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64, No. 24 New York, December 13, 1924 Pages 983-1020

ELECTRIC RAILWAY JOURNAL

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Thank You!

"OF COURSE it takes a little time to answer these questions sent out every year by the ELECTRIC RAILWAY JOURNAL, but I figure that I ought to be willing to help the paper because the paper helps me."

This was the comment of a way engineer to one of the editors the other day who called just as the former was filling out one of the blank forms for the Annual Statistical Number.

It is just that spirit which makes possible the service the JOURNAL is able to render to its readers all through the year. Without the generous co-operation of the men of the electric railway industry it would be impossible to gather and publish the information that appears every week in this paper.

But because we do get this assistance, we are able to give our readers practical information concerning all the latest developments in the field. From the Bay of Fundy to the Gulf of California, information of all kinds concerning electric railway matters comes to us. Foreign countries furnish their share also.

Although we try to thank the individuals for the assistance they give us at the time it is rendered, we take this occasion to thank all collectively.

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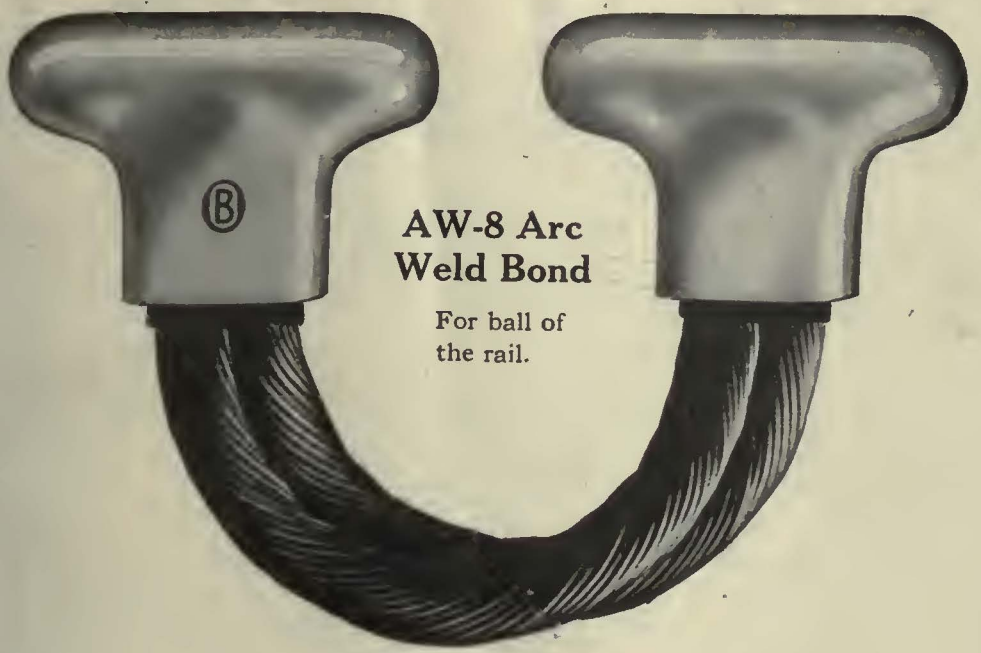

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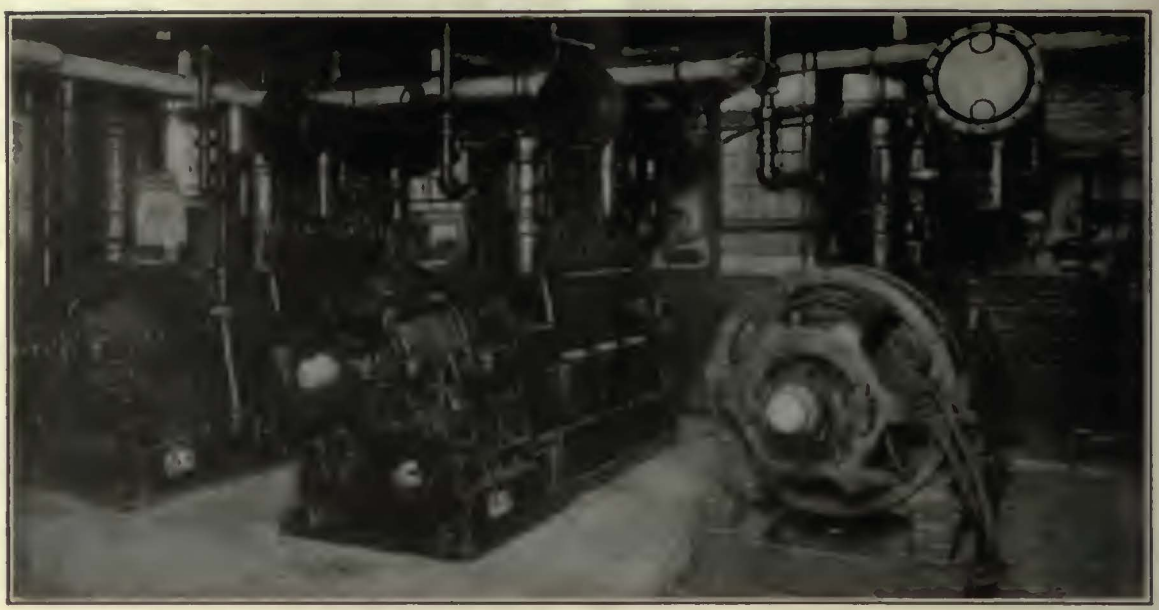

