center of the double doorway and at both sides. These are located inside the folding doors so as to discourage passengers attempting to board the car after the doors have been closed. The doors are manually operated, but are interlocked with a line switch in the main motor circuit. Another safety feature which was introduced when the cars were rebuilt was the use of sloping steel hoods on the end bumpers.

The weight of these cars was slightly less than 19 tons before rebuilding. The reconstruction added only a small amount to the weight. A modern type car has been acquired at approximately 10 per cent of the sum that new cars would have cost.

Handy Method for Supporting Short Armatures

WHERE armature racks are constructed for supporting railway motor armatures, which are all of approximately the same length, difficulty is sometimes experienced in providing supports for short armatures such as those for compressor motors. The accompanying illustra-

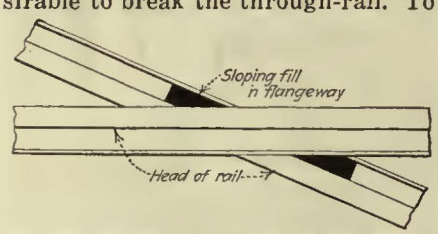
An 18-In. Section Was Added to the Platform to Fit New Bedford Car for Use on the Prepayment Plan. At Right, Enameled Stanchions Placed to Aid Ingress and Egress and Divide Passenger Streams

Built-In Armature Rack with Provisions for Supporting Short Armatures

tion shows an armature rack in the shops of the Philadelphia & Western Railway, Norristown, Pa. At the top is a short armature which is supported by hooks from a shaft extending over the supports ordinarily used for the longer armature shafts. By this method the short armatures can be stored in the rack where the larger type armatures from railway motors are placed.

Special Crossover Preserves Continuous Through-Rail

AN UNUSUAL type of crossover has been made by the Springfield Street Railway, Springfield, Mass., for use in front of its carhouse at Main and Carew Streets. It is frequently desired to cross cars over from one track to the other at this point, but there is also through service on a comparatively short headway and it was thought undesirable to break the through-rail. To meet this situation a special crossover was made by the track department. The main line rail was left continuous and the crossing rail was welded to it. Grooved rail was used in both cases and a sloping fill was welded into the flangeway of the broken rail in order to facilitate the passage of wheels over the continuous rail.



The Sloping Fill of Welding Metal Facilitates the Passage of Wheels Over the Continuous Rail of This Home-Made Frog

Painted Paths Promote Safety

IN THE shops of the Worcester Consolidated Street Railway, Worcester, Mass., an overhead monorail system equipped with chain hoists is used for transporting heavy material. This was described in the JOURNAL for March 22. The routes by which this material is moved are therefore definitely established, and have been marked out on the floor. A broad white stripe on each side indicates the limits of the passageway which must be kept clear for the movement of material. Nothing is permitted to be stored in this area. The passageway is also available for individuals walking from one place to another, movement of material in hand trucks, etc. The white lines are repainted about once every two weeks so that they are always distinct.

It has been found that the cost of thus marking the passageways has been more than repaid by reduction in the number of accidents due to persons, or material in transit, colliding with material stored on the floor.

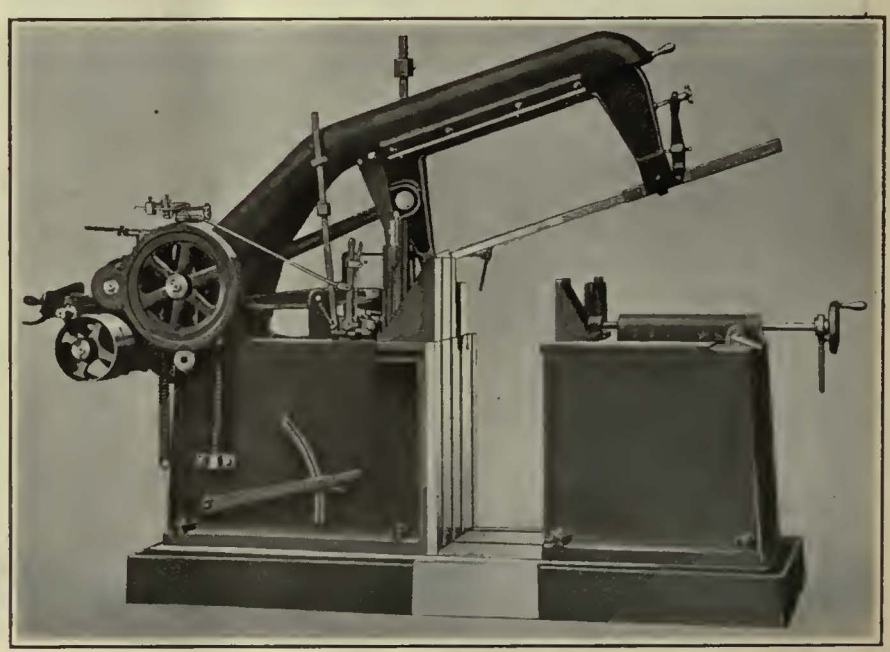
New Equipment Available

Power Hack Saw with Gap

A NEW type of power hack-saw, which the manufacturer calls a "Gap-Saw," has just been announced by the Peerless Machine Company, Racine, Wis. As in the case of a gap-lathe, when the gap is closed the saw can be used for ordinary purposes. When the gap is open, it has an excess work holding capacity of 24 in. in height and 16 in. in width.

The work can either be clamped to the finished vertical face on the bed, where four "T" slots are provided for clamping purposes, or the work can be clamped directly to the base, where three "T" slots will give ample clamping convenience. The base has a water-trough extending entirely around its perimeter, which carries the coolant back into a reservoir located in the rear of the base, from where a rotary geared pump circulates the coolant up into the distributing pipe. The finished pad which is opposite the gap and which is located on each side of the base is for the convenience of the operator when locating work which is clamped directly to the base. The left-hand edge of the bed is also finished for measuring convenience purposes.

A piece of steel 16 in. x 26 in. can be sawed in two by sawing through 13 in. and then meeting the cut by



Power Hack Saw with Gap Open

GENERAL SPECIFICATIONS FOR POWER HACK SAW

Capacity of machine on ordinary work	13 in. x 16 in.
Capacity of gap-work	16 in. x 37 in.
Length of blade	14 in. to 24 in.
Length of machine	80 in.
Width of machine	30 in.
Weight of machine, approx.	3,000 lb.
Distance from floor to top of base	6 in.
Distance from floor to top of table	30 in.
Strokes per minute of saw frame	125

turning the piece half way over. This work is often encountered in the railroad shop, the drop-forge shop and the structural steel yards. Often hammered forgings such as are machined up into crank-shafts can be blocked out prior to the machining operations.

The head lifts up on each return stroke and when the blade comes to the bottom of the cut, the feed is automatically disengaged and the head lifted up to its uppermost position through balance springs. Blade pressure or feed can also be varied at will by raising or lowering the ratchet lever shown on the side of the head.

The machine shown in the cut is equipped with the standard six-speed stroke mechanism which is used on the Peerless high-speed saws when the materials require different cutting speeds. Either this attachment or the usual 2-hp. motor, or both, can be furnished with the machine. The machine can also be furnished without the six-speed gear box or motor and bracket.

Birney Safety Buses Exhibited at St. Louis

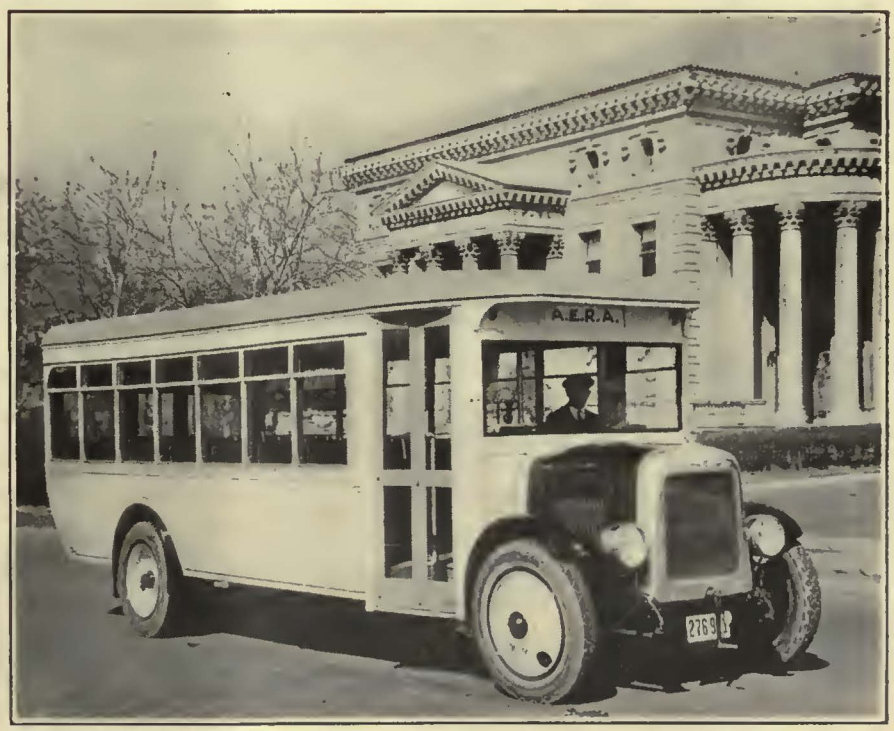
TWO buses designed particularly to meet the needs of electric railways were exhibited at the recent meeting of the American Electric Railway Association at St. Louis. Working on the principle that the safety devices which have been so successfully used on one-man street cars are even more desirable on a one-man bus which has to be maneuvered through vehicular traffic, and that any device which will relieve the operator of some of his duties will increase the safety of operation, an interesting arrangement of pneumatic safety devices and auxiliary apparatus has been developed. This work is the result of a study of bus operation by the bus committee of the Stone & Webster properties, of which C. O. Birney is designing engineer, working in co-operation with the Westinghouse Traction Brake Company, St. Louis Pneumatic Devices Company, American Car Company, St. Louis Car Company, Fageol Motors Company and the Yellow Coach Manufacturing Company.

Birney Design Body Built by American Car Company on Fageol Chassis

One of the buses has a body constructed by the St. Louis Car Company, mounted on a Yellow Coach chassis, while the other has a body built by the American Car Company, mounted on a Fageol chassis. Low hung chassis and pleasing lines feature both vehicles. The low step heights, together with liberal aisle space, insure convenient and rapid interchange of passengers in city service. Each bus has a seating capacity of 29. The body constructed by the American Car Company has a combination of cross and longitudinal seats upholstered in leather, the longitudinal seats being used over the rear wheel housings adjacent to the service door at the front. In the St. Louis body the cross-seat arrangement is used throughout and the seats are upholstered in green frieze plush.

Combined Accelerator and Brake Control

Compressed air for the brake system and the pneumatic devices is



Birney Design Body Built by St. Louis Car Company on Yellow Coach Chassis

obtained from a 3-cu.ft. Westinghouse automotive type compressor. Both the throttle and the air brake control valves are operated from a common pedal, which, when it is pushed down from the neutral position, opens the carburetor throttle, and when it is released tilts up beyond the neutral position to operate the air brake valve. The neutral position is clearly defined by a compound spring arrangement which is installed to facilitate the shifting of gears.

On the side of the foot pedal is a latch so that it can be depressed by the foot of the operator to engage a notch in the supporting casting and hold the pedal in full brake application position after this position has been reached. This latch controls the emergency or "deadman" feature of the device. If the pedal is released from any position less than full service brake application position, it immediately springs beyond the point where the latch will engage in its notch to a position in which not only a full service brake application is made, but also the engine throttle is closed to idling position and the air-operated service door is balanced so that it can be pushed open by hand.

Graduated control of the air brake is obtained by the use of an automatic lap valve with a reducing action which gives a predetermined brake application pressure for any given position of the brake valve. In any intermediate position, a constant brake chamber pressure is retained corresponding to this position, until the valve is moved to give a higher or lower pressure.

Arrangement of Pneumatic Control

A reservoir pressure of 75 lb. per square inch is carried. Two pipes lead from the main reservoir, one directly to the brake control valve and another to a reducing valve which allows a pressure of 50 lb. per square inch to the door control valve mounted on the steering wheel column. The brake valve controlled from the foot pedal allows air to flow to the brake chambers in graduated amounts as the pedal is allowed to tilt above the neutral position, and conversely, as the pedal is depressed from full brake application position, the brake chamber pressure is gradually reduced to zero. At the neutral position the brake chamber pressure is completely released, in which position the brake control valve connects the brake chamber pipe to atmosphere.

A center port in the upper portion of the brake valve body is connected directly to the door closing port of the door control valve on the steering wheel column. In all positions of the brake valve between neutral and full brake application position this port registers with a pipe leading directly to the door closing side of the door engine, allowing air to be transmitted through the reducing valve to the door control valve, thence to the center port of the brake valve and from there to the door closing side of the engine.

In the "deadman" or emergency position of the treadle the air connection through the brake valve is cut off and the door closing side of the door engine is vented directly to atmosphere, thus allowing the door to be pushed open by hand in the same way as is accomplished on the Birney safety car when an emergency application of the air brakes takes place.

The air in the brake control pipe from the brake valve to the brake chambers passes through an automatic three-way valve before it reaches the chambers. The door opening pipe leading from the door control valve on the steering column is connected to the door opening side of the engine and is also continued through a tee to this same three-way valve. A sliding check in the three-way valve, in its normal position, closes the port leading from the door opening pipe and allows air to flow from the brake valve to the brake chambers. If, however, an attempt is made to open the service door by admitting air to the door opening side of the engine before a full brake application is made, the pressure immediately forces over the slide in the three-way valve and allows air to flow directly to the brake chambers, thus applying the brakes.

An additional port is provided in the upper portion of the brake valve to which pressure is admitted in the emergency position. This port is available for operating any auxiliary pressure device on the vehicle which it may be desirable to bring into action when an emergency application occurs. If not required, this additional port can be plugged so as to be inoperative.

Pneumatically Operated Fare Box

Each bus is equipped with a Johnson fare box, which is mounted on the vertical stanchion immediately to the right of the driver. An extremely simple four-cylinder pneumatic engine, mounted in an aluminum case fastened to the bottom of the box, drives the registering mechanism by a light chain inclosed in an aluminum housing on the side of the box. This engine was developed by the St. Louis Pneumatic Devices Company and the arrangement is such that the entire box with its driving mechanism can readily be removed from the supporting stanchion. When this is done the air connections are automatically broken, and are likewise automatically remade when the box is replaced in its socket.

The design and construction of both bus bodies is very similar to that of the single-truck Birney type of one-man safety car. Continuous tee-posts are used for the side posts and roof supports, and many other features of the body structure are likewise similar to the construction used in the Birney car. In the American body wood lower side sash reinforced with brass wearing channels are used, while the St. Louis body is equipped with Curtain Supply Company's brass sash. The general dimensions of the two buses are shown in the accompanying tabulation.

GENERAL DIMENSIONS

	Birney Safety Buses	
Body	American	St. Louis
Chassis	Fageol	Yellow Coach "2"
Wheelbase	218 in.	193½ in.
Length over all	26 ft., 2 9/16 in.	25 ft., 1 in.
Length over body corner posts	18 ft., 10½ in.	21 ft., 0 in.
Width at belt rail	7 ft., 6 in.	7 ft., 6 in.
Width at side sills	6 ft., 0½ in.	6 ft., 8 in.
Height from road over roof	9 ft., 0 in. (over ventilators	8 ft., 10 in.
Height from road to top of floor	1 ft., 10 in. at door 2 ft., 3 in. rear end	2 ft., 2½ in.
Height from floor to headlining in center		6 ft., 3½ in.
Height from floor to window sill	1 ft., 11½ in.	2 ft., 1½ in.
Seating capacity	29 passengers	29 passengers
Seat centers	2 ft., 5 in.	2 ft., 5 in.
Post centers	2 ft., 5 in.	2 ft., 5 in.
Aisle width at cushion	1 ft., 8 in.	1 ft., 8 in.
Service door opening in clear	1 ft., 11 in.	2 ft., 3½ in.
Height from road to step	1 ft., 3 in.	1 ft., 4 in.

The News of the Industry

Everett Results Disappointing

$14,780 Deficit in 1923 There Under Five-Cent Fare with Bus Operation

Everett, Wash., a city of 30,000, in which the local railway, the Pacific Northwest Traction Company, substituted buses for street cars except for one 5-mile line, is going to lose its 5-cent fare. After a long conference between city officials and officers of the railway, the proposed discontinuance of transfers on the company's bus lines has been averted by an increase in fare from 5 cents to 6¼ cents.