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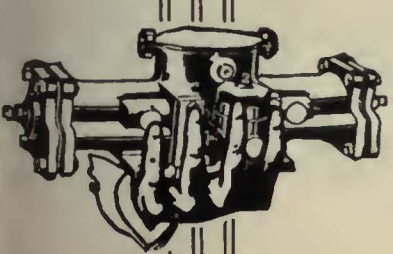

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f course such traffic would not warrant an xtension of car lines, even if the right of way ere available.

et the business is there and belongs to the ailway. How can it be brought in?

y Bus.

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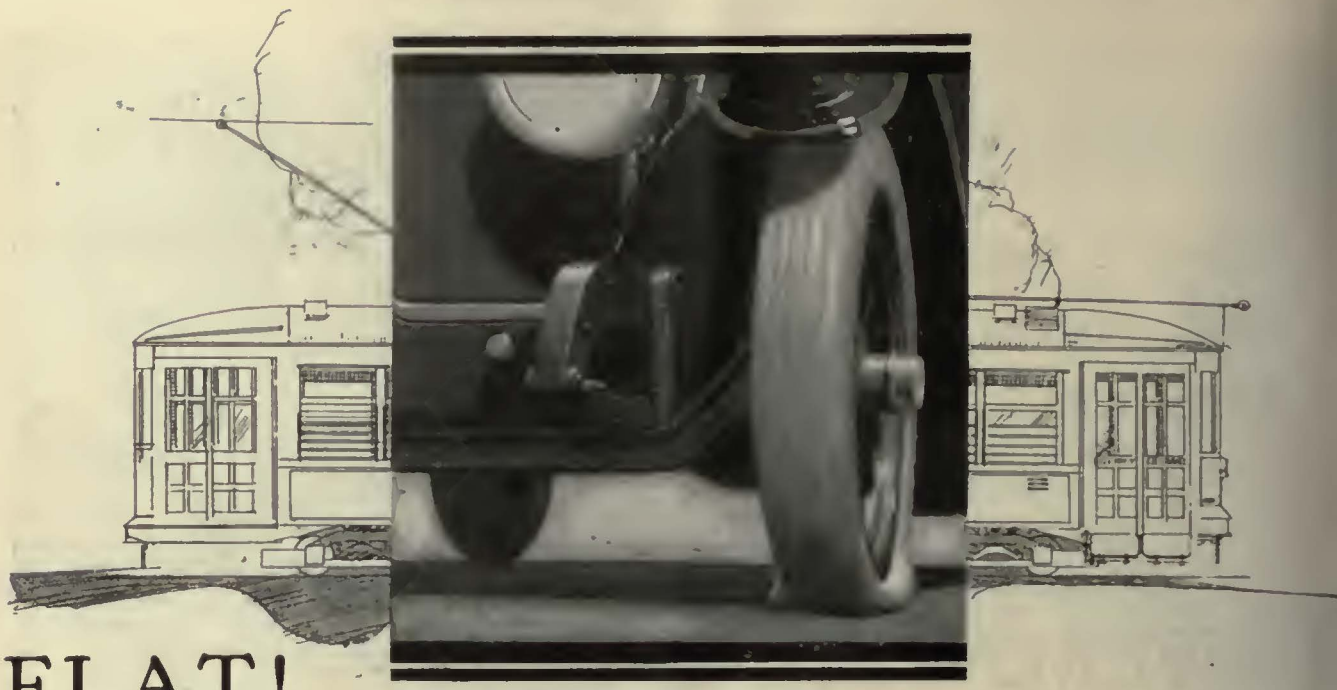

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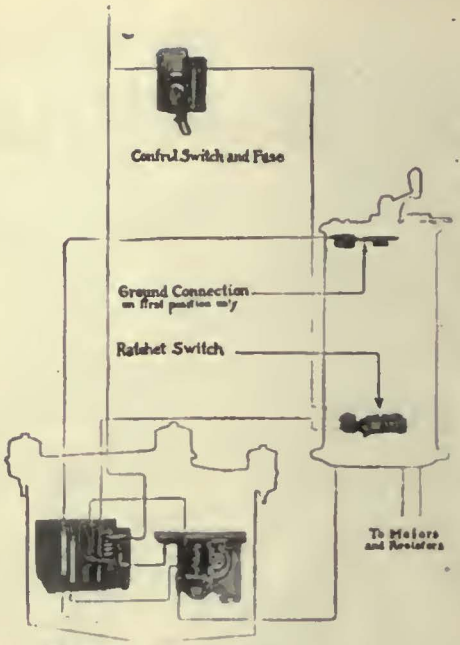

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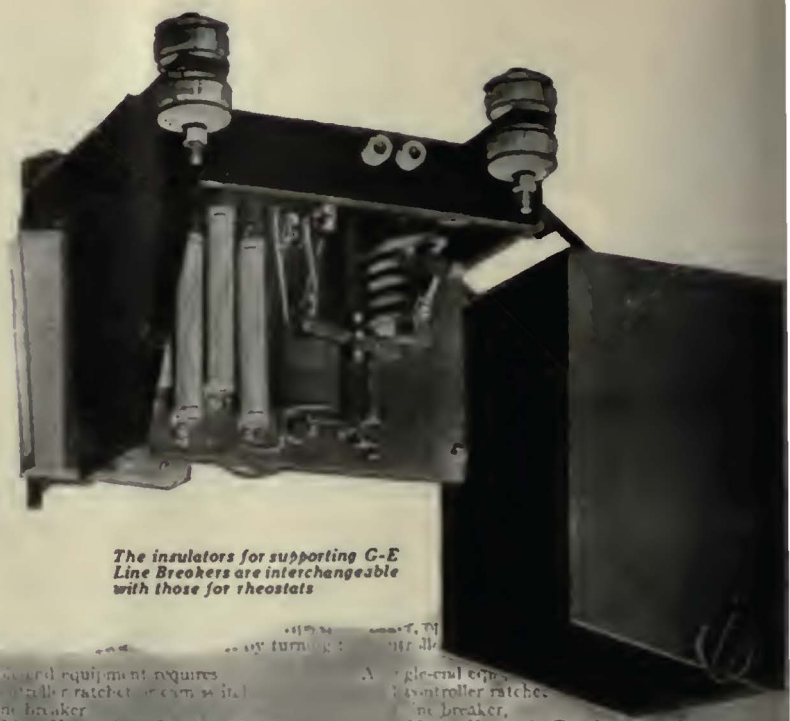

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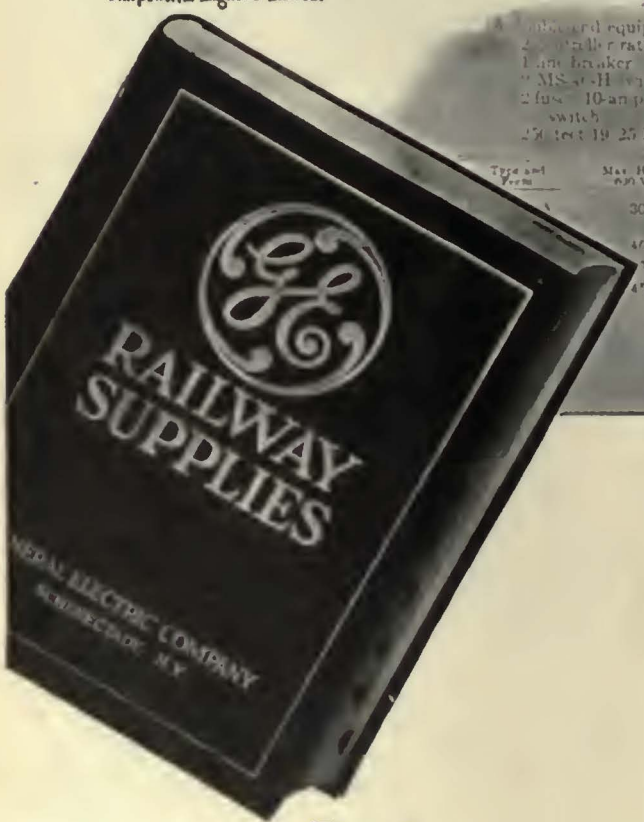

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GENERAL ELECTRIC

New York, Saturday, December 13, 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 64
Number 24

Time to Tighten Up Toward Wage Increases

THE rising trend of wages in the electric railway field is causing uneasiness. There has been accumulating some doubt as to the fairness of the outcome of arbitrations, and the question is raised whether this method of settling wage disputes is falling down. Another question is whether fares, if further increased to meet higher labor costs, will produce the necessary increase in revenue. These are pertinent, vital questions.

Taking the long view of wage arbitrations, as seen in the data presented on page 992 covering the last five years, there does not seem to be justification for the fear that arbitration proceedings cannot be relied upon to produce on the average a fair decision. In this period practically as many cases have been decided for the companies as for the men. The disturbing thing perhaps is that nearly all arbitrations in the last two years have resulted in increased wages, despite the fact that the general trend of wages in all industry is not upward and that there has been no increase in the general cost of living. One or two recent arbitrations have notably disregarded the basic considerations and have no doubt given impetus to the questioning of the wisdom of submitting wages to arbitration.

However, the JOURNAL is inclined to feel that this five-year view of arbitration awards probably shows the matter up in about its true light, and that this need be discounted only to the extent that expertness on the part of the labor side in presenting its case may have come to have a bearing on the decisions of more recent years. This expertness results from an organized, experienced handling of the case on labor's part, as against the individual, largely inexperienced treatment on the part of the railway.

As to the question of fares, the present average for the street railways of the country is 7.17 cents. This compares with 6.95 cents a year ago, but with 7.24 cents in May, 1921, which was the high mark. In other words, the industry has already had an average rate 0.07 cent higher than that at present, which did bring increased revenue over previous rates. Hence, it is at least practical to say that fares could be increased some from the present level if wages necessitated. How much increase in fares would be productive of increase in revenue is problematical. For the individual companies whose fares are already up to about 10 cents, this question becomes extremely serious. If wages for these companies increase more, and the fare cannot be raised to advantage, then these railways have their backs to the wall, so to speak. They are without relief from fare adjustment and have only two courses open. They must be able to make other operating economies to offset the increased labor costs, or they must successfully withstand higher wage demands.