Trouble Dates Back to 1917

Sentiment against abolition of transfers arose at a conference attended by representatives of various civic bodies and George Newell, local manager of the company at Everett, agreed to withdraw his application to the Department of Public Works for this permit. Mr. Newell explained that the company automatically reverts to the 6¼-cent fare on April 1, and that the 5-cent fare, which has prevailed for sixteen months, had been merely the result of an agreement between the old City Council and the traction company for an experimental period.

The trials of the railway at Everett date back to 1917. Cost really reached the highest point in June, 1920. The railway was obliged to raise the pay of employees and at the beginning of 1921 employees were receiving considerably above 100 per cent more wages than before the war.

But that is only part of the story. Early in 1922 the company was confronted with additional problems in the way of rebuilding tracks and paving streets, and with an expenditure of between $3,000,000 and $4,000,000 in the next five years. As it could see no way of raising this amount or of earning a return on it the company decided to take its problems up with the City Commissioners with a view to working out a system of city transportation that would be adequate and that it could finance. As a result the bus was substituted for the railway.

Five-Cent Fare an Experiment

During the negotiations with the City Commissioners for an amended franchise, the matter of fares was discussed and the commissioners were of the opinion that the company should try out a 5-cent fare with transfer privileges. The company agreed to give the 5-cent fare a fair trial in the hope that revenues might be sufficient to operate the system. That fare went into effect on Dec. 1, 1922.

The result was disappointing, however, for the company took in $6,450 less in 1923 with a 5-cent fare in effect than it did in 1922 when 6¼ cents was the rate for eleven months and 5 cents the rate for one month. On the other hand, expenses increased $19,020, not including depreciation on the buses. Including depreciation on the buses, expenses increased $34,573. When books were closed for the year the company lacked $3,180 of funds sufficient to pay operating expenses, depreciation on the buses and taxes, and money had to be borrowed with which to pay taxes. The deficit for the year 1923, including a reasonable depreciation on the remaining track and electric cars and other operating property in connection with the system, was $14,780.

Still further to aggravate this situation, gasoline took a sharp advance and city operators demanded higher pay. Finally an arbitration board granted the men a substantial increase in pay and recommended the company to the mercy of its citizens and car riders. This, however, placed the company in the position of having to carry out the award without sufficient funds to do so. The concern of the company was to pay legitimate expenses and give the stockholders, who have not received any dividends for the past nine years, some little return on the money invested.

Company Asks Only a Square Deal

About Jan. 20 there was filed with the department of public works at Olympia a temporary tariff extending the 5-cent fare until March 31 of this year. The company never withdrew regular tariff No. 6, under which it collected the 6¼-cent fare, but simply filed an experimental supplementary tariff every three months, keeping the 5-cent fare in effect. Due to the fact that it did not receive sufficient revenue last year with which to pay expenses and taxes, and anticipating increased expenditures in the way of higher wages this year, the company filed with the department of public works, to take effect April 1, an experimental tariff to run for three months eliminating transfer privileges except from the Lowell-Smelter line to the bayside cars.

The company, in turn, was informed by the department of public works that it would allow this to go into effect unless a protest was filed by the citizens of the community, in which case it would not allow it to go into effect, but would give the company and all concerned a hearing. There matters stand.

The company concedes the right of the people, who pay the fare and support the road, to have some voice in how these fares should be paid. All the company asks is that the fares shall be sufficient to allow it to pay the employees a living wage and to give the company something near a reasonable return.

Forty-two Buses for Akron

Northern Ohio Company Has Bought $300,000 of Vehicles for City and Interurban Service

The Northern Ohio Traction & Light Company, Akron, has purchased forty-two new buses, of which twenty-eight will be used in Akron city and the remaining fourteen will be used in the Akron-Cleveland interurban service. The buses represent an investment in excess of $300,000.

The interurban buses will be of the de luxe chair car type. They are White chassis with Bender bodies. Each seats 20 passengers. It is planned to maintain a fifteen-minute service between the two cities. During the last thirty days a 75-cent rate to Cleveland on Mondays, Wednesdays and Fridays has so increased travel that the regular thirty-minute service has proved inadequate.

For the city service ten Whites seating twenty-five each, six Macks seating twenty-five each, six Reos seating twenty each and six Masons seating twenty each have been purchased. Some of the bodies are being built by The G. C. Kuhlman Car Company. All bodies are steel and of the same type as the twenty-four buses now used by the company in its Akron city service.

The new routes to be served include extending the Akron crosstown line east to the Martha Avenue loop; Maple Street line west to Hawkins Avenue; new line from car line terminal on Wooster to West South Street; South Main from Steiner Avenue to Firestone Boulevard.

The buses will give service to sections of Akron which now have little or no transportation facilities.

Buses for Bridgeport in Coordination with Railway

The Connecticut Company believes it has made initial overtures to the community at Bridgeport in the matter of bus service upon routes not served. As a result it will await expressions from the community as to the desirability and acceptability of the proposed auxiliary service.

The chief factor in the consideration is one of finance. Less important is the matter of securing the bus equipment which it is conceded can be taken care of within a reasonable time. President Storrs has pointed out that the Connecticut Company is committed to a policy of extending bus service.

The commission has now before it the proposition of passing upon the petitions of local individuals and corporations for the operation of bus lines and at the same time the proposal of

the Connecticut Company to start lines. Upon the decision of the commission will depend to a great extent the time within which the bus service will be established.

Mr. Storrs outlined what the Connecticut Company recognizes as needed routes in Bridgeport, as follows:

1. Iranistan Avenue as far as the bathing beach in summer and as far as the park in other periods of the year.
2. Through Howard Avenue and Spruce Street to serve the industries located in the West End as well as the industrial workers who have their homes in this territory.
3. Out Madison Avenue over routes as now served by jitneys and further beyond the jitney route on Madison Avenue itself if occasion requires.
4. From the industrial territory on the southerly side of the New York, New Haven & Hartford Railroad tracks in East Bridgeport across the railroad tracks and through the industrial settlement on the northerly side of the tracks as far as the General Electric plant.

Mr. Storrs holds to the opinion that it is only through such co-ordinated service that the city of Bridgeport can obtain a thoroughly efficient transportation medium operated for the benefit of all of the people of the city at the lowest possible charge.

Storm in East Hampers Traffic

Simultaneously with the preparation of spring and summer schedules for electric railways came on April 1 a wind, snow, sleet, thunder and lightning storm, the only real blizzard on the Atlantic Coast during this winter. Four deaths and many injuries were reported. Heavy traffic congestion, blocks, tie-ups, isolation of towns and a cost to New York City of $250,000 were the minor results. Eight inches of snow fell in New York City. In addition to the "L" and train service being generally hampered there were traffic delays on the Long Island road, the Brooklyn-Manhattan Transit lines, the New York & Queens County Railway and the municipal cars on Staten Island. A serious accident occurred when a B.-M. T. shuttle train and an Interborough elevated train crashed in Long Island City. In this collision one person was killed and thirteen injured.

Mr. Turner Retained at Pittsburgh

The Council of Pittsburgh has confirmed the appointment by the Mayor of Daniel L. Turner, New York, to be chief engineer of the survey to be made of transit and traffic conditions in Pittsburgh. An advisory committee consisting of Ralph S. Rainsford, chief engineer of the Pittsburgh Railways; L. W. Monteverde, representing the real estate board, Henry Tranter, the Civic Club and Allied Boards of Trade; George S. Davison, the Chamber of Commerce and planning commission and W. M. Jacoby the Retail Merchants' Association, was named and confirmed at the same time.

With this organization subway and other solutions of traffic problems is left for consummation of a plan. Funds amounting to $60,000 taken from the $6,000,000 authorization for the downtown subway will be made available for the study or survey.

Bus Operation in Prospect in Albany District

The United Traction Company, serving the cities of Albany, Rensselaer, Watervliet, Troy and Cohoes, N. Y., is planning to put trackless trolleys into operation in Cohoes and the city of Rensselaer on certain lines which act as feeders to the main arteries of travel.

In the city of Rensselaer, situated immediately opposite Albany on the east side of the Hudson River, application was made to the Common Council on April 1 for permission to substitute buses on one of its city lines. A public hearing is to be had on the application on April 15.

Plans to tear up the Cohoes belt line tracks and supplant the street cars with trackless trolleys, the work probably to be completed before summer is over, were disclosed last week by officials of the United Traction Company. It is expected, if the Cohoes plan proves a success, that other "feeder" lines in the Capitol district may be replaced by "pneumatic-tired trolleys."

The company must first obtain permission from the Public Service Commission to install the new cars and then must convince the Cohoes Common Council that the move will be a wise one. After arrangements with the city have been completed about three months will be necessary to make the change.

Trackage to be abandoned is about 2.3 miles long. It will cost the company about $74,000 to remove the tracks and repave the street, Ernest Murphy, general manager of the United Traction Company, told Mayor Cosgro of Cohoes.

Northern Ohio Is Rehabilitating Mahoning Valley Line

Through passenger service between Akron and Warren and Akron and Alliance every two hours was established by the Northern Ohio Traction & Light Company on April 1. Light-weight Peter Witt cars are being used. The old cars are to be rebuilt into freight cars and trailers.

At the same time the company began the work of completely rehabilitating the Cleveland, Alliance & Mahoning Valley Railroad from Ravenna to Warren and Ravenna to Alliance. This road the company recently took over under a purchase agreement with the bondholders. All curves are to be renewed at once and 45,000 new ties placed in the roadbed. New rail will be laid in many places where the old rail was badly worn.

Connection is made at Silver Lake Junction from Alliance, Newton Falls and Warren with limited trains to Cleveland, while freight trains operate direct from these cities to Cleveland, Detroit and other cities. Freight terminals are to be increased at all points in the immediate future. The C., A. & M. V. line offers excellent freight opportunities and these are to be embraced by the Northern Ohio Traction & Light Company.

Arrangements are being made to start a thirty-minute service between Newton Falls and Warren. Weekly passes will probably be sold for use on this line.

A. C. Blinn, vice-president and general manager of the Northern Ohio Traction & Light Company, is conducting a speaking tour through the towns and cities reached by the old C., A. & M. V. lines. He is asking the co-operation of the people in bringing the road out of the chaotic condition in which it has been for several years. His appeals are meeting with splendid response.

Ordinance Passed in Cleveland to Inquire Into City Purchase

The Council of Cleveland, Ohio, has passed an ordinance which calls for a committee of five, to work in conjunction with the street railway committee, to survey the feasibility of taking over the entire property of the Cleveland Railway, now operated under a service-at-cost arrangement. The survey is to include a report on the value of the property and recommend a means of financing the purchase.

$4,000,000 Long Island Electrification Authorized

The Long Island Railroad announced on April 3 that the largest improvement budget in its history had been authorized by its board of directors, and that instructions had been issued to carry out the work with the least possible delay.

The budget provides among other things for the electrification of the Montauk division from Jamaica to Babylon at a cost of $4,000,000.

The date set for completion of the electrification work is May, 1925, in time for the summer schedule. The completion of this work will improve the whole operation of the railroad system, greatly reduce the transfer of passengers at Jamaica, enable the railroad to operate more trains in the congested section between Amityville and Jamaica, lessen the running time of local trains and give service similar to other electrified branches of the system.

G. R. Van Namee Named for New York Commission

Governor Smith on March 31 transmitted to the New York State Senate the nomination of George Rivet Van Namee, Watertown, N. Y., as a member of the Public Service Commission to fill a vacancy caused by the resignation of James A. Parsons for the unexpired term of nine years.

Mr. Van Namee became a member of the Public Service Commission, Second District, upon which he served until the consolidation of the commissions under the Miller administration of 1921. He then returned to Albany as secretary to Governor Smith.

Higher Fare Sought.—The Indianapolis Street Railway, Indianapolis, Ind., has applied to the Public Service Commission for a 7-cent cash fare with a 6¾-cent ticket rate. A 1-cent transfer charge is also sought. The present fare is 5 cents cash and 2 cents for a transfer. Corporation Counsel Groninger recently stated that the city would insist on seventeen tickets for $1.

Pittsburgh Men Ask Wage Conference

Business Agent John L. Nelson of Division No. 85, Amalgamated Association, representing the 3,000 motormen and conductors of the Pittsburgh Railways, has served notice that changes will be asked in the existing agreement between the company and the union. The notice is in accordance with the existing agreement, which expires at nidnight, April 30.

A note simply announcing that changes will be asked, and not going into any details on the nature of the changes—which, however, are understood to include a request for a wage increase—was handed to General Manager Fitzgerald of the railway along with a request that the changes be taken up in conference at an early date convenient to the company. This date will be fixed later.

New York State Men Present Wage Request

The Rochester, Syracuse and Utica divisions of the Amalgamated Association, in a proposal for a new contract effective May 1, submitted to James F. Hamilton, president of the New York State Railways, seek a 70-cent hourly wage and a six-day week. More than 3,000 workers make up the three city divisions, which are carrying on joint negotiations. Contracts, however, are made separately with the three unions.

The scale now in effect went into force last May. It provides as follows: 51 cents for the first three months, 53 cents for the next nine months and after one year 55 cents an hour. An increase of 5 cents an hour was granted last year. In the proposal just submitted, the men ask a scale of 66, 68 and 70 cents and a 10-cent increase over those amounts for operators of one-man cars.

Unusual Agreement Effected

An agreement has been made between A. K. Ellis, general manager of the Wisconsin Traction, Light, Heat & Power Company, and Olaf M. Lundquist, owner of the Inter-City Transportation Company, Inc., whereby the traction company will take over the motor bus business of this company, which has been furnishing competitive bus service parallel to the interurban line in Appleton, Menasha and Neenah. Mr. Lundquist, formerly owner of the Inter-City line, has been placed in charge of the new department due to his bus operating experience and close touch with local bus conditions.

Wages Advanced in Atlanta Three Cents an Hour

The arbitration board called to settle the wage dispute between the Georgia Railway & Power Company, Atlanta, Ga., and its railway employees has decided on an advance of 3 cents an hour. The company announced that the amount would be paid. Under the new schedule of wage rates, effective as of Jan. 1, 1924, employees paid by the week will receive a 10 per cent increase. Employees working by the hour who are not trainmen received an increase of 3 cents an hour and platform men's wages were raised 3 cents an hour for the first nine months, 8 cents an hour for the second nine months, and thereafter raised to 51 cents an hour.

The company estimates that the increase will add about $235,000 to the expenses for the year.

Wages in Memphis Will Be Arbitrated

Unable to reach an agreement on the new wage scale for the employees of the Memphis Street Railway, Memphis, Tenn., for the year beginning April 1, representatives of the company and the union have announced their decision to leave the settlement to arbitration. This is in accord with the agreement made by both sides last year. On March 1, thirty days before the year's contract expired, the union advised the company of its demand for an increase. The company responded with the demand for a 4-cent cut, which was refused by the employees. Then representatives were appointed to confer in an effort to reach an agreement. The wage scale in effect for the last year is 42 cents an hour for first year men, 47 cents for second year men and 52 cents for men in the service longer than three years.

Fare Readjustment Asked in Baltimore

The United Railways & Electric Company, Baltimore, has filed with the Maryland Public Service Commission a petition asking that rates and charges be fixed to yield the company an annual net income of $1,500,000. The request also is made that until this be done the present rates and charges be maintained. The present fare is 7 cents.

The petition is signed by C. D. Emmons, president, and William H. Maltbie and Joseph C. France, attorneys for the company. It is pointed out that $1,500,000 is the income which the commission itself had decided was reasonable, necessary and in the public interest. The minimum annual net income set by the commission was $1,000,000.

In its appeal to the commission the company says that the granting of the petition, which seeks to readjust fare zones, will reduce materially the gross income without decreasing the expense of operation. Although no request is made for a specific rate, the petition points out that the 7-cent fare is lower than that charged in many other cities.

In 1919, the petition states, the commission established rates and charges intended to yield a minimum surplus of $1,000,000 to the company and placed upon the latter the burden of increasing this amount to $1,500,000 through exercising economy and efficiency. Statements filed during the last four years show that from Jan. 1, 1920, to Dec. 31, 1923, the total net surplus is $3,454,365, or $2,545,635 less than the $6,000,000 which should have been collected at the rate of $1,500,000, the amount set forth by the commission as necessary in the interest of the public.