These situations at present are not numerous, but they do point to the necessity of a very determined resistance against further increases, especially where wages are already on such a level that average earnings are equal to or in excess of those in other industries.

Abandonments Are Not Always Justified

SOME replacements of non-paying trolley lines by bus lines have taken place and figures have been presented to show how economies have been effected and sometimes additional traffic developed by the new service. Such facts are established beyond dispute in many cases. But now and then one familiar with the history of the case may well wonder whether, had the situation been handled differently, the trolley line could not have been made to pay, and perhaps to earn a return even greater than that possible by the new service.

A case may be cited to show the situation as it sometimes exists. An interurban electric line some 30 miles long connected two cities, the smaller of which has about 100,000 inhabitants. The railway was equipped with cars suitable for city service, geared for a maximum speed of only about 30 m.p.h. The power supply was poor. The d.c. power plant was nearly 20 miles away from one end of the line with feeders far too small for economical operation. In fact, the voltage drop was so great that on days of heavy traffic, when extra cars were run to handle the peaks, the cars would scarcely crawl up the steeper hills. The writer has in mind one section of the line where he observed the motorman throw his controller handle all the way around—and the car stood still. Not until an inspector issued orders for one car at a time to start did the car move.

The railway location was alongside the highway, but was separated from it, and the opportunity existed for fairly high speed running. But with stops every few hundred feet, it was not surprising that the cars took nearly three hours to go from terminal to terminal, the schedule speed being barely 12 m.p.h. With all these handicaps the road did a good business in the old days, when there was no other means of travel save a steam road that operated indifferently.

Naturally, when the automobile came, traffic fell off until it was deemed wise to abandon through service, and even to tear up portions of the track. As there was a need for through service, a bus line was started, making a limited schedule of less than two hours from the center of one city to the center of the other. Patronage was attracted at once, and the line has been quite successful.

The disappointing part is that it would have been possible to overcome most of the defects of the old

rail service. Purchased power with automatic substations properly located would have provided adequate power for a high-speed service without interruption and delay. Many local stops could have been eliminated and schedules as good as or better than those of the buses maintained. Light-weight, one-man interurban cars would have made possible ample service at much less cost than did the old cars. The new investment necessary would not have been excessive. The old investment in track and line, too, could have been preserved.

The case cited is one where inefficiency and indifference to the public's wants spelled the doom of the old line. It was not the failure of one kind of vehicle and the success of another; it was a failure of the management of the electric line. Such failures are too common, especially on the weaker properties. A bus line run the same way as the trolley line was run would have failed just as dismally.

Before deciding to abandon all service on non-paying rail lines, or to change the kind of system, it might be well to examine the defects of the present system. A correction of the faults in operation and the adoption of modern equipment and modern methods will perhaps save the property and make it profitable.

New Car Proposed to Increase Subway Capacity

MUCH publicity is being given in one of the New York picture newspapers to a method "for increasing the capacity of the subways 100 per cent," according to the announcements. The plan is, briefly, to substitute double-deck cars for the present single-deck cars. While it is easy to publish freehand sketches showing how such cars would look, it is quite another matter to build and operate them with the restrictions imposed by the present structures. The headroom in the older subways is only some 12 ft. 6 in., although it might be possible to drop the track 6 in.

It must be realized that the introduction of double-deck cars would not increase the carrying capacity anything like 100 per cent. In the first place, with the floor dropped as low as possible and clear of the rail, space would have to be provided at the ends for the trucks, wheels and motors. The control and braking equipment also take space, and become a real problem in a low-floor vehicle. As the present station platforms are approximately 3 ft. 6 in. above the rail level, the necessary stairways in the cars up to the upper deck and down to the lower deck would take considerable room. Making allowance for all these points, a double-deck car could scarcely carry more than 50 per cent passenger capacity in excess of the present cars. There is also an element of danger in the stairways.

A better type of double-deck car was proposed by John P. Fox, a New York transit expert, over 20 years ago and described in the Boston *Herald* for Oct. 16, 1903. This was a two-level car, with separate doors for each deck and without stairways other than for emergency. Entrance and exit were to be made by means of two-story station platforms. Such an arrangement would simplify the car design materially, and would double the door space, so that the double-deck cars would load and unload perhaps even more quickly than the ordinary single-deck cars. The headroom needed for such a car would be 14 to 15 ft., or greater than that available in the New York subways. The use of such special cars would be practicable now, were new and independent subways constructed for the purpose.

Even if there were sufficient clearance, there are several drawbacks to the use of such cars as are now proposed. If the station platforms were modified for double-deck cars, the existing single-deck cars could not stop at them. As there are several thousand of the latter type of cars in use, such a modification of the platforms would not be feasible. The routing is so complex, and so many different lines operate over the same tracks, that it is improbable that any important routes could be selected for this proposed type of car.