Rerouting Proposals in Toledo Approved

The City Council at Toledo has approved eleven of the individual proposals in the rerouting plan submitted some weeks ago by Commissioner W. E. Cann for extensions and betterments to the service supplied by the Community Traction Company. One which has been delayed is the elimination of the Indiana line. The most important item in the new legislation was the final approval of the trackless trolley cross-town line by way of the Fearing Street subway. The new route for the Long Belt line, which will be out Contan Street and Cherry to Central Avenue and providing for elimination of tracks on Collingwood Avenue between Delaware and Central, is another important move. The north arm of the Short Belt will be connected up with the southern arm of the Bancroft Belt. The new extension of Summit Street will be double-tracked. Track will be laid in Jackson Street for a new short interurban loop downtown. Extensions will be made on the East Broadway line and the Erie Street bus feeder will be eliminated. The Collingwood bus line, Ottawa Park line, elimination of the Michigan line and change in route for the Erie Street line will come up later for action by Council. In voting upon the separate issues the Council also approved a general rerouting of the cars in the business section.

Commissioner Cann told the members of Council that he had figured the deficit down to $48,000 a year under the new system and believed that additional business would make that up and add to the stabilizing fund.

He said in a letter to Councilman Dowd that the adoption of the plan would not result in increased fares, but would produce material increases in the balance of the stabilizing fund. His original estimated deficit was $102,857. He believed the new power rate offered by the Toledo Edison Company would mean a saving of $100,000 a year.

The officers of the Community Traction Company will have to go over the projects and give their views on probable costs and revenues before the improvements can be made. Then there will come the necessity for financing.

Bus Drivers Strike in Newburgh

Bus drivers employed by the Public Service Corporation of Newburgh, N. Y., went on strike March 18 and the city was without bus service until March 21. The strike was called in protest against the discharge of sixteen members of the bus drivers' union and the arrest of three others on complaint of the corporation on charges of larceny and alleged improper handling of collections.

When the members of the drivers' union became convinced that the company's action in discharging the sixteen employees was not an attack upon the union itself, the men returned to work. The sixteen discharged drivers were not reemployed, although charges against them are understood to have been dropped. Buses were installed to replace the local railway some time ago.

Strike in Scranton

Inability to Agree on Questions of Wages and Rush-Hour Tripper Service Results in Walk-Out

Railway service was abandoned in Scranton, Pa., on April 1, when 600 employees of the Scranton Railway walked out following the inability of the company and the men to come to an agreement on wages and rush-hour tripper service. The trainmen are demanding an increase of 17 cents an hour. The company is willing to submit both the wage question and the rush-hour tripper service to arbitration, but the men are demanding that only the wage be arbitrated and that the question of tripper service be dropped.

A conference between representatives of the company and the striking employees was held on April 3, the participators being Mayor John Durkan, Bishop J. J. Hoban, the publishers of both daily newspapers and representatives of the United States Department of Labor. Neither side would recede from the position taken and the conference adjourned without any progress having been made. In order to meet the emergency caused by the strike the Public Service Commission has granted authority to the city of Scranton to issue ten-day permits to jitney operators provided satisfactory guarantee as to personal and property liability is given.

The wage contract expired on April 1. Prior to that date Division 168 of the Amalgamated presented a contract asking for an increase for all employees, amounting to 17 cents an hour. Along with this demand double time was sought for Sundays for trackmen, carhouse men and shopmen. A meeting was held on March 25, at which the men presented their demand for increased wages. When the increase was refused the men inquired what counter proposition the company had to offer. The company then submitted the contract the men are now working under, with a proviso for "spread runs," i.e., runs twenty or less to take care of morning and afternoon rush. Under them the men would work approximately eight hours in a spread of thirteen, similar to men in other cities. Following that meeting the employees' committee called a midnight meeting, took a strike vote and notified the management that the men would not arbitrate the questions involved.

The wages paid to the Scranton Railway employees have been advanced 26 per cent since January, 1920. At that time the wage was 50 cents an hour. The present scale is 63 cents an hour. With the demand of the men satisfied the scale would amount to 80 cents an hour, totaling an increase to the company of $300,000 a year.

In a statement to the public J. J. Coleman, general manager, said the net profit last year, after deducting operating expenses, taxes, bond interest and other fixed charges, was only $94,000. The company's earnings for the year were $85,000 short of what the State Public Service Commission fixed as the amount the company was entitled to earn. Of last year's net profit of $94,000, $80,000 was earned during the first three months. Wages were raised to their present level on April 1, and from that date to the close of the year, a period of nine months, only $14,000 was earned.

Weekly Pass in Victoria—Free Movie Admittance

Weekly passes were put in effect on the Saanich line of the British Columbia Electric Railway, Victoria, B. C., on March 29. This is an interurban line, 24 miles in length, traversing a rural district adjacent to Victoria. The basis will be less than the price of six round-trip tickets between two points. The purpose is to improve traffic, which has been cut down by motor and bus competition. The Saanich line has been operated with one-man cars for more than a year. Under the pass system, a passenger when boarding a car will show his pass and receive a "hat check," which he will deposit with the operator on leaving the car. In order to popularize the new passes the company has arranged to have passholders admitted to one of the moving picture theaters free on every Thursday in April. A supply of passes for four weeks may be bought at once.

Foreign News

Tramway and Bus Strike in London

A great strike of tramway and bus employees in London began on March 22, causing enormous inconvenience and loss of time to the public. All the tramway undertakings of the metropolis and the London General Omnibus Company were involved, but a comparatively small number of buses belonging to minor companies continued to run. These, however, were but a drop in the bucket. People had to use the steam and electric main lines, where these were available, or to walk, except in the case of those wealthy enough and fortunate enough to be able to use cabs. Both tramway men and busmen are now combined in one trade union called the Transport and General Workers Union. It was primarily a tramway men's strike, their demand being for an increase of wages of 8s. per week. The bus men had no particular grievance, but they came out "in sympathy" with the tramway men.

The wages ruling in the London district for tramway drivers and conductors at the time of the strike were 58s. per week, rising to 67s. after two years' service. The bus drivers began at 80s. 6d., rising to 86s. 6d., while the conductors got 73s. 6d., rising to 79s. 6d. It had always been contended that bus drivers' work requires more skill than tramcar drivers' work, and that this is the reason for the difference of pay.

It was computed that about 25,000 bus employees and 17,000 tramway employees were affected by the strike. The tramway undertakings involved were those of the London County Council and a number of smaller ones, some belonging to local authorities and some to companies in the outskirts of London.

The strike was preceded by negotiations between representatives of the parties, but these proved futile, and the government thereafter set up a court of inquiry to ascertain the facts.

For the last few years tramway men's wages in England generally have been regulated by a national agreement under which wages rise or fall 1s. per week for every five points rise or fall in the official index figure of the cost of living. By their demand and by their strike action the London men broke away from the agreement, and did so without giving the stipulated three months' notice. They averred that their wages were 5s. a week lower than in September, 1922, when the cost of living figure was the same as now. That did not appear to accord with the sliding scale agreement.

Before the negotiations collapsed, the tramway authorities, while declaring that the financial condition of their undertakings was such that they were unable to pay any higher wages, in some cases made compromise offers. The London County Council, West Ham, and Walthamston offered an increase of 5s. per week, while others offered 2s. and some offered nothing. An alternative proposal by the employers was that the whole dispute should be submitted to arbitration.

The main reason given by the employers for the bad financial position of the tramways was unrestricted bus competition. The trade union representatives rejected all the offers made by the employers.

It was when the National Council for the tramway industry found that it could not solve the difficulty that the individual offers were made by the employers. The London County Council issued a statement to the effect that its offer of 5s. a week would mean an increased expenditure of at least £100,000 a year, while the receipts for the present financial year now closing showed a decline of nearly £400,000 compared with the previous year.

The position of the tramway companies affected which are included in the underground railways "combine" was set out in a statement signed by Lord Ashfield, chairman of the group. In this it was stated that for the year 1923 the return on capital of the Metropolitan Electric Tramways, the London United Tramways Company and the South Metropolitan Electric Tramways, after providing a totally insufficient sum for renewals, was less than two-thirds of 1 per cent. In the first two months of this year the three companies were in a worse position and actually failed to meet their fixed charges by £6,393, and had no funds for renewals. The earnings lost to the tramways were not gained by the underground railways or the buses.

Financial and Corporate

Birmingham Properties Sold

Local Railway and Light Units Pass at Foreclosure to National Power & Light Company

The properties of the Birmingham Railway, Light & Power Company were sold for $18,500,000 to the National Power & Light Company, New York, at noon March 31 in front of the courthouse door by J. S. Pevear, special master. The properties were bought in the name of the Birmingham Electric Company, organized a few days ago to purchase and operate the properties. Bidding was spirited. Starting at $13,000,000, the price gradually rose to $18,500,000.

Other companies which bid for the properties were the United Gas & Electric Engineering Company, New York, and the L. H. McHenry Company, Louisville, Ky. L. B. Hatch represented the purchasing company at the sale.

Sale of the property was made subject to outstanding debts and it is understood that the bid accepted will make the price of the properties approximately $30,000,000. There are outstanding about $9,500,000 of bonds, which it is stated are to be assumed, and about $2,000,000 receiver's obligations, which must be met.

Tidewater Sale Postponed

Sale of the so-called Tidewater line was called for 12:30 o'clock, but no bidders appeared. Mr. Pevear announced that the sale would be postponed until April 14, at noon, when this line will again be offered for sale. Should there be no bidders at that time, Mr. Pevear announced that the line will continue to operate in the hands of the receivers and efforts will be made to give as good service as its receipts will permit.

Confirmation of the sale of the Birmingham Railway, Light & Power Company property is expected following the return of Judge William I. Grubb of the United States District Court from New Orleans. Pending the confirmation of the sale and the formal transfer of the properties to the Birmingham Electric Company, the operation will continue under the direction of Lee C. Bradley and J. S. Pevear, co-receivers.

H. C. Abell, president of the National Power & Light Company, stated following the sale that his company, some two or more years ago, acquired the capital stock and some of the debt of Birmingham Railway, Light & Power Company, formerly owned by American Cities Company. He said that more than $10,000,000 of debts of the old company will be paid off in full, thus laying the basis for a sound program for future financing. Among the debts so to be paid will be the $781,000 of first mortgage 5 per cent bonds of Birmingham Railway & Electric Company which fall due on July 1, of this year. It is expected that arrangements will be made so that the holders of these bonds can get principal and accrued interest at any time on surrender.

In line with modern practice the Birmingham Electric Company will have non-par value stock, both preferred and common. No change is contemplated in the present executive management. The temporary board of directors of Birmingham Electric Company will continue to function for the time being, but it is expected that the permanent board of directors will be composed, for the most part, of residents of Birmingham.

A new modern serial mortgage will be created and bonds will be issued to pay a part of the debts of the old company. Between $4,000,000 and $5,000,000 of the present company's so-called senior securities will be shifted into common stock as a result of the reorganization.

Conference on St. Louis Reorganization Held in New York

F. O. Watts, president of the First National Bank, St. Louis, and one of the financial group most active in the reorganization plans for the United Railways, St. Louis, acted as chairman of the conference held in New York on April 2 to consider the affairs of the company. He is expected to be in St. Louis on April 7 and at that time will issue a statement. The meetings in New York have been under the auspices of the St. Louis Transit Company 5 per cent bondholders combined committee. Edwin M. Bulkely of Spencer, Trask & Company is chairman of this committee and William P. Gest of the Fidelity Trust Company, Philadelphia, vice-chairman. It is believed that this committee, working with the executive committee, will formulate the policies which will lift the receivership. Newman, Saunders & Company, New York, are mentioned as bankers for the reorganization committee.

New York State Railways Buys Bus Company

The New York State Railways has purchased a majority interest in the East Avenue Bus Company, Inc., operators of a 10-mile route from the heart of Rochester to Pittsford, according to J. J. Basrow, president of the bus company. Plans are under way for an extension and improvement of service. The East Avenue line will retain its separate identity. The bus line operates over East Avenue, Rochester's finest shopping and residential street, connecting the business and exclusive suburban districts. The railway operates trolley service between Rochester and Pittsford over a different route. No immediate change in either route is anticipated.

Investment Opportunities in Tractions Overlooked

There are neglected opportunities in the public utility field similar to those investment bargains which prevailed in railroad securities four years ago. This is the conclusion of H. M. Jacoby of the banking firm of H. M. Jacoby & Company, New York. He says that investors four years ago needed courage to buy railroad issues; to-day they need courage for investment in many utilities, notably tractions. Mr. Jacoby says the time of acquisition should be at the turning point and not after everything becomes bright and rosy again.

Remarking that his firm was not obligated to hold any briefs for electric railways, Mr. Jacoby pointed out that there were many bonds of such companies selling to yield 8 to 10 per cent, a condition due to the fact that the average investor had not noticed the changing position of the traction business. In a statement made to the ELECTRIC RAILWAY JOURNAL he continued:

> It so happens that in the nature of the case there will always be certain groups of securities which are at times unpopular with investors. This has, for instance, been the case with traction securities. This lack of popularity was certainly well deserved, considering that during the period of ultra-inflated operating costs—1919—receiverships of electric railways amounted to $634,174,000 par value of securities.
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> However, is it not interesting to note that this figure of over half a billion was reduced to only $23,039,000 in 1923 and that this figure is the lowest and most favorable one in fifteen years?
>
> We have heard a good deal about bus and automobile competition. Yet car rides per capita have increased from 100 in 1912 to 109 in 1917 and to 117 in 1922. In other words, the growth of traffic has been just about as rapid during the past five years as it has been during the five preceding years. The truth of the matter is that notably in the larger cities the automobile reaches the saturation point at a given angle while bus competition can only be of a supplemental character.
>
> To cite two recent cases: When the street car franchise in Akron expired, on Feb. 1 of this year, the trolleys were ruled off the streets and a bus service was started. Only a few weeks later, a petition signed by 33,000 citizens forced the Mayor to reinstate the trolleys on an equitable fare basis, while the jitney competition was eliminated. In New Jersey, where the jitney competition is probably more keen than in any other part of the United States, 8,000,000 more passengers were riding on the lines of the Public Service Railway in December, 1923, than in December, 1922. Here are facts with no opinion involved.

Mr. Jacoby also referred to the recent decrease in cost of certain basic commodities used by the electric railways as factors making for lowered operating costs.

$1,027,238 Deficit in Buffalo

There was a deficit last year of $1,027,238 in the operation of the International Railway, Buffalo, N. Y. The passenger revenue during 1923 was $9,468,124 and revenue from other sources $327,061. The report states that the operating revenue was $926,093 less in 1923 than in 1921, the year before the last strike. The difference in the revenue is explained by the operation of jitneys and the practice of motor car owners in giving a lift to persons who would otherwise use the street cars.

President Tulley told the stock-

holders that the Bailey Avenue bus line is being operated at a loss of $2,000 a month.

The International now awaits only the determination of its property value and the sanction of a higher fare, says the report, to complete the following program:

To render adequate service to the public; to promote among the employees efficiency and co-operation and a betterment of their conditions; to protect the owners' investment in the property and to assure the earning and payment of a reasonable return.

Mr. Tulley states that 99 per cent of the eligible employees of the I.R.C. are stockholders of the company. The wages of I.R.C. employees were raised 2½ cents an hour for 1924. They signed over the money, amounting to about $200,000, to the trustees of their association, who bought for them $1,000,000 par value I.R.C. stock for $100,000 and $200,000 par value I.R.C. bonds at 50 cents on the dollar. This investment will pay them 5 per cent.

A separate individual savings fund has also been started for the men.

New Jersey Company Making Progress

President McCarter Looks Hopefully Toward the Future—Reviews the Past Year's Work—Riding Is on Increase and Revenues Are Better

THE Public Service Corporation of New Jersey reports for the year ended Dec. 31, 1923, a net increase in surplus before the payment of common stock dividends of $3,737,179. The Public Service Railway, operating 893 miles of track and 2,420 cars, and its affiliated companies report deficit of $1,675,534 for the year.

In reviewing the affairs of the company, President T. N. McCarter, in speaking of the railway, says that the company has made considerable progress in perfecting its plan for co-ordinating street car and bus service and has been able to put into effect some important economies in operation, which permit the hope that, with public co-operation in the carrying out of the company's co-ordination scheme, the railway will, within a reasonable time, be operating on a satisfactory and stable basis. Mr. McCarter says that the new rates have not so far produced adequate revenue for the operation of the system, but that they have quite largely increased riding and that revenue is much more satisfactory than at first.

Operation of the railway for the first six months of 1923 showed a margin of some $202,000 after payment of operating expenses and fixed charges, but this amount and more was needed to meet the deficit accumulated since 1917. Trouble for the company was precipitated with the expiration on Aug. 1 of the wage agreement with the railway employees and their demand for an increase in pay amounting to 30 per cent.

The financial condition of the company was such that it was impossible to grant the men's demand. Every endeavor was made by the company to secure a renewal of the agreement with the men at the old pay and as a compromise the company offered to apply to wage increases the estimated suplus for the year, but without success. On Aug. 1 the trainmen quit work and for a period of fifty-one days no cars were operated. The decision of the company not to attempt operation with new employees was based on the impossibility of securing a sufficient number of competent men and upon its belief that any attempt to run cars would lead to disorder and the destruction of property.

After careful consideration, there was presented to the state and municipal authorities and to the public generally a "plan of settlement," providing for the co-ordination of both trolley and bus operation under the company's management. It was stipulated that the company would purchase competing buses, give employment to competent bus operators, grant a 20 per cent increase in wages to employees and put into effect a universal fare of 7 cents with transfers between trolleys and buses. The municipal and state authorities were asked to co-operate.

This plan indorsed by commercial organizations all over the state, was accepted by a number of municipalities and petitions favoring its acceptance were signed by nearly 400,000 citizens. Owing to the mixed jurisdiction of the state and the municipalities, however, the plan was not accepted. The stoppage of street car service and the inability of the buses adequately to supply the demand for transportation was in the meantime causing such loss and inconvenience to the public, and especially to business men, their employees and patrons, that the Governor of the state, acting through the Attorney-General, and on the plea that public interest required the immediate resumption of street car service, brought an action in equity before the Chancellor for an injunction to compel the company to resume service.

In granting the injunction, the Chancellor pointed out that the way was open for a just settlement of the transportation difficulty, saying as to the effect of the court's action: "I think . . . that the effect will be to stimulate negotiations to settle the many difficulties with which the company is confronted."

The injunction was accepted without appeal by the company, which granted a 20 per cent increase in wages and resumed operation on Sept. 21.

Mr. McCarter explains that shortly afterward the company adopted, at the suggestion of the Board of Public Utility Commissioners, for a trial period of four months beginning Oct. 1, a rate schedule which provided within the limits of the larger cities served a 5-cent fare with an additional 5-cent charge in the suburbs, no transfers. The rate of 8 cents, four tokens for 30 cents, 1 cent transfer, in effect before the strike, was continued in all other parts of the territory. This schedule as applied to the traffic of the railway is substantially equivalent to the fare in effect before the cessation of service.

With respect to the railway's rate case Mr. McCarter says that on June 9, 1923, former Judge Thomas G. Haight, the special master appointed by the United States District Court to take evidence in the proceedings instituted by the Public Service Railway in 1921, handed down a report fixing the value of the company's property used and useful in the operation of the company at $110,000,000 and continuing the rate of 8 cents, four tokens for 30 cents, 1 cent transfer.

To this report the company filed exceptions on the ground that several items had been improperly omitted which if included would have given the property an increased value, while the defendants excepted on the grounds that the value was too high. The exceptions have been argued before the District Court, which reserved decision. On Oct. 1 the fare schedule now in effect was applied for at the suggestion of the Board of Public Utilities Commissioners and was accepted by the United States District Court, without prejudice to the proceedings before that court.

During the year the railway charged to fixed capital installed during the year $2,651,089, less $603,359 of property written off, leaving the net in-

INCOME ACCOUNT OF PUBLIC SERVICE RAILWAY AND AFFILIATED COMPANIES FOR THE TWELVE MONTHS ENDED DEC. 31, 1923

	Public Service Railway	Public Service Railroad	Affiliated Companies	Total
Operating revenues	$21,524,601	$265,533	$1,314,868	$23,105,003
Operating expenses and taxes	17,407,259	212,534	977,829	18,597,623
Amortization charges	945,553	.....	137,200	1,082,753
Operating revenue deductions	18,352,812	212,534	1,115,029	19,680,376
Operating income	3,171,788	52,999	199,839	3,424,627
Non-operating income (exclusive of dividends of affiliated companies)	93,375	808	26,126	120,308
Gross income	3,265,163	53,807	225,965	3,544,936
Income deductions (bond interest, rentals and miscellaneous interest charges)	5,244,217	114,576	52,715	5,411,510
Net income or loss	*1,979,054	*60,769	173,249	*1,866,574
Profit and loss accounts (excluding dividends)	†176,697	†3,688	†10,829	†191,215
Surplus—(before dividends)	*1,802,357	*57,080	184,079	*1,675,358
Intercompany dividends	†284,624	.....	284,624	.....
	*1,517,733	*57,080	*100,544	*1,675,358
Dividends paid unaffiliated interests (directors)	.....	.....	176	176
Net increase or decrease in surplus	*$1,517,733	*$57,080	*$100,720	*$1,675,534

* Deficit. † Credit.

TRAFFIC STATISTICS OF THE PUBLIC SERVICE RAILWAY FOR LAST TEN YEARS

Year	Revenue Passengers	Transfers and Passes	Total Passengers	Percentage of Passengers Using Transfers	Average Fare per Passenger, Cents	Car-Mileage	Car-Hours	Passengers per Day	Passenger Receipts per Car-Mile, Cents	Passenger Receipts per Car-Hour
1914	310,308,660	96,969,254	407,277,914	21.2	3.83	50,792,889	5,665,119	1,115,830	30.72	2.75
1915	313,923,363	100,498,677	414,422,040	21.5	3.82	51,873,660	5,573,670	1,135,403	30.49	2.84
1916	342,205,993	109,492,019	451,698,012	21.8	3.82	54,964,708	5,911,131	1,234,147	31.37	2.92
1917	361,187,782	115,787,201	476,974,983	21.9	3.82	56,087,403	6,021,225	1,306,781	32.44	3.02
1918	352,190,897*	98,029,909	451,220,806	20.0	4.31	54,039,150	5,698,089	1,236,221	36.00	3.41
1919†	327,619,606*	69,069,628	396,689,234	15.4	5.71	57,644,927	6,039,453	1,086,820	39.29	3.75
1920	363,757,587*	89,777,107	453,534,694	17.7	5.79	60,798,743	6,539,207	1,239,166	43.21	4.02
1921	348,284,212*	87,395,589	435,679,801	17.3	5.90	58,309,883	6,212,276	1,193,643	44.11	4.14
1922	325,265,180*	84,947,634	410,212,814	17.6	6.27	56,419,982	5,983,122	1,123,871	45.59	4.30
1923	300,319,928*	53,875,005	354,194,933	12.4	5.95	49,272,078	5,206,092	970,397	42.75	4.05

* Excluding revenue transfer passengers. † Mile zone system in effect from Sept. 14 to Dec. 7.

crease in the fixed capital $2,047,729. The railway also retired $388,000 of equipment trust certificate of series "D," "E" and "F" in accordance with the equipment trust agreements.

The report contains as a frontispiece a reproduction of a half-tone showing types of cars, buses and operators for use in co-ordinated service.

Issue of Stock for Acquisition Purposes Completed

The Charleston Interurban Railroad, Charleston, W. Va., has completed plans to issue $500,000 of cumulative participating preferred stock of the par value of $100. The company proposes to use the proceeds from the sale of 4,250 shares of the preferred stock to acquire all the capital stock of the Kanawha Valley Traction Company and the Charleston-Dunbar Traction Company and to use the proceeds from the sale of 750 shares of the preferred stock to defray the cost of certain improvements. The rest of the money from the sale of stock is to be used for other corporate purposes.

Fare Advance in Cincinnati Explained

Exact figures on the operation of the Cincinnati Traction Company, Cincinnati, Ohio, for February and on which the fare advanced on April 1 from 8½ to 9 cents have been announced by W. J. Kuertz, Director of Street Railroads. The deficiency for February was $24,826, and the total loss for two years—1922 and 1923—is $574,786. This includes deficiency for city tax since Oct. 1, 1923. For three months in 1923, October, November and December, the city tax amounted to $89,000. For the two months in 1924, January and February, it amounted to $57,677. The deficiency for return on capital in 1922 amounted to $163,278 and in 1923 to $264,830.

There was a daily decline in the number of revenue passengers for February, 1924, as compared with 1923, although the aggregate for February this year is greater, due to having twenty-nine days. The revenue passengers in February, 1924, brought $8,549,249 and in February, 1923, the revenue was $8,343,104.

Although detailed figures are unavailable the number of daily passengers during March is 10,000 below that of March a year ago. Unemployment, the use of the radio in the homes and bad weather are some of the explanations offered, as well as the increase in fare, it being 1 cent more this year.

Purchase of Boston "L" by State Urged

An order has been filed in the Massachusetts Legislature calling for the appointment of a special commission to consider the advisability of the state acquiring the property of the Boston Elevated Railway. Representative Coyne contends that under the present law the State has the right to purchase the properties by paying the amount of the outstanding stock, approximately $52,000,000. He said purchase by the state would save $4,000,000 in dividends annually and that it would eventually result in a reduction of fare.

Indiana Road Purchased from Bondholders

Purchase of practically all bonds of the Goshen and Peru divisions of the Winona Interurban Railway, Warsaw, Ind., by Harry Reid and James P. Goodrich, Indianapolis, and Theodore Frazer, Warsaw, has been announced.

The plan of the new holders of the bonds, according to Pierre Goodrich of Mote & Goodrich, is to foreclose the mortgages on the property, sell the railway and terminate the receivership.

More than $2,000,000 in bonds are outstanding, $1,593,700 on the Peru division and $750,000 on the Goshen division.

Plans of the new owners include through traction service from Indianapolis to South Bend, both for passenger and freight service.

Mr. Reid, one of the purchasers, is president of the Interstate Public Service Company, but it is said that that company is not interested in the purchase as a company although the lines bought will be tied in with those of that property for through operating purposes. In fact, the Winona property, extending from Peru to Goshen through Warsaw and Winona Lake, is the connecting link in a through interurban route from Louisville through Indianapolis to South Bend and Chicago.

The likelihood of this purchase being made was referred to in the ELECTRIC RAILWAY JOURNAL for Feb. 2, page 195.

Arrears in Dividends Being Paid in Worcester

The directors of the Worcester Consolidated Street Railway, Worcester, Mass., have declared an extra dividend of $2.50 a share to apply on dividends in arrears on the 5 per cent cumulative preferred stock. The dividend was paid by the company on April 1 to stock of record March 20.

On April 1, 1922, the accumulated and unpaid dividends amounted to $20. At that time a $2.50 extra was paid and this has continued semi-annually. The dividend paid on April 1 this year makes the fifth extra and cuts the amount in arrears from $20 to $7.50.

Operation Abandoned Between Greenfield and Northampton

The towns on the 20-mile stretch between Greenfield and Northampton, Mass., which for twenty years have been served by the Connecticut Valley Street Railway, are without service. The operation of the line ceased March 31 at midnight. The receiver will delay application to the courts to dismantle the road pending possible purchase of it by the towns themselves for municipal operation. Nine miles of the Greenfield to Northampton division have already been thus purchased with the intention of reopening the road. The portion sold runs from Greenfield through Deerfield and South Deerfield. Traffic between Greenfield and South Deerfield is now being handled by a bus service.

Rochester Valuation May Be Reduced

Unofficial reports say that a settlement of the litigation instituted by the city of Rochester to reappraise the Rochester lines of the New York State Railways under the service-at-cost contract is in prospect. Conferences looking toward a settlement have been held and it is said to be not unlikely that an amicable adjustment of the entire matter will be had to the best interests of the company and also to the public.

The plan for settlement is said to comprehend a reduction in the valuation, principally by the elimination of certain items in the appraisal, which the company will consent to as a matter of compromise. Such a readjustment, possibly by the elimination of certain real estate, will bring a reduction in the valuation and with it will go the possibility of the public of the city of Rochester obtaining a lower fare.

James F. Hamilton, president of the New York State Railways, is confident that the present appraisal is justified by any method of appraising that may be used, and maintains the actual book value of the property used and useful, under methods of appraisal approved by the United States Supreme Court,

can result only in a higher valuation than that now existing.

In commenting on the matter one of the Rochester papers says:

> The attitude of the company has been to welcome the trial of the litigation so as to settle once and for all the valuation matter, but Mr. Hamilton has expressed a willingness to compromise the proposition by eliminating certain factors, so that the earnings of the company, under the contract, will be based largely on the property actually in use in the conveyance of passengers. This is looked upon by the city officials as a broad concession and one that will reflect to the benefit of the public.

Capital Structure to Be Rearranged at Portland

Stockholders of the Portland Railway, Light & Power Company, Portland, Ore., have been requested to meet and approve plans for the issue of $7,500,000 of 6 per cent first preferred stock. The company plans to rearrange its capital structure and to change the name to Portland Electric Power Company.

Auction Sales in New York.—At the public auction rooms of A. H. Muller & Sons there were no sales of electric railway securities this week.

Seeks to Abandon Service. — The Pacific Electric Railway, Los Angeles, Cal., has applied to the Railroad Commission for permission to abandon passenger service on the Santa Monica air line from Colorado Street, Santa Monica, to the end of the line.

Discontinuance of New Jersey Line Approved.—The Board of Public Utility Commissioners of New Jersey on April 1 approved the application of the Public Service Railway to abandon service on the Fairview extension located between Broadway and Warren Streets, Gloucester, and Collings and Mount Ephriam Avenue, Camden. No opposition was offered by local authorities. The company is required to remove appurtenances. The road yielded $4,000 a year and operation costs totaled $20,950. It is said that the company is prepared to increase the present bus service over the route.

Thrift Being Encouraged at Buffalo.—In co-operation with the Bank of Buffalo branch of the Marine Trust Company, Buffalo, the International Railway Co-operative Association has started a savings plan in addition to the co-operative wage fund for the benefit of employees of the company. The co-operative wage fund provides for impounding the wage increase granted on Jan. 1, and diverting the fund thus accumulated to purchase bonds and stock of the railway. The thrift and savings plan is a separate and distinct movement fostered to encourage regular weekly savings by employees.

Mortgage Gold Bonds Offered. — A syndicate including E. H. Rollins & Sons, New York, is offering at 98¾ and accrued interest to yield about 6.10 per cent $5,000,000 of the Illinois Power & Light Corporation first and refunding mortgage gold bonds known as Series "A," 6 per cent, thirty years. The bonds are dated April 2, 1923, and are due April 1, 1953. They are secured by direct mortgage or collateral lien on properties appraised at a value very substantially in excess of the total debt and are a direct first mortgage on some of the most important power and light properties of the system.

Want to Abandon Passenger Service.—The Pacific Electric Railway, Los Angeles, Cal., has applied to the commission for authority to abandon passenger service on its line between Fifth Street (San Pedro district) and the Outer Harbor.

Revaluation of Kansas City Properties Asked.—The reorganization committee of the Kansas City Railways on March 31 at Jefferson City, Mo., filed with the Missouri Public Service Commission an application for a revaluation of the railway. The application was made with the consent and approval of Judge Kimbrough Stone, and of the receivers for the company.

Net Income Shows Increase.—The Department of Street Railways, City of Detroit, Mich., reported a revenue from transportation of $1,906,121 during February, 1924. In February, 1923, this item was $1,528,539. The total operating revenue for February, 1924, was $1,946,727, against $1,619,266 for February a year ago. Total operating expenses increased from $1,185,779 in February, 1923, to $1,418,595 in February of the present year. The net income showed an increase, being $40,834 in February, 1923, and $99,258 in February of the present year. There was an increase in total passengers carried. The number in February, 1923, was 37,707,665 and in February, 1924, 40,970,792.

Private Sale of Property. — The Greenfield & Turners Falls, division of the Connecticut Valley Street Railway is to be offered at a private sale by receiver D. P. Abercrombie of Greenfield, Mass. People of Turners Falls and Greenfield are united in their desire to maintain trolley service between the two towns, and arrangements with this point in view are being made.

Bus Line to Be Sold to Pacific Electric.—The Compton Transportation Company has been authorized by the Railroad Commission to sell to the Pacific Electric Railway, Los Angeles, Cal., its auto stage rights and property for a line operated between Long Beach, Huntington Park and intermediate points.

Accumulated Surplus $1,000,000.—The Los Angeles Railway Corporation, Los Angeles, Cal., reports to the Railroad Commission for the year 1923 that its operating revenue was $12,645,436 and operating expenses $8,915,490, giving a net operating revenue of $3,729,946. Miscellaneous non-operating revenue amounted to $113,820. Interest, rent, taxes and other deductions totaled $2,306,095. The net corporate income for the year was $1,537,670. The deficit at the beginning of the year amounted to $13,017. Miscellaneous additions to surplus for 1923 amounted to $7,497 and miscellaneous deductions were $251,874, leaving an accumulated surplus at the end of the year of $1,280,276.