Another Way of Getting Subway Relief

ONE of the simplest methods of increasing the capacity of New York subways would be to use all tracks for express service. The principal rapid transit lines have four-track trunks through the heart of Manhattan, some of them continuing well out into the other boroughs before they divide into double-track branches. Express service is given on one pair of the tracks and local service on the other pair.

It has been demonstrated on practically all the lines that the local trains carry much smaller loads than the expresses. From the very nature of the service this must be so. The function of the locals is to pick up and distribute passengers who make one or both ends of the journey to local stations, but who combine it with a ride on an express. Even the plan which has been adopted in recent years of extending the local tracks into the suburbs has not served to fill the local cars, for all the riders who can, use the expresses until they are forced to transfer to the locals.

The local stations are patronized less than in proportion to the areas served by them. Where the walk is equal, the express station naturally is chosen. Patrons will sometimes walk past a local station to an express stop to avoid changing cars and the double wait.

Practically every rapid transit line in the city has directly above or below it a surface car line, many of which are not being used to capacity. By using such surface car lines as feeders and distributors for the rapid transit lines all or a large share of the local stations could be eliminated entirely so that the four-track subways could be converted into all-express lines. This would permit the present capacity to be nearly doubled, and without any additional expense whatever. In fact, there should be a saving on the rapid transit lines, as the schedule speed on the present local tracks would be increased materially, raising the car-miles to be obtained from a car-hour. Even some of the double-track elevateds and subways could be made express.

With the present state of chaos in which the surface lines have been thrown through receiverships and disintegration, the working out of such a plan would be beset by great difficulties. Then, too, traffic congestion is today at a point where drastic measures would have to be taken to speed up these surface cars. But with the rapid transit situation as desperate as it has become in New York City, a radical remedy must be resorted to if any kind of relief is to be obtained. Even though a comprehensive program of new construction is adopted, it will be years before the new lines can be made ready for service. Meanwhile anything that will aid in relieving the present intolerable conditions might well be given serious consideration, particularly when it involves no new construction or radical change in equipment or methods of operation.

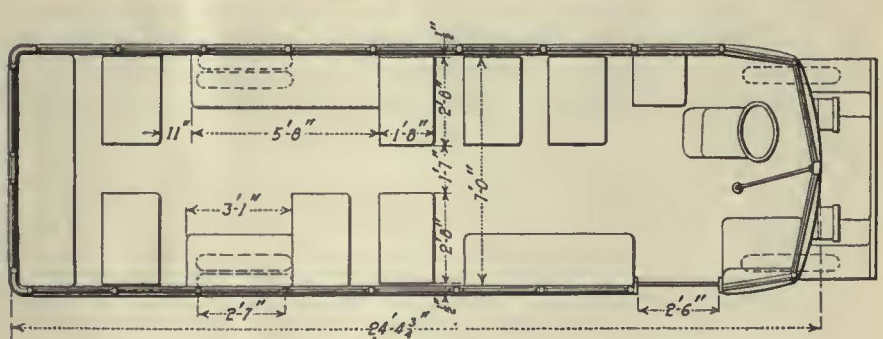
Trackless Trolleys Give Improved Service to Cohoes, N. Y.

The New Route Passes Through the Main Business Section, Replacing a Railway Belt Line—Residents in a Large Area Now Can Reach the Central Section in 4 Minutes, as Against 15 Minutes Previously

OPERATION of trackless trolleys by the Capital District Transportation Company, a subsidiary of the United Traction Company of Albany, began in Cohoes, N. Y., on Nov. 1, as was announced in the Nov. 8 issue of the ELECTRIC RAILWAY JOURNAL. Four trolley buses are used in the initial service. The routes over which the trackless trolleys are operated and the electric car lines which they replaced are shown on on accompanying map of the district.

Electric car service was previously operated over a belt line which extended north as far as Manor Avenue, south along Columbia Street, west as far as Simmons Avenue and east along Main and North Mohawk Streets. The business section of Cohoes lies along Main and Remsen Streets and residents along the westerly part of the belt line had to follow a roundabout route if they took the electric cars downtown. In fact, residents along a large part of this route could walk across to the business section in less time than by taking the electric cars. The company was anxious to give improved service to this section and believed that this could best be taken care of through a change in route so as to operate west from the business center and give a quick service to the residents along the westerly part of the old belt line. This could be done more economically with the trackless trolley than by building new track. That the company was correct in its diagnosis of the routing is shown by the increased riding which has resulted. On Nov. 3, two days after the trackless trolleys started, they carried 804 passengers. Riding increased steadily and on Nov. 15 1,735 passengers were carried. Transportation figures of passengers carried by the belt line show that Nov. 14 a year ago, which was an average day, 940 passengers were carried. The riding on the new trackless trolley is now well above that of the old belt line, and the steady increase shows that additional vehicles soon will be required.