Another Preferred Dividend at Louisville.—There is a strong probability that the back dividends of the Louisville Railway on its preferred stock will be cleaned up by Jan. 1, 1925, or not later than April 1, if business continues active. Directors at a meeting on March 20 declared a 2½ per cent dividend on the preferred stock, payable on April 4. This left 2½ per cent due from 1922, 5 per cent from 1923 and 1¼ per cent for the first quarter of 1924.

Market Street Ready to Redeem Bonds.—Notice has gone out to holders of the first consolidated mortgage gold bonds of the Market Street Railway, San Francisco, maturing on Sept. 1, that there has been deposited money sufficient to pay these bonds at par and accrued interest. Holders are accordingly advised to present their bonds for payment at any time prior to Sept. 1 at the office of the trustee at San Francisco or at the office of Ladenburg, Thalman & Company, New York. The bonds maturing on Sept. 1 were authorized in the amount of $17,500,000 on Sept. 1, 1894. The amount outstanding on Jan. 31, 1923, was $9,527,000.

$400,000 Issue Quickly Oversold Locally.—The Houston Electric Company has, in five and one-half selling days, just oversold an issue of $400,000 of the Galveston-Houston Electric Company 7 per cent bond-secured gold coupon notes. This money will be used to make part of the improvements to the Houston Electric Company's system under the agreement recently entered into between the company and the city provided jitneys are abolished in accordance with the ordinance voted upon Jan. 19.

$1,000,000 of Stock Offered.—Tucker, Anthony & Company, New York, head a syndicate which is offering for subscription at 93½ and accrued dividend, to yield about 7.50 per cent $1,000,000 of 7 per cent cumulative preferred stock of the Consolidated Power & Light Company. The company, directly or through subsidiaries, owns and operates the electric power and light and electric railway business in Huntington, W. Va.; Roanoke and Lynchburg, Va., and in Ironton, Ohio, Ashland and Catlettsburg, Ky., and the surrounding communities, as well as the gas business in Lynchburg. The proceeds of the issue are to be used for additions and improvements which will further expand the revenue producing facilities of the system.

Increase in Net Income.—The net income of the East Penn Electric Company and its predecessors for the year ended Dec. 31, 1923, was $603,482, against $399,991 for the same period ended Dec. 31, 1922. This fact was disclosed in the first annual report of the company, which was incorporated in July, 1922, under the laws of Pennsylvania to acquire control of the Eastern Pennsylvania Railways and to provide increased power generating facilities for the territories served by that company. During the year 1923 the consolidations were completed. The East Penn Electric Company is under the management of the J. G. White Management Corporation, New York.

Personal Items

Pittsburgh Personnel Changes

Young Men, All Especially Resourceful, Appointed to New Posts with Pittsburgh Railways

F. W. Cogswell, J. B. Donley, C. C. Gillette and J. E. Davis, all recently appointed to new offices with the Pittsburgh Railways, are especially qualified by technical training and by temperament for the positions to which they have been assigned. As noted previously in the ELECTRIC RAILWAY JOURNAL Mr. Cogswell has been made director of traffic promotion, Mr. Donley director of public relations, Mr. Gillette traffic agent and Mr. Davis special investigator.

Few men have a more detailed knowledge of the traffic habits of Greater Pittsburgh than has Mr. Cogswell. Mention any spot in the iron, steel or smoky city (it goes by all these names) and Fred Cogswell will rattle off the routes that pass by in the day and the night like the well-known hail from a machine gun. Before his appointment to the position of director of traffic promotion, Mr. Cogswell was traffic agent for the receivers of the Pittsburgh Railways, from August, 1917, to May, 1919. He served during the war as first lieutenant and later as captain and adjutant of the 53d U. S. Infantry. Before that he was assistant to the electrical engineer and traffic agent of the Pittsburgh Railways. He entered the service of the Pittsburgh Railways as load dispatcher in December, 1910. He was graduated at Carnegie Institute of Technology in electrical engineering in June, 1912. Mr. Cogswell was born in 1881.

In his new post with the company Mr. Donley looks after the newspapers, public neighborhood meetings held for the discussion of local service problems and explains matters to visiting complainants. It is no reflection on the Pittsburgh Railways to say that this is a difficult job to handle, for no matter how hard a company strives to be 100 per cent perfect different people have different ideas of perfection, so that the need exists for a peculiar combination of talent in the man assigned to handle the duties of an office of this kind. These Mr. Donley has. His resourcefulness has never failed him. He handles all the matters of a controversial nature that come before him with all the Celtic charm of a born diplomat. Mr. Donley was formerly employment agent and statistician for the mechanical department of the Pittsburgh Railways. He entered the service of the company as a shop clerk in 1902. In 1904 he was appointed chief clerk of the mechanical department, and in September, 1913, was appointed publicity agent in charge of exhibits. In June, 1915, he was appointed special investigator of the traffic department. Mr. Donley was graduated from high school and took a special course in economics at Duquesne University and a business course in the Iron City College. He was born Jan. 8, 1883.

Mr. Gillette will now apply his intimate knowledge of schedule construction to the commercial side of more miles for more revenue rather than the older purely operating viewpoint of fewer miles for less expense. Mr. Gillette was acting traffic agent of the company from May 1, 1923, to March 1, 1924. He entered the employ of the Pittsburgh Railways on Sept. 1, 1921, as a special investigator. Before that he was with the Westinghouse Electric & Mfg. Company. With that company he took the graduate students' apprentice course and special engineering course under B. G. Lamme. He also worked one year in the railway project section of the general engineering department. He entered the military service in May, 1917, and served with the Fourth Infantry, Third Division as a first lieutenant and captain from September, 1917, to December, 1919. He entered Bucknell University in 1913 and was graduated in electrical engineering in June, 1917. He was born on Sept. 1, 1895.

Mr. Davis was formerly chief clerk in the traffic department of the Pittsburgh Railways. He served in this capacity from April, 1921, to Feb. 20, 1923. He entered the service of the company in November, 1920, as a traffic observer. Before that for two years he had been timekeeper and paymaster for a mining company. He was graduated from high school in 1914 and from Geneva College in 1918, receiving the A.B. degree. In 1918 and 1919 he was principal of a high school. He was born on March 9, 1898, at Darlington, Pa.

F. W. Cogswell

J. B. Donley

C. C. Gillette

J. E. Davis

Key Route Changes Made

Announcement Affects Messrs. Drum, Harris and Allen—Mr. Harris Becomes Chief Engineer

New duties have been assumed by present officials of the Key System Transit in Oakland, Cal., and one new appointment has been made.

John S. Drum has been made chairman of the reorganized executive committee; George H. Harris, formerly assistant to Vice-President and General Manager W. R. Alberger, has been appointed chief engineer of the entire system, and Ben Allen, to whom reference has been made previously in the ELECTRIC RAILWAY JOURNAL, has been named as the head of the new public relations department.

In the promotion of Mr. Harris, Mr. Alberger, for the time being at least, is left without an assistant. Hereafter Mr. Harris will devote his entire time to engineering matters, including supervision of all the physical properties of the company. He has been in the business for thirty years. Mr. Harris has been with the Key System since 1914, being originally general superintendent. Before that he was connected with electric railways in Georgia and Alabama. Two years ago he was made assistant to the general manager of the San Francisco-Oakland Terminal Railways, a position from which he has just been promoted.

Mr. Drum was chairman of the exec-

utive committee of the former San Francisco-Oakland Terminal Railways and has been re-elected in the process of reorganization. He is well known in Pacific Coast banking circles. Mr. Drum was born in Oakland and was graduated in 1894 from Hastings Law College attached to the University of California. He practiced law until 1903 and then went into banking, becoming president of the Savings Union Bank & Trust Company in 1910. He is a director of the Pacific Gas & Electric Company, the East Bay Water Company and the Yosemite Valley Railroad.

Mr. Allen gained fame in the late war by acting as publicity director for Herbert Hoover in his food saving campaigns. He succeeds R. H. Brockhagen, press agent.

Now that a survey of Oakland's traffic needs is under way many suggestions are already beginning to pour in. Previously there was no department to handle this mass of detail. Most of it went to Mr. Alberger and his assistant. The bureau of public relations will fill this gap.

Thomas J. Lynch Will Resign

Thomas J. Lynch, assistant general manager and later general manager of the Schenectady Railway, Schenectady, N. Y., since July, 1923, has tendered his resignation, to take effect on May 1. Mr. Lynch came to the company from the United Traction Company, Troy division, living then, as he does now, in Albany. At the time of the reorganization of the company last October Mr. Lynch was requested to remain and did so, though at some sacrifices to his personal interests. For the present Mr. Lynch is devoting his time to personal interests which he has in his home city and will later announce plans which he now has under consideration.

Mr. Danforth Resigns

R. E. Danforth has resigned as vice-president and general manager of the Public Service Railway, Newark, N. J. Mr. Danforth has been spending the winter in South Carolina and expects to take an extended vacation before engaging again in active business. During Mr. Danforth's absence M. R. Boylan has been acting general manager of the Public Service Railway.

Frank Hampshire has been appointed master mechanic of the Binghamton Railway, Binghamton, N. Y. In that capacity he succeeds H. M. Rhoda, who left the company on March 1 to take up duties under Charles S. Banghart, vice-president of the Richmond Light & Railroad Company, Staten Island, N. Y. Mr. Hampshire was first employed by the Binghamton Railway in November, 1907, as a night car cleaner. He was promoted to the day force as a car repairer during the spring of the following year, and in August, 1916, became night carhouse foreman. He resumed repair work within a couple of months and became assistant master mechanic to Mr. Rhoda in February, 1917. He remained in that capacity until Mr. Rhoda resigned March 1. Mr. Hampshire is an Englishman by birth.

H. H. Couzens to Brazil

General Manager of Toronto Transportation Commission Appointed to Canadian Holding Company

H. H. Couzens, general manager of the Toronto Transportation Commission, operating the civic railway lines in Toronto, and the Toronto Hydro, is to become vice-president of the subsidiary companies of Brazilian Traction, Light & Power Company, controlled by Canadian interests. He will make his headquarters at Rio de Janeiro.

Since Mr. Couzens assumed the duties of his present position, Sept. 1, 1921, Toronto's transportation system has been almost entirely rehabilitated. When the city took over the lines of the Toronto Railway the system was in exceedingly bad physical shape due to neglect during the purchase negotiations. Under the leadership of Mr. Couzens the Transportation Commission at once began the work of rehabilitation.

H. H. Couzens

Born in England in 1877, Mr. Couzens received his education at the Independent College at Taunton, England, after which he served as a pupil in mechanical and electrical engineering with Allen & Sons, Taunton, and the Taunton Corporation Electrical Works. After holding a number of engineering positions he became manager and engineer of the West Ham Corporation Electric Supplies in 1909, and three years later accepted a similar position with the Hampstead Borough Council. He held the latter position only one year, resigning at the end of 1912 to become general manager of the Toronto Hydro-Electric system, with which he took up his duties early in 1913. He continued in the latter position until the Toronto Transportation Commission took over the local street railway, when he assumed his present work.

At the concluding meeting of the Canadian Electric Railway Association, held on June 30, 1923, at Toronto, Mr. Couzens was elected president of the association.

Sir Alex. Mackenzie is president of Brazilian Traction, Light & Power Company and Messrs. E. R. Wood, R. C. Brown and Miller Nash of Toronto are among the vice-presidents. Sir Henry Pellatt and Sir Thomas White are among the directors. The company was formed to link the São Paulo Tramway, Light & Power Company, Rio de Janeiro Tramway, Light & Power Company, and São Paulo Electric Company. It also controls the Brazilian Telephone Company.

Personnel Changes at Knoxville

The Knoxville Power & Light Company, Knoxville, Tenn., has promoted two of its officers and has transferred the office of the treasurer of the company to New York City. H. C. Ray, formerly assistant treasurer, has been elected treasurer, due to the resignation of C. J. Pleming, who will engage in private business. Mr. Ray will conduct the affairs of the office of treasurer in New York.

Chester A. Briggs, present auditor of the company, has been elected secretary and in addition to the duties of his new office will retain his old position.

Jesse W. Bye, Jr., was elected to the position of assistant treasurer. He has formerly been cashier of the company and will continue to remain in Knoxville.

H. U. Wallace, formerly assistant general manager of the Arkansas Central Power Company, Little Rock, Ark., has been appointed assistant general manager.

Frank J. Jones, formerly engineer way and structures, has been appointed chief engineer to succeed James Link, who has been transferred and appointed superintendent of the electric department.

H. M. Rhoda, formerly master mechanic of the Binghamton Railway, Binghamton, N. Y., resigned from that property on March 1 to take up duties under Charles S. Banghart, vice-president of the Richmond Light & Railroad Company, Staten Island, N. Y. At one time Mr. Rhoda was master mechanic of the Long Island Electric Railway, Jamaica, L. I. and prior to that served in the capacity of assistant master mechanic of the Reading Transit Company, Reading, Pa. He was also at one time identified with the Trenton & Mercer County Traction Corporation.

Obituary

John W. Boyle

John W. Boyle, Utica, N. Y., a pioneer operator of electric railway properties in central New York, died suddenly on March 27 in Los Angeles. It was in 1886 that Mr. Boyle first became interested in street railroad management when he filled the position of attorney for the Utica Belt Line, then just organized. Later when the Thomson-Houston Company secured control in 1889 he was made vice-president and general attorney. In 1894, upon the reorganization of the line, which he brought about, he was made president. Mr. Boyle disposed of his interests in the Utica Belt Line Street Railroad in 1901 and retired from the company. He first practiced law in Utica with Waterman & Hunt, but later followed his profession without a partner. He was born in Scotland in 1851.

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

Bus Market Active

Forty-two Vehicles for Akron—Railway Bus Purchases Approximating $2,000,000 Are Indicated

Contracts just placed by the Northern Ohio Traction & Light Company, Akron, Ohio, for $300,000 of automotive equipment again focus attention on the constantly increasing use of the bus by the electric railways. As noted elsewhere in this issue that order includes forty-two vehicles. In it are included Whites, Macks, Reos and Masons. Moreover, part of the equipment is intended to be used in city service and part in interurban.

This in itself is more significant, perhaps, than would at first appear, although so far as the Northern Ohio Company is concerned it does not mark a new departure in its practices. That order properly is regarded as mighty significant. It is. But after all, it stands apart as news largely because it bulks big as a single order. It is only one of many noted recently in the ELECTRIC RAILWAY JOURNAL. That record is not complete. It does not pretend to be. But it is a pretty fair criterion. Moreover, the trend which it indicates toward the constantly growing use of the bus by the railways is substantiated by the reports from the manufacturers themselves with respect to inquiries for buses.

Duplicate of Cleveland Automobile Show Job Just Delivered to the Pennsylvania-Ohio Electric Company

Among the large prospective orders is one in connection with the Philadelphia Rapid Transit Company bus development. It is understood in this connection that the company is likely to buy about 120 vehicles. It is understood that the Trenton, Bristol & Philadelphia Street Railway is considering the purchase of five or ten vehicles. The Washington, Baltimore & Annapolis is understood to be considering the purchase of buses. Another company in the East reported likely to be in the market is the Atlantic Coast Electric Railway, now included in the system of the Eastern New Jersey Power Company. The Third Avenue Railway, New York, is also understood to contemplate the purchase of five buses. The New Bedford Street Railway has recently purchased two Whites and one Mack and is reported to be in the market for additional vehicles.

Among orders reported placed are five Garfords and one Yellow Coach for the Springfield Street Railway, Springfield, Mass.; ten Fageols for the Trenton & Mercer County Traction Corporation in addition to three already delivered; five Garfords for the Chicago, South Bend & Northern Indiana Railway; six Fageols for the Indiana, Columbus & Eastern Traction Company and six Yellow Coaches for the Houston Electric Company.

This last is among the jobs already delivered. The Houston buses will seat twenty-nine passengers. They will be used in service put in operation to replace jitneys under the terms of the recent settlement ordinance there.

As for other orders completed the White company reports a brand new DeLuxe job just delivered to the Pennsylvania-Ohio Electric Company at Youngstown. This is a duplicate of "Miss Rosalie," the White bus displayed in the Cleveland Automobile Show. The body was built by Bender. The White company also reports having just delivered nine new jobs to the P-O—the DeLuxe coach just mentioned, and eight city pay-enter type that will go into the service of the Youngstown Municipal Railway. The P-O also has ten city pay-enter White buses on order. The White company also figured in the Akron order to the extent of ten model 50-A buses with Kuhlman bodies. These buses will go into service in Akron, making a total of 34 White buses being operated by the N.O.T.L. in the city of Akron and a grand total of 54 Whites in the service of that railway company.

There is no need to repeat at this time the figures of the JOURNAL with respect to its recent automotive survey for 1923. Significant as was that record of the trend of events with respect to the increased use of the bus by the railways, it appears to have been very conservative in the face of the development so far this year of which there is definite knowledge.

G. E. Has Good Year

Sales for 1923 Increased Nearly $30,000,000—Unfilled Orders at End of 1923 $87,112,000

Orders received by the General Electric Company during the year 1923 were $304,199,746, compared with $242,739,527 in the year 1922, an increase of 25 per cent. The profit available for dividends for 1923 was $33,525,118 and the surplus after cash dividends $18,579,423. The surplus as of Dec. 31, 1923, was $82,762,095. The surplus in 1922 in excess of cash dividends was $12,157,391. Unfilled orders at the end of 1923 were $87,112,000, compared with $76,220,000 in 1922.

EXPORT BUSINESS GOOD

The export business is conducted by the International General Electric Company, Inc. The total of all orders received by the International Company during the year was $21,743,000, compared with $21,536,000 during 1922. The net sales billed were $22,371,526 during 1923. The International Company's business was conducted at a profit available for dividends of $2,469,463, compared with $2,265,477 in 1922. Dividends of $700,000 were paid during 1923, of which the General Electric Company received $669,372.

During the year distinct notable improvements were made in internal rearrangement and production processes and methods, which, notwithstanding increased cost of labor and material, have resulted in lower costs, and these have been reflected from time to time in reduced selling prices.

One of the most important new investments of the year was the purchase of a majority of the common stock of the Canadian General Electric Company, Limited. It is the intention to preserve essentially the Canadian character of this company.

IMPORTANT MECHANICAL ADVANCES MADE

Inventories in factories and warehouses and on consignment have been valued at cost or market, whichever was lower. After deducting adequate reserves, they are carried at $83,746,031 compared with $75,334,561 at the end of 1922.

Notes and accounts receivable are carried at $37,987,339, compared with $35,154,419 at the end of 1922. Collections were good and credit losses very small.

The cash balance, including temporary investments in short term obligations of the United States Government, was $91,205,620 at Dec. 31, as compared with $85,341,538 at the close of the previous year. The company has no notes payable, or any obligations bearing its indorsement outstanding.

In carrying out the provisions of the Charles A. Coffin Foundation various awards were made. Thus in October, 1923, the committee of the American Electric Railway Association awarded the Charles A. Coffin medal to the Chicago, North Shore & Milwaukee Railroad and $1,000 to the Employees Mutual Benefit Association of that company. In this connection the company

expresses the hope that the awards of the Charles A. Coffin Foundation for achievements on the part of companies and individuals will serve as appreciation and recognition of meritorious and distinguished service to the electrical industry.

The company reports important progress during the year from the work of the engineering department and research laboratory. In addition to the improvement of existing designs many new designs have been developed and placed on the market. These include standard lines of induction motors, steam turbines up to 60,000 kw. capacity, designed for steam pressure of 600 pounds, superheated to a temperature of 750 degrees F., and special turbines for 1,200 pounds steam pressure.

The Emmet mercury vapor process has been installed and is in successful operation at the power house of the Hartford Electric Light Company. This system is regarded to represent an important improvement in prime mover efficiency over present standard steam boiler and turbine practice.

Rolling Stock

Pacific Electric Railway, Los Angeles, Cal., has purchased 1,350 additional freight cars for $3,000,000, with delivery specified at the rate of 150 cars average per week. The first lot of the new freight cars will probably be received early in April. This order is a little more than twice the size of a contract for freight equipment made during the past year. The final delivery of this 650-car order has just been completed. The total expenditure for freight equipment by the company the past year was $4,950,000.

East St. Louis Company Improving Shop

As part of a general program for modernizing its shop equipment, the East St. Louis & Suburban Railway, East St. Louis, Ill., has made a number of improvements to existing facilities and added a number of new machine tools. Individual motor drive is being gradually installed to replace line shafts and belt equipment. It is expected that by the end of the current year practically all of the machinery in the Win Stanley shop will be individually motor driven.

A new 48-in. swing, double-head wheel lathe has been added for turning steel wheels. In the machine shop a motor-driven hacksaw which was recently installed has proved to be particularly useful. A molding machine has been added in the wood mill and a new electric welder has been added for reclaiming broken or worn parts.

In addition, a survey of the pipe work which is required in the routine maintenance of equipment has led to the installation of a new motor-driven pipe cutting and threading machine. It is expected that the addition of this machine will save not only a large part of the time and labor incident to threading the large amount of pipe used for maintenance work, but will also make a considerable saving.

Track and Line

Madison Railways, Madison, Wis., has completed preparations for the double tracking of nearly the entire length of its Wingra Park-Fair Oaks Street line. Soon double tracking and paving work will start from Regent Street on Breeze Terrace to University Avenue, thence down University Avenue to Chester Street. On University Avenue the tracks will be lowered to conform with the present grade.

Wisconsin Valley Electric Company, Wausau, Wis., has been petitioned by property owners on the northwest and east side sections of the city to construct a loop north of Clarke Street.

Fresno Interurban Railway, Fresno, Cal., has received permission from the commission to construct its track at grade across Academy, Madsen, Newmark, Zediker and Riverbend Avenues in the County of Fresno.

Pacific Electric Railway and Southern Pacific Railroad, Los Angeles, Cal., have announced that plans have been completed for a proposed expenditure of $1,750,000 to construct a huge joint freight classification and distribution yards at Watson Station on the Los Angeles-San Pedro Line.

Trade Notes

Charles Longenecker, formerly sales engineer with the Bonnot Company at Canton, Ohio, has become associated with the Combustion Engineering Corporation, 43 Broad Street, New York. Mr. Longenecker was one of the first men to specialize in pulverized fuel and he has been active in this field for many years past. His efforts have been directed particularly along the line of industrial application to both boilers and furnaces. In this new connection he will be identified with the recently created industrial department of the Combustion Engineering Corporation. This department, in charge of H. D. Savage, will specialize in the application of pulverized fuel to industrial work of all kinds.

William Arthur has arranged with J. M. Pneuman to represent in the Midwest territory the Arthur Power-Saving Company, of which he is general manager. As reported in the March 29 issue of ELECTRIC RAILWAY JOURNAL, J. M. Pneuman has entered the commercial field as manufacturers' agent for electric railway supplies and equipment, operating from Berea, Ohio, near Cleveland. The Arthur Power-Saving Recorder Company is at New Haven, Conn. More than 12,000 of the Arthur power-saving recorders are now in use. Recent improvements in the apparatus have made them dust-proof and tamper-proof. Further, all hand winding of the clock mechanism has been eliminated, as the process is now entirely automatic.

ELECTRIC RAILWAY MATERIAL PRICES—APRIL 1, 1924

Metals—New York

Copper, electrolytic, cents per lb.	13.562
Lead, cents per lb.	8.975
Nickel, cents per lb.	26.00
Zinc, cents per lb.	6.50
Tin, Straits, cents per lb.	50.25
Aluminum, 98 to 99 per cent, cents per lb.	27.50
Babbitt metal, warehouse, cents per lb.:	
Fair grade	60.00
Commercial	28.00

Bituminous Coal

Smokeless mine run, f.o.b. vessel, Hampton Roads	$4.20
Somerset mine run, Boston	2.125
Pittsburgh mine run, Pittsburgh	2.125
Franklin, Ill., screenings, Chicago	2.075
Central, Ill., screenings, Chicago	1.675
Kansas screenings, Kansas City	2.50

Track Materials—Pittsburgh

Standard Bessemer steel rails, gross ton	$43.00
Standard open hearth rails, gross ton	43.00
Railroad spikes, drive, Pittsburgh base, cents per lb.	3.00
Tie plates (flat type), cents per lb.	2.60
Angle bars, cents per lb.	2.75
Rail bolts and nuts, Pittsburgh base, cents, lb.	4.125
Steel bars, cents per lb.	2.30
Ties, white oak, Chicago, 6 in.x8 in.x8½ ft.	$1.70

Hardware—Pittsburgh

Wire nails, base per keg	3.00
Sheet iron (28 gage), cents per lb.	3.75
Sheet iron, galvanized (28 gage), cents per lb.	4.90
Galvanized barbed wire, cents per lb.	3.80
Galvanized wire, ordinary, cents per lb.	2.75

Waste—New York

Waste, wool, cents per lb.	.15
Waste, cotton (100 lb. bale), cents per lb.:	
White	12–18
Colored	9–14

Paints, Putty and Glass—New York

Linseed oil (5 bbl. lots), per gal.	$0.93
White lead (100 lb. keg), cents per lb.	12.25
Turpentine (bbl. lots), per gal.	$1.01
Car window glass, (single strength), first three brackets, A quality, discount*	84.0%
Car window glass, (single strength), first three brackets, B quality, discount*	86.0%
Car window glass, (double strength) all sizes, A quality, discount*	85.0%
Putty, 100 lb. tins, cents per lb.	4–6

*These prices are f.o.b. works, boxing charges extra.

Wire—New York

Copper wire base, cents per lb.	16.00
Rubber-covered wire, No. 14, per 1,000 ft.	$6 75
Weatherproof wire base, cents per lb.	18.00

Paving Materials

Paving stone, granite, 4x8x4, f.o.b. Chicago, dressed, per sq.yd.	$3.60
Common, per sq.yd.	2.95
Wood block paving 3½, 16 treatment, N. Y., per sq.yd.	2.56
Paving brick 3½x8½x4, N. Y., per 1,000 in carload lots	54.00
Crushed stone, ¾-in., carload lots, N. Y., per cu.yd.	1.85
Cement, Chicago consumers' net prices, without bags	2.20
Gravel, ¾-in., cu.yd., f. o. b. N. Y.	2.00
Sand, cu.yd., N. Y.	1.25

Old Metals—New York and Chicago

Heavy copper, cents per lb.	10.75
Light copper, cents per lb.	9.25
Heavy brass, cents per lb.	6.75
Zinc, old scrap, cents per lb.	4.00
Yellow brass, cents per lb. (heavy)	6.00
Lead, cents per lb (heavy)	7.25
Steel car axles, Chicago, net ton	$18.25
Cast iron car wheels, Chicago, gross ton	17.25
Rails (short), Chicago, gross ton	18.75
Rails, (relaying), Chicago, gross ton	26.50
Machine turnings, Chicago, gross ton	8.75

New Advertising Literature

The Johns-Pratt Company, Hartford, Conn., has issued a circular called "Going Underground?" It states that more than 1,200 different kinds of Noark underground boxes have been produced.

James H. Channon Manufacturing Company, Chicago, Ill., has issued a pamphlet on Sherardizing "the most modern and thorough method of rust-proofing in use today."

Bankers and Engineers

Ford, Bacon & Davis
Incorporated
Engineers
115 Broadway, New York
PHILADELPHIA CHICAGO SAN FRANCISCO

The J. G. White Engineering Corporation
Engineers — Constructors
Steam and Hydro-Electric Power Plants, Gas Plants, Steam and Electric Railroads, Buildings and Industrial Plants, Transmission Systems.
43 Exchange Place New York

STONE & WEBSTER
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EXAMINATIONS REPORTS APPRAISALS
ON
INDUSTRIAL AND PUBLIC SERVICE PROPERTIES
NEW YORK BOSTON CHICAGO

JOHN A. BEELER
Operating, Traction and Traffic Investigations
Routing Surveys—Valuations—Operation
Management
52 Vanderbilt Ave., NEW YORK

SANDERSON & PORTER
ENGINEERS
REPORTS, DESIGNS, CONSTRUCTION, MANAGEMENT
HYDRO-ELECTRIC DEVELOPMENTS
RAILWAY, LIGHT and POWER PROPERTIES
CHICAGO NEW YORK SAN FRANCISCO

A. L. DRUM & COMPANY
Consulting and Constructing Engineers
VALUATION AND FINANCIAL REPORTS
RATE STUDIES FOR PRESENTATION TO PUBLIC SERVICE COMMISSIONS
CONSTRUCTION AND MANAGEMENT OF ELECTRIC RAILWAYS
230 South Clark Street, Chicago, Ill.
215 South Broad Street, Philadelphia, Pa.

THE ARNOLD COMPANY
ENGINEERS—CONSTRUCTORS
ELECTRICAL—CIVIL—MECHANICAL
105 South La Salle Street
CHICAGO

ENGELHARDT W. HOLST
Consulting Engineer
Appraisals, Reports, Rates, Service Investigation, Studies on Financial and Physical Rehabilitation Reorganization, Operation, Management
683 Atlantic Ave., Boston, Mass.

ALBERT S. RICHEY
ELECTRIC RAILWAY ENGINEER
WORCESTER, MASSACHUSETTS
REPORTS—APPRAISALS—RATES—OPERATION—SERVICE

JOE R. ONG
Consulting Transportation Engineer
Specializing in Traffic Problems and in Methods to Improve Service and Increase Efficiency of Operation
PIQUA, OHIO

JAMES E. ALLISON & CO.
Consulting Engineers
Specializing in Utility Rate Cases and Reports to Bankers and Investors
1017 Olive St., St. Louis, Mo.

EDWIN WORTHAM, E.E.
Consulting Engineer
Valuations of Electric Railways and Utilities of All Kinds
Traffic and Operating Studies
Allison Bldg. Richmond, Va.
Established Feb. 1913.

STEVENS & WOOD, INC.
Design and Construction of Power Stations
Railroad Electrification, Industrial Plants
REPORTS AND APPRAISALS
Management and Financing of Utilities and Industrials
Youngstown New York

WALTER JACKSON
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Originator of unlimited ride, transferable weekly pass. Campaigns handled to make it a success.
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APPRAISALS
INVESTIGATIONS COVERING
Reorganization Management Operation Construction
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J. ROWLAND BIBBINS
Engineer—927 Fifteenth St., WASHINGTON
TRANSPORTATION SURVEYS
Organized Traffic Relief and Transit Development
Co-ordinating Motor Transport, Railroad and City Plans, Service, Routing, Valuation, Economic Studies
EXPERIENCE IN 20 CITIES

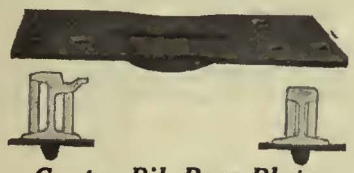
Track Recommendations for 1924

Solid Manganese Tongue Switch, Design 905

This switch is of the improved "Big Pin" type, providing maximum bearing surface or support at the heel. The positive action of hold-down block resists any tendency of the tongue to rock under side thrust, or kick up at the point due to the pounding action of car wheels. The extra large box at the heel of the tongue provides ample room for easy adjustment and quick cleaning.

Hard Center Mate, Iron Bound Type, Design 923

The mate illustrated above is provided with a heavy manganese steel wearing plate three inches thick held firmly to the carefully machined bed of the mate body by heavy stud bolts of heat-treated Mayari chrome-nickel steel. The entire construction is unusually heavy and substantial.

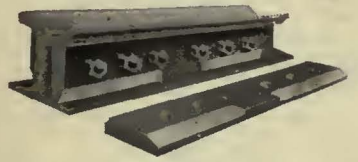


Center Rib Base Plate

This design provides the maximum stiffening reinforcement directly under the rail joint. It supports the joint and prevents battering or cupping of the rail ends.

Abbot Base Plate

This plate serves the same purpose as the Center Rib. In this case the reinforcement is on each side instead of in the center.

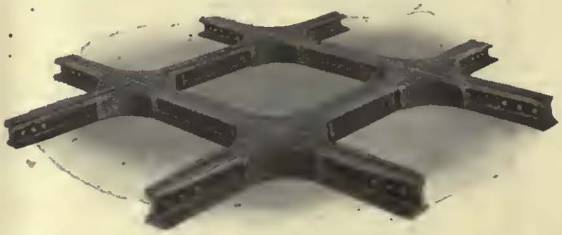


Machine Fitted Joint, Design 983

Joint illustrated above is accurately machined top and bottom to fit any rail section. The special bevel top and bottom is provided for electric arc welding.

Hard Center Frog, Iron Bound Type, Design 942

This hard center frog is of the same construction and offers the same advantages as the mate described above. Particular attention is called to the large bearing area of the plate.