Receiving Passengers at the Manor Avenue Terminus of the Cohoes Trackless Trolley Line

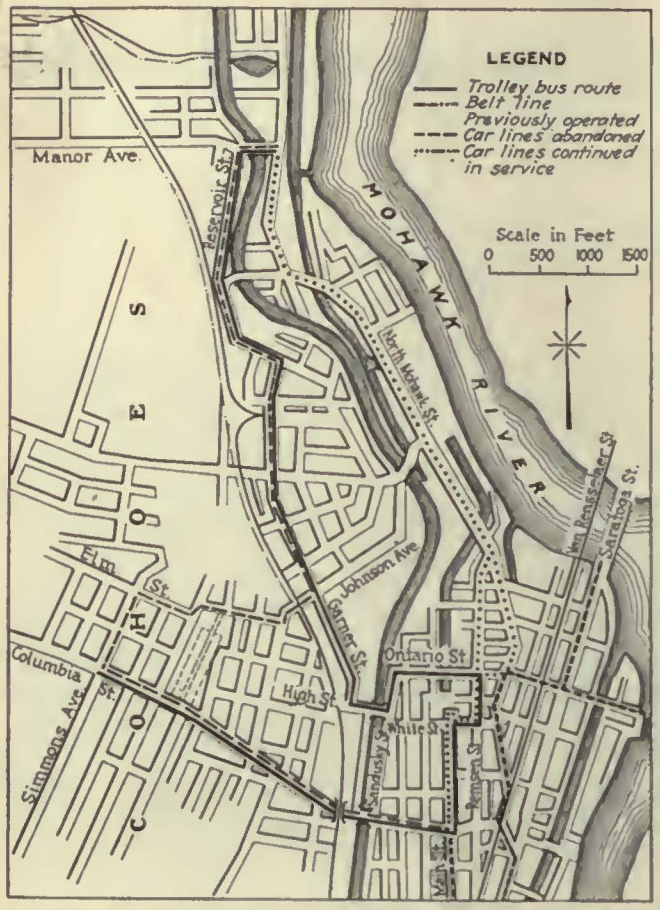


Plan by Which Cohoes Trackless Trolley Seats 31 Passengers

REASONS FOR DECIDING ON TRACKLESS TROLLEY

The use of trackless trolleys in place of electric cars has enabled the operating company to reduce its track and paving expenses. The city of Cohoes decided to reconstruct and repave streets on a considerable portion of the old belt line route. The revenue obtained from operation of railway service was insufficient for the company to assume this additional cost, but by the use of trackless trolleys this item of expense was eliminated, so that the company is in position to give greatly improved service. The fare charged is 7 cents, the same as on the cars of the United Traction Company. Free transfers are exchanged with connecting car lines.

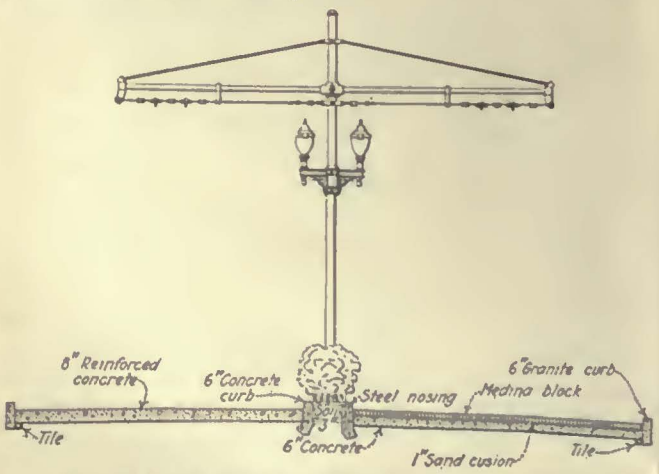
The length of the trackless trolley route from Simmons Avenue on the west to Manor Avenue on the north is 2½ miles. The running time in one direction is 18 minutes, with a 2-minute layover at each terminal. The original belt line mileage was 3.6 for northbound cars and 3.7 for southbound cars. The running time was 30 minutes. The trackless trolleys are thus making a schedule speed of 8.4 m.p.h., as against 7.3 m.p.h. for the belt line cars. More than 40 per cent of the trackless trolley route is over grades of from 5 to 8 per cent. This is another factor in favor of trackless trolley operation as compared with electric cars, since



Route of New Trackless Trolley Line and Belt Line on Which Service Has Been Discontinued

the 8 per cent grade is around a curve and trackless trolleys can negotiate the grade on a larger curve than would be possible with tracks. This is the first trackless trolley route through a business section that has been operated in the United States.

The car tracks along the westerly and southerly part of the old belt line route will be abandoned. Tracks on Columbia Street from Simmons Avenue to the railroad have already been removed and the street has been reconstructed and repaved. The tracks along Main, Remsen and North Mohawk Streets will be retained and electric service operated over these lines. The section along North Mohawk Street as far as Manor Avenue now has cars from Waterford, which previously operated around the downtown loop.



Center Pole Arrangement and Overhead Construction Used on Columbia Street

A considerable part of the route of the trackless trolleys is paved with granite block on a concrete base with cement grout, but brick, concrete, wood block and resurfaced granite block pavements are also found along the route.