Rolled Steel Alloy Crossing, Design 960

This rolled steel crossing is made of a special rolled Mayari chrome-nickel steel rail. The head of the rail is rolled full, the flangeways machined to any desired depth and then heat-treated to withstand wear. The rails are iron-bound into one solid piece, flange bearing throughout. This crossing may be welded after wear has developed.

BETHLEHEM STEEL COMPANY, *General Offices:* BETHLEHEM, PA.

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

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

BETHLEHEM


The solid, substantial character of
COLLIER SERVICE
has placed it high among those permanent organizations recognized as National Institutions
Barron G. Collier
INCORPORATED

Now!

Is the time of the year to begin changing over to:

TEXACO *Summer* Electric Car Oil
TEXACO *Summer* Air Compressor Oil
TEXACO *Summer* Gear Lubricant
TEXACO *Summer* Curve Oil
TEXACO *Summer* Curve Grease

And here is why:

All oils tend to become a little lighter; a little more fluid in warm weather.

The fluidity of oil is expressed in terms of viscosity. Viscosity varies with temperature.

In the application of lubricants to street cars, it is the "Operating Temperature" that counts.

As the weather gets warm the oils you used all winter will thin out. They will not feed at the same rate.

You can't change the temperature, but you can change the oils to compensate.

But weather doesn't change at a given date, so here's what we recommend:

Compensate gradually. Begin now adding steadily small quantities of HEAVIER oils to the lubricants now on the cars. This will gradually raise the viscosity so that by May 1st the change over will be completed.

Then all the time, even in the "dog days," you will be fully protected by these carefully refined Texaco Lubricants.*

*In the late Fall reverse the process gradually lowering the viscosity of the lubricants so that under the cold of winter the oils will have the proper fluidity.

As conditions vary throughout the country, watch the thermometer more than the calendar and you will not be caught off guard.

We have worked out an interesting and economical method of making this change on roads all over the country and we will consider it a privilege to have our Texaco Lubrication Engineers discuss it with you in person.

There Is a Texaco Lubricant for Every Purpose

TEXACO

THE TEXAS COMPANY

TEXACO

DEPT. R-J · 17 BATTERY PLACE · NEW YORK CITY
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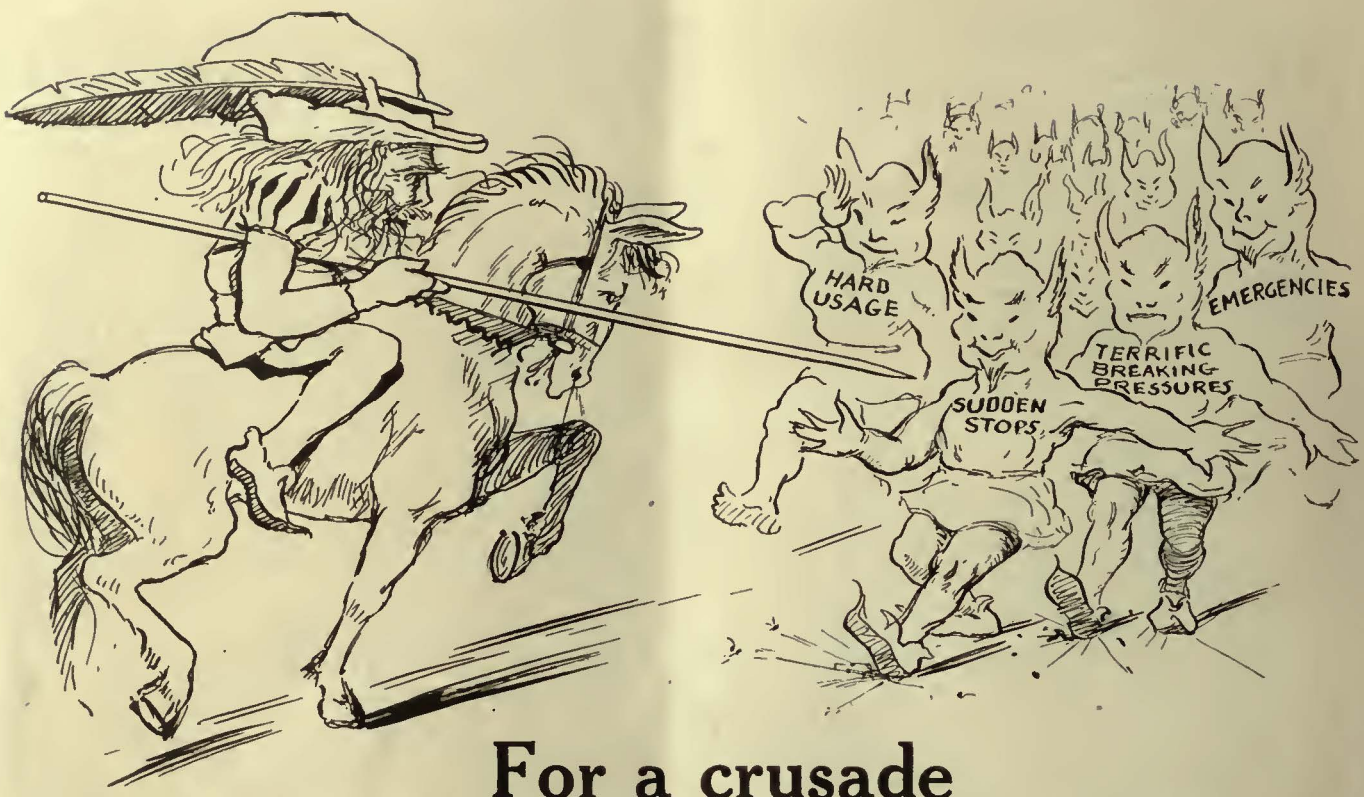


For a crusade against high maintenance BOYERIZE!

Even the trusty steel of olden times couldn't stand up to the strains of a brake rigging job on city cars.

Only specially hardened steel can live at all. Only Boyerized steel with its glossy armor plate surface can give full service and protection.

Experience has proved that it actually outwears case-hardened steel three to four times.

Choose from the long wear line

It's Boyerized!

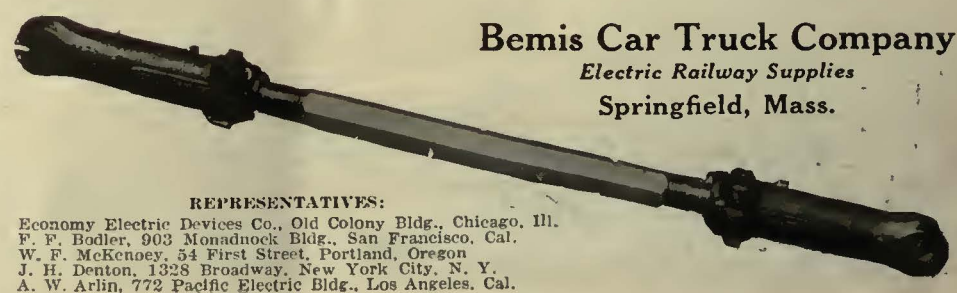
Brake Pins
Brake Hangers
Brake Levers
Pedestal Gibs
Brake Fulcrums
Center Bearings
Side Bearings
Spring Post Bushings
Spring Posts
Bolster and Transom Chafing Plates
McArthur Turnbuckles
Manganese Brake Heads
Manganese Truck Parts
Bushings
Bronze Bearings

The McArthur Turnbuckle

You won't have to refit the rigging with new turnbuckles, if you specify McArthur Turnbuckles in the first place. They will last as long as the truck itself.

More than that—the old-style jam-nut idea has been scrapped, and an efficient spring-equipped, split-clamp principle has been substituted. Now it only takes a pocket-wrench and a moment's time to make an adjustment, and tighten it up to stay.

Full details on request. Let us quote you.



Bemis Car Truck Company
Electric Railway Supplies
Springfield, Mass.

REPRESENTATIVES:
Economy Electric Devices Co., Old Colony Bldg., Chicago, Ill.
F. F. Bodler, 903 Monadnock Bldg., San Francisco, Cal.
W. F. McKenoey, 54 First Street, Portland, Oregon
J. H. Denton, 1328 Broadway, New York City, N. Y.
A. W. Arlin, 772 Pacific Electric Bldg., Los Angeles, Cal.

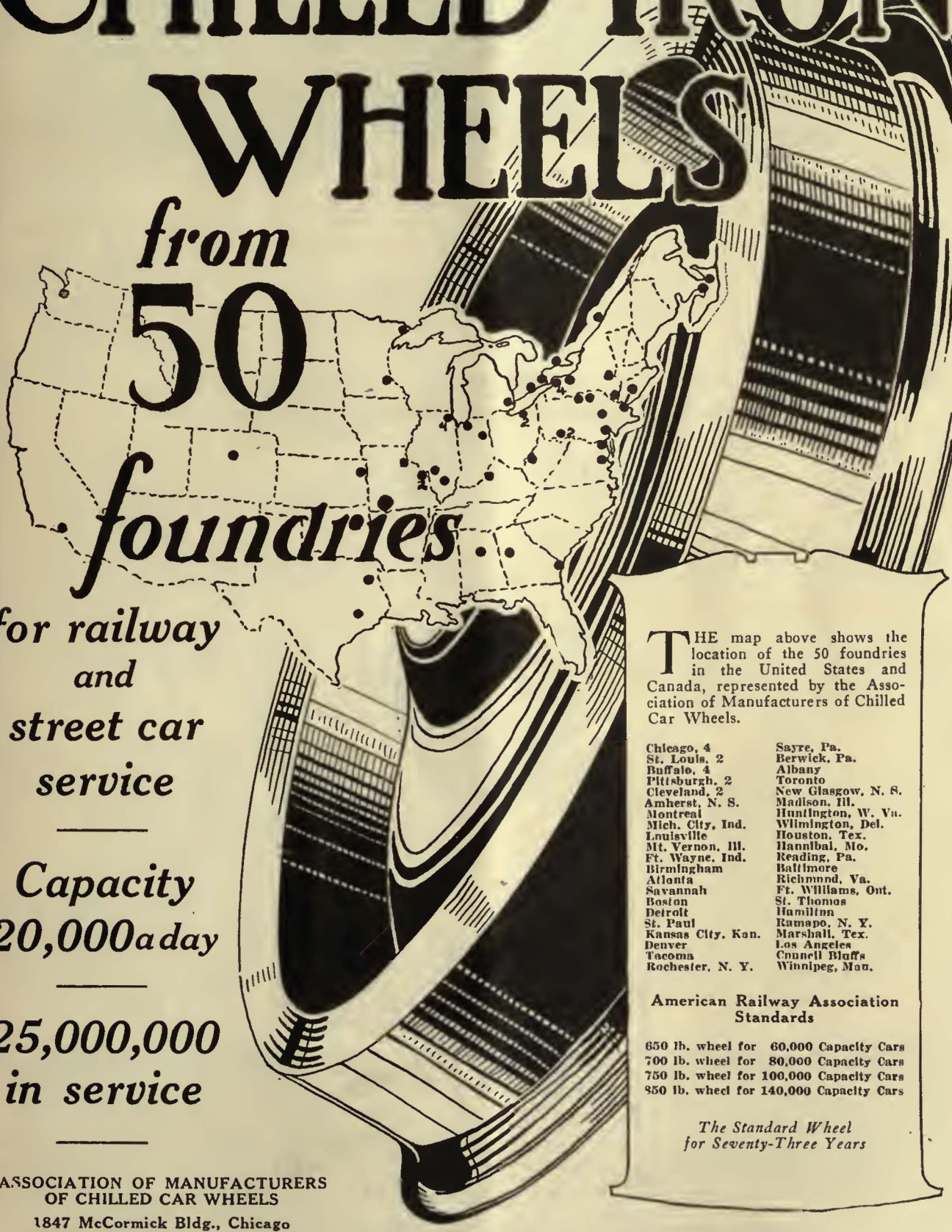
CHILLED IRON WHEELS

from **50** *foundries*

for railway and street car service

Capacity 20,000 a day

25,000,000 in service



THE map above shows the location of the 50 foundries in the United States and Canada, represented by the Association of Manufacturers of Chilled Car Wheels.

Chicago, 4	Sayre, Pa.
St. Louis, 2	Berwick, Pa.
Buffalo, 4	Albany
Pittsburgh, 2	Toronto
Cleveland, 2	New Glasgow, N. S.
Amherst, N. S.	Madison, Ill.
Montreal	Huntington, W. Va.
Mich. City, Ind.	Wilmington, Del.
Louisville	Houston, Tex.
Mt. Vernon, Ill.	Hannibal, Mo.
Ft. Wayne, Ind.	Reading, Pa.
Birmingham	Baltimore
Atlanta	Richmond, Va.
Savannah	Ft. Williams, Ont.
Boston	St. Thomas
Detroit	Hamilton
St. Paul	Ramapo, N. Y.
Kansas City, Kan.	Marshall, Tex.
Denver	Los Angeles
Tacoma	Council Bluffs
Rochester, N. Y.	Winnipeg, Man.

American Railway Association Standards

650 lb. wheel for 60,000 Capacity Cars
700 lb. wheel for 80,000 Capacity Cars
750 lb. wheel for 100,000 Capacity Cars
850 lb. wheel for 140,000 Capacity Cars

The Standard Wheel for Seventy-Three Years

ASSOCIATION OF MANUFACTURERS OF CHILLED CAR WHEELS
1847 McCormick Bldg., Chicago

ERICO RAIL BONDS

Type ET

Brazed Bonds

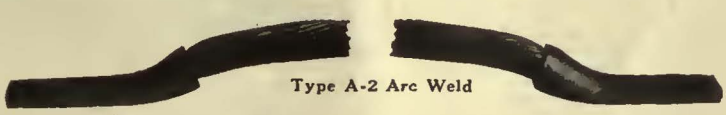
Have the most conductivity of all rail-bonds. For this reason they are unexcelled for bonding long track sections where feeders are infrequent, or track sections where the return current load is particularly heavy.

Standard Brazed Bond types are available for bonding the head of rail; or the web of rail, either concealed or exposed. Brazed bonds can be made in any capacity, length and shape of loop desired.

Type AT-F

Arc Weld Bonds

Can be applied with the very portable equipment and the services of a single operator. While not so conductive as the Brazed bond, they can be very cheaply installed at infrequent intervals along the track for replacements, and in places in special work where access is difficult. Types for application to head and top of base of rail. Capacities 2/0, 4/0 and 400,000 CM are standard.



Type A-2 Arc Weld

The Electric Railway Improvement Co.

Cleveland, Ohio

THERMIT WELDS

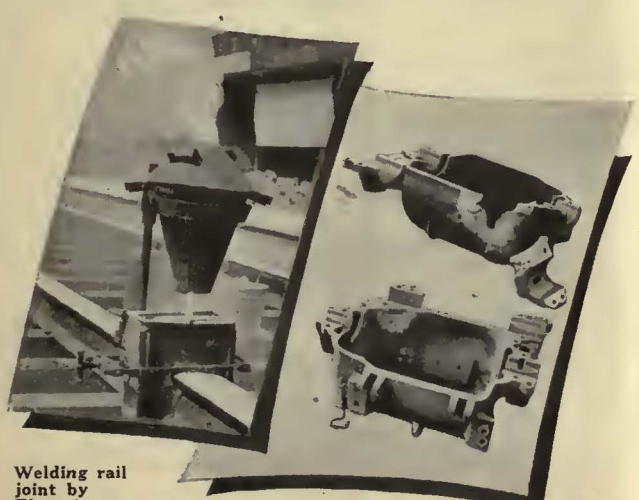
IN

The Way Department

Thermit Welds eliminate joints and rail bonds. Reduces car depreciation. Saves paving expense around joints because of prolonged life of track. Eliminates electrolysis. Frogs and Crossings can be shop made.

The Shop

A Thermit Welding Outfit will save many dollars in repairing truck frames—broken motor cases and other uses too numerous to mention.



Welding rail joint by Thermit process.

Thermit Welded Motor case before and after welding.

Our expert operators will teach your own men both in track and shop work, and show them the most efficient methods of making Thermit Welds.

Metal & Thermit Corporation, 120 Broadway, N. Y.

PITTSBURGH CHICAGO BOSTON S. SAN FRANCISCO TORONTO

SEARCHLIGHT SECTION

USED EQUIPMENT & NEW—BUSINESS OPPORTUNITIES

UNDISPLAYED—RATE PER WORD:

Positions Wanted, 4 cents a word, minimum 75 cents an insertion, payable in advance.

Positions Vacant and all other classifications, 9 cents a word, minimum charge $2.00.

Proposals, 40 cents a line an insertion.

INFORMATION:

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

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

DISPLAYED—RATE PER INCH:

1 to 3 inches.....$4.50 an inch
4 to 7 inches..... 4.30 an inch
8 to 14 inches..... 4.10 an inch

Rates for larger spaces, or yearly rates, on request.

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

E.F.J.

POSITIONS VACANT

A GENERAL track foreman wanted; to have charge of four or five gangs on construction and general track maintenance work in Connecticut. State qualifications and give references. P-671, Electric Railway Journal, 10th Ave. at 36th St., New York.

GENERAL shop foreman wanted for Middle West property, experienced in heavy traction equipment as well as city. In application, state qualifications, references and salary expected. P-678, Electric Railway Journal, Old Colony Bldg., Chicago, Ill.

SUPERINTENDENT for high-speed interurban line, consisting of 107 miles in central territory. One who has had experience covering the installation and operation of light weight, one man operated interurban cars, preferred. P-674, Elec. Ry. Journal, Old Colony Bldg., Chicago, Ill.

POSITIONS WANTED

AS M. M. or with chance for advancement. Experienced low and high voltage D.C. equipment, passenger and freight, city and interurban. Expert on motor and controller repairs. PW-672, Elec. Ry. Journal, Old Colony Bldg., Chicago, Ill.

AUDITOR, with thorough experience large railway, electric and gas properties, seeks engagement. PW-677, Electric Railway Journal, Old Colony Bldg., Chicago, Ill.

CIVIL engineering draftsman seeks opening in drawing office or field with street railway company or manufacturer. PW-679, Electric Railway Journal, Real Estate Trust Bldg., Philadelphia, Pa.

GRADUATE civil engineer desires permanent position, experienced in construction and design of subway and street railway tracks, valuation, rehabilitation, maintenance, welding, pavements and executive and contractors engineer. PW-675, Elec. Ry. Journal, 10th Ave. at 36th St., New York.

SUPERINTENDENT of city and interurban road operating fifty cars, seeks similar position affording greater opportunity for advancement. Successful in maintenance, operation and public relations. Age 35; salary $3,600. PW-673, Elec. Ry. Journal, 10th Ave. at 36th St., New York.

WANTED to locate with city or interurban railway in equipment, distribution, purchasing, construction, traffic and transportation or other capacity requiring engineering ability. Over ten years' experience in railway and power manufacturing, installation, operating. Your proposition solicited. PW-651, Elec. Ry. Journal, Old Colony Bldg., Chicago, Ill.

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.

Amusement Park Equipment
Walker Amusement 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.

Axles
Bemis Car Truck Co.
Johnson & Co., J. R.
St. Louis Car Co.
Standard Steel Works Co.

Axles, Bus
Standard Steel Co.

Axle Straighteners
Columbia M. W. & M. I. 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.

Babbitting Devices
Columbia M. W. & M. I. Co.

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

Batteries, Dry
Nichols-Lintern Co.

Bearings and Bearing Metals
Bemis Car Truck Co.
Columbia M. W. & M. I. Co.
General Electric Co.
A. Gilbert & Sons, B. F. Co.
More-Jones Brass & Metal Co.
Taylor Electric Truck Co.
Westinghouse Elec. & M. Co.

Bearings, Center and Roller Side
Stucki Co., A.

Bells and Gongs
Brill Co., The J. G.
Columbia M. W. & M. I. Co.
Consolidated Car Heating Co.
Elec. Service Supplies Co.

Benders, Rail
Railway Track-work Co.

Boiler Tubes
Nat'l Tube 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.
Rail Welding & Bonding Co.
Railway Track-work Co.

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

Book Publishers
McGraw-Hill Book Co., Inc.

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 Ry. Appliance Co.
Westinghouse Tr. Br. Co.

Brake Shoes
Amer. Brake Shoe & Fdry. Co.
Bemis Car Truck Co.
Brill Co., The J. G.
Columbia M. W. & M. I. Co.
Taylor Electric Truck Co.
Wheel Truing Brake Shoe Co.

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

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

Brushes Graphite
Morganite Brush Co.

Brush Holders
Anderson Mfg. Co., A. & J. M.
Columbia M. W. & M. I. Co.

Brushes, Wire Pneumatic
Ingersoll-Rand Co.

Bunkers, Coal
American Bridge Co.

Buses, Motor
Brill Co., The J. G.
St. Louis Car Co.

Bushings, Case Hardened and Manganese
Bemis Car Truck Co.
Brill Co., The J. G.

Cables
(See Wires and Cables)

Calculating Machines
W. A. Morschhauser

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

Cambric Yellow & Black Varnish
Mica Insulataor Co.

Carbon Brushes
(See Brushes, Carbon)

Car Lighting Apparatus
Elec. Service Supplies Co.

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

Car Steps Safety
Irving Iron Works

Car Wheels, Rolled Steel
Bethlehem Steel Co.

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

Cars, Gas Rail
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.
St. Louis Car 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.
Columbia M. W. & M. I. Co.
More-Jones Brass & Metal Co.

Castings, Funnel
Wharton, Jr. & Co., Inc., Wm.

Castings, Gray Iron and Steel
American Bridge Co.
Bemis Car Truck Co.
Columbia M. W. & M. I. Co.
Standard Steel Works
Wharton, Jr., & Co., Inc., Wm.

Castings, Malleable and Brass
Amer. Brake Shoe & Fdry. Co.
Bemis Car Truck Co.
Columbia M. W. & M. I. Co.

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.
WestinghouseElec . & 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.

Cinsters and Sockets
General Electric Co.

Coal and Ash Handling (See Conveying and Hoisting Machinery)

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

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

Colls, 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.
Columbia M. W. & M. I. 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.

Concrete Flooring Surface
Irving Iron Works

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

Condensor 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.
Columbia M. W. & M. I. 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.

Conveying and Hoisting Machinery
Columbia M. W. & M. I. Co.

Copper Wire
Anaconda Copper Mining Co.
Rome Wire Co.

Cord, Bell, Trolley, Register, etc.
Brill Co., The J. G.
Electric Service Supplies Co.
International Register Co., The
Roeblings Sons Co., John A.
Sameon 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.

Cutouts
Johns Pratt Co.

Dealers' Machinery
Electric Equipment Co.
Transit Equipment Co.

Derailing Switches, Tee Rail
Ramapo Ajax Corp.

Destination Signs
Columbia M. W. & M. I. Co.
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.
St. Louis Car Co.

Doors, Folding Vestibule
National Pneumatic Co., Inc.

Draft Rigging, (See Couplers)

Drills, Rock
Ingersoll-Rand Co.

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.
Rome Wire Co.

Enamels
Beckwith-Chandler Co.

Engineers, Consulting, Contracting and Operating
Allison & Co., J. E.
Archbold-Brady Co.
Arnold Co., The
Beeler, John A.
Bibbens, J. Rowland
Buchanan & Laying
Byllesby & Co., H. M.
Day & Zimmerman, Inc.
Drum & Co., A. L.
Feustel, Robert M.
Ford, Bacon & Davis
Hemphill & Wells
Holst, Engelhardt W.
Jackson, Walter
Ong, Jee R.
Parsons, Klapp, Brinkerhoff & Douglas
Railway Audit & Inspection Co.
Richey, Albert S.
Dwight P. Robinson & Co.
Sanderson & Porter
Shaw, Henry M.
Stevens & Wood, Inc.
Stone & Webster
Wortham, Edwin

Engineers Inspecting & Chemists
Pittsburgh Testing Laboratory

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

Expansion Joints, Track
Wharton, Jr., & Co., Inc., Wm.

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

Fences, Woven Wire and Fence Posts
Amer. Steel & Wire Co.
Cyclone Fence 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
Godwin Co., Inc., W. S.

Flaxlinum Insulation
Nat'l Ry. Appliance Co.

Floodlights
Electric Service Sup. Co.

Flooring, Fireproof
Irving Iron Works

Flooring, Non-Slipping
Irving Iron Works

Flooring, Open Steel
Irving Iron Works

Flooring Steel Subway
Irving Iron Works

Flooring, Ventilating
Irving Iron Works

Forgings
Carnegie Steel Co.
Columbia M. W. & M. I. Co.
Standard Steel Works

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

Frogs, Track. (See Track Work)

Frogs, Trolley
Ohio Brass Co.

Furnaces, Electric
American Bridge Co.

Fuses Cartridge, Non Refillable & High Voltage
Johns Pratt Co.

Fuses Cartridge, Refillable
Johns Pratt Co.

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

Fuses, Refillable
Columbia M. W. & M. I. Co.
General Electric Co.

Gaskets
Westinghouse Tr. Br. Co.

Gas-Electric Cars
General Electric Co.

Gas Producers
Westinghouse Elec. & M. Co.

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

Gear Blanks
Bethlehem Steel Co.
Carnegie Steel Co.
Standard Steel Works

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

Gears and Pinions
Bemis Car Truck Co.
Bethlehem Steel Co.
Columbia M. W. & M. I. 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, Safety
Indianapolis Switch & Frog Co.

Gongs (See Bells and Gongs)

Grating, Steel Subway
Irving Iron Works

Greases (See Lubricants)

Grinders and Grinding Supplies
Indianapolis Switch & Frog Co.
Metal & Thermit Corp.
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, Cattle
American Bridge Co.

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.
More-Jones Brass & Metal Co.
Nuttall Co., R. D.
Star Brass Works

Headlights
Electric Service Sup. Co.
General Electric Co.
Ohio Brass 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 and Lifts
Columbia M. W. & M. I. Co.

Hoists, Portable
Ingersoll-Rand Co.

Hose, Bridge
Ohio Brass Co.

Hydraulic Machinery
Allis-Chalmers Mfg. Co.

Indicating, Signals
Nichols-Lintern Co.
Oskel Equipment Co.

Inspecting Engineers & Chemists
Pittsburgh Testing Laboratory

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

Insulating Cloth, Paper and Tape
Anchor Webbing Co.
General Electric Co.
Hope Webbing 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.

Insulators, High Voltage
Lapp Insulator Co., Inc.

Jacks (See also Hoists and Lifts)
Buckeye Jack Mfg. Co.
Columbia M. W. & M. I. Co.
Electric Service Sup. Co.
National Ry. Appliance Co.
Templeton Kenly & Co.

Journal Boxes
Bemis Car Truck Co.
Brill Co., The J. G.

Junction Boxes
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.

Lightning Arresters
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.
Columbia M. W. & M. I. Co.
Electric Ry. Equipment Co.
Electric Service Sup. Co.
English Electric Co.
General Electric Co.
Hubbard & Co.
More-Jones Brass & Metal Co.
Westinghouse Elec. & M. Co.

Locomotives, Electric
General Electric Co.
Westinghouse Elec. & M. Co.

Lubricating Engineers
Galena-Signal Oil Co.
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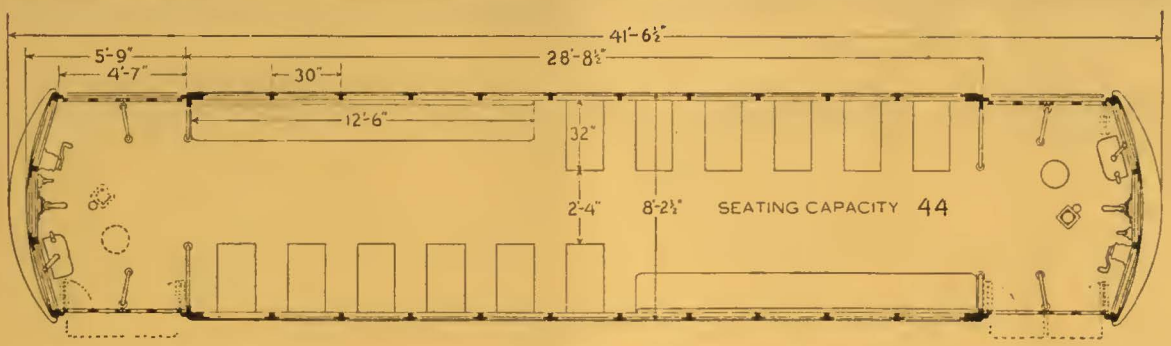

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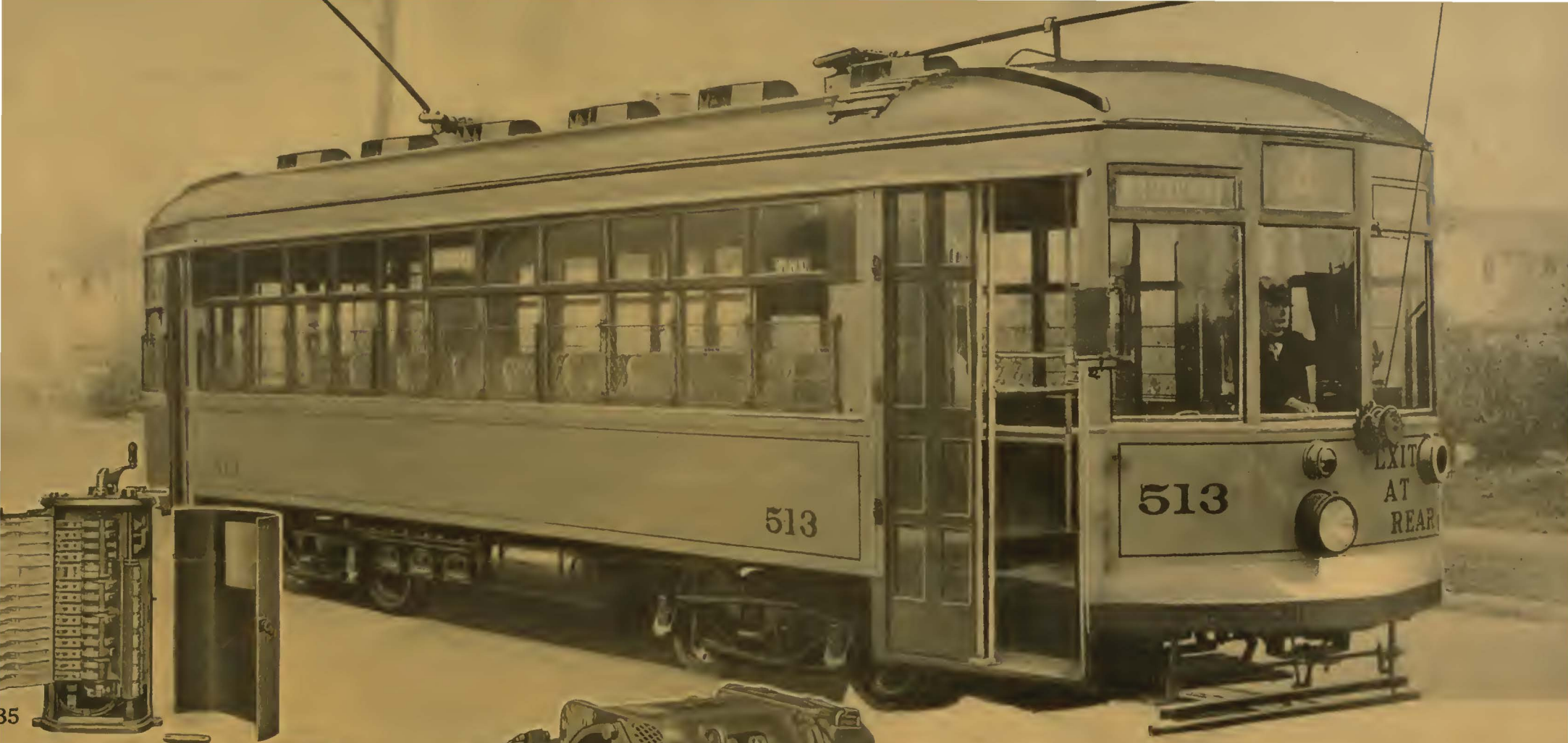

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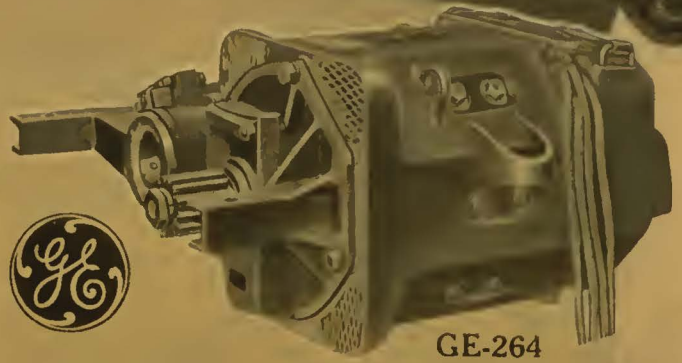

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