The overhead construction for the trackless trolley is entirely independent of that for the railway. Two No. 00 copper trolley wires, spaced 24 in. apart, are suspended by ordinary ears and hangers to ⅜-in. span wires. The section of the route along Main, White and Remsen Streets also has double-track electric car lines. Here the additional overhead lines for the trolley buses are run at the side of the street and no attempt has been made to use the trolley wire of the car lines. In all cases the negative wires are laid outside, and in order to decrease the drop in potential the two positive wires and two negative wires are tied together about every 1,000 ft. Approximately ½ mile of the entire route is new construction, the other part of the route being over what was previously the belt line track. The poles previously used for the railway are used for the overhead of the trackless trolleys except where the operation is through new territory and along Columbia Street from Simmons Avenue to the railroad, which has been entirely reconstructed and repaved. This part of Columbia Street is 40 ft. wide and the new construction has provided a boulevard arrangement with poles down the center in a reservation 3 ft. wide inclosed by concrete curbs. The city intends to plant flowers and a hedge in this section, so as to beautify the street. The poles also support lighting fixtures, resulting in a decrease in the total number of poles from 11 to 4 in a single 400-ft. block. The sides of the street are thus relieved of pole construction, and a very attractive arrangement has resulted, as is shown in an accompanying illustration. As land was not available for con-

DETAILS OF TRACKLESS TROLLEY BUSES OPERATED IN COHOES, N. Y.

Operating company	Capital District Transportation Company
Number of trackless trolleys operated	4
Chassis	Model J, Brockway Corporation with Clark axles
Wheelbase	197 in.
Tires	General pneumatic cords 36 x 6, dual rears
Front tread	5 ft. 6 in.
Rear tread	5 ft. 11 in.
Turning radius inside wheels	35 ft.
Body manufacturer	Wason Manufacturing Company
Length over all	26 ft. 1⅛ in.
Height, pavement to top of roof	9 ft. ⅛ in.
Height inside	6 ft. 6⅞ in.
Floor height above pavement	2 ft. 4½ in.
First step above pavement	15 in.
Second step height	13 in.
Width inside	7 ft.
Weight, total	12,600 lb.
Seating capacity	31
Seats	Hale-Kilburn 208 de luxe
Seating material	Spanish leather
Interior trim	Mahogany
Headlining	Haskelite
Sides	Plymetl
Roof	Canvas
Window sash	Wood lined with brass, arranged to be raised
Window guards	Stationary
Ventilators	Nichols-Lintern
Car trimmings	Brass
Signal system	Faraday
Curtains	None
Destination signs	Hunter, roller
Doors and steps	Folding, hand operated
Heaters (with thermostatic control)	Consolidated
Headlights	Ohio Brass
Lamps, interior	12 frosted, 36-watt
Lamp sockets	Lock type
Fare registers	Ohmer
Grab handles and rails	Porcelain
Hand straps	Sanitary
Gong	Consolidated, electric
Trolley equipment	Nuttal
Trolley catchers	Earl
Operator's curtain	Company's standard draw type
Motors	2 GE-264
Control	GE C-154-B
Painting	Red body, cream trimmings, buff roof

Overhead Construction Used with Trackless Trolleys. At Left, on Remsen Street, Where Trolley Buses Parallel Existing Electric Line. Center, Y Construction at Columbia Street Terminal. At Right, Overhead at Manor Avenue Terminal

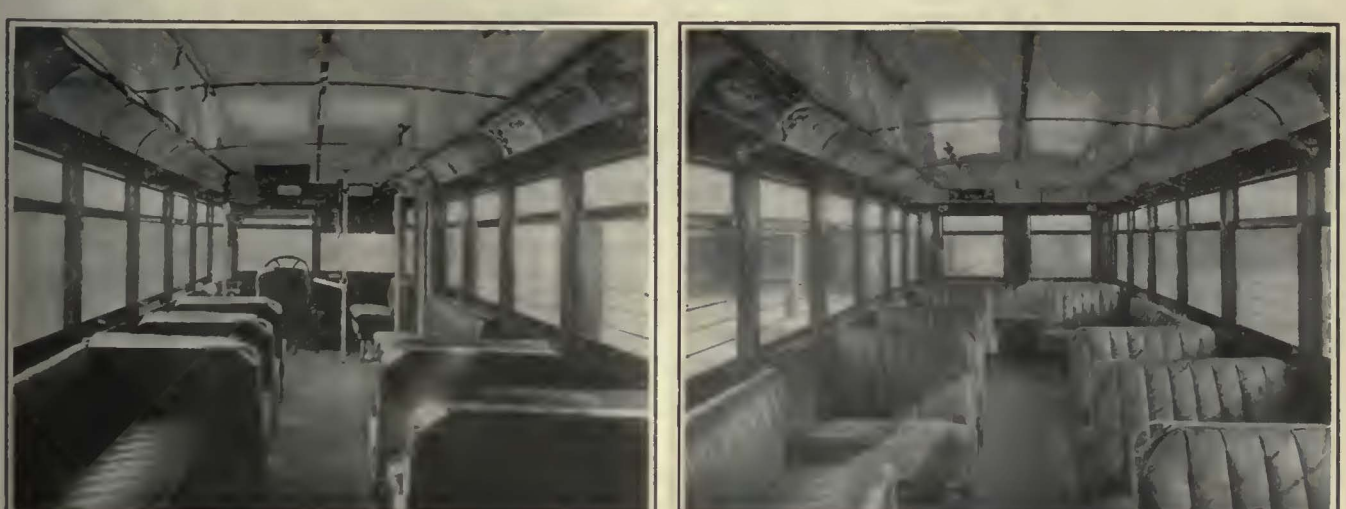
structing loops at the ends of the line a Y construction is used for reversing the vehicles.

In the design of the vehicles themselves, particular attention has been given to attractiveness and comfort. The bodies were built by the Wason Manufacturing Company, Springfield, Mass., and are mounted on Brockway chassis. The important details of construction and equipment are given in the accompanying table.

The over-all length of 26 ft. 1½ in. is the same as that of a standard 29-passenger gasoline bus. By extending the front part of the body, so as to utilize the space taken by the hood of a gasoline bus, a seating capacity of 31 has been obtained. An accompanying illustration shows the seating plan. Seats are comfortable, being of the de luxe type upholstered in Spanish leather. The longitudinal seat at the front end provides additional space for entrance and exit and is also convenient for standing passengers. The two longitudinal seats in the rear part of the body were necessary in order to utilize advantageously the space over the wheel housings. A clear height of 6 ft. 6⅞ in. inside is a convenience for standing passengers. Porcelain hand rails with sanitary hand straps are provided. The folding entrance doors provide a clear passageway of 2 ft. 6 in. Window posts are spaced 2 ft. 7 in. between centers, which gives eight large windows on the entrance side. Stationary window guards are installed, as the windows are arranged to be raised. The upper sash are stationary and glazed with white opaque glass. Interior illumination at night is provided by ten 36-watt lamps which have frosted globes and locking receptacles. The two rear lamps are located in front of openings in the rear wall fitted with colored lenses so as to serve as marker lights. While the lamps are along the side of the car over the windows, the type of fixture used brings them out for a distance of approximately 12 in.

The wiring for the signal system also runs in the same section with the light wiring. A push button is located over the center of each window. This location simplifies the wiring considerably, as splices are not needed at each window post, as would be necessary if the signal buttons were installed on the window posts. Electric heaters, equipped with thermostatic control, provide a comfortable interior temperature at all times. An emergency door in the rear right-hand side swings outward together with the window which occupies the panel. The latch for releasing the door is installed in a glass case within the body, so that it must be broken to open the door.

The power for propulsion is provided by two tandem-connected General Electric type 264 motors, which have a rating of 25 hp. each. The control equipment is General Electric type C-154-B contactor type. The operating company is now conducting tests of a control equipment with automatic acceleration and also of regenerative braking for this type of vehicle. The present motor control equipment is actuated by the left-hand pedal, while the right-hand pedal is for braking. A signal lamp of the Consolidated Car Heating Company's type is connected in the control circuit so as to show when the full series position of the control has been reached. Each bus is also equipped with a Consolidated electric gong, which is controlled by a push botton.



Comfortable Interior Attracts Riders to the Trolley Bus. At Left, Looking Toward Operating End. At Right, From Operating End

The color scheme for painting is the standard used by the United Traction Company and consists of a red body, cream window posts and a buff roof.

In regard to the advantages of trackless trolley vehicles over gasoline buses, Ernest M. Murphy, general manager of the United Traction Company, stated that due to the many curves and severe grades which this line contains and provision for rapid acceleration, the power demand is heavy. The motor equipment provided has a higher rating and a greater overload capacity than is ordinarily furnished for the corresponding gasoline-driven bus. There is also an advantage in that the motors used are of a type standard on some of the electric cars of the United Traction Company.

The trackless trolley vehicles have a low center of gravity, which permits an increased height, and thus gives increased comfort to standing passengers. The body has also been extended the full length of the chassis, so as to provide an increased number of seats with greater comfort to seated passengers. The present maintenance forces are familiar with the inspection and repair of electric car equipment and so the addition of the trackless trolleys required no addition to the company's maintenance forces. As power is supplied by a central station instead of from individual engines, as is necessary with gasoline-driven units, the trackless trolleys are cheaper to operate and to maintain. In addition, they are in the shop a considerably smaller portion of the time. There are many other conveniences, such as better lighting and heating, and convenience for control of the various operating devices that present a much simpler arrangement on the trackless trolley.

Determining the Average Length of Ride*

Method Proposed in Connection with Mail Pay Reduces the Number of Observers Needed to Take Field Data—Load Factor Can Be Quickly Determined

IN THE brief submitted by the railway mail pay committee of the American Electric Railway Association, which was presented in the railway mail pay case before the post office department at Washington, a new method of determining the average length of ride on urban railways was proposed. The plan was the work of W. H. Maltbie, special counsel of the United Railways & Electric Company, Baltimore, Md., as attorney for the railway mail pay committee.

Comparatively few accurate determinations of load factor have been made in the past for member companies, so that the amount of evidence which could be presented to the Interstate Commerce Commission as to direct determinations of load factor was relatively limited. A number of other companies, however, have made direct studies as to the average length of ride, and it was possible by a consideration of the configuration and area of American cities, supplemented by the experience of specialists who have worked in traffic surveys, to reach a maximum figure for the average length of ride for the average municipal area. Moreover, the figures furnished by the member companies in the mail pay study made it possible to determine the average seating capacity of the cars used by member companies; while the average number of revenue passengers per car-mile, representing the average number of persons who board each car per mile, is a well-known and daily constant figure for the industry.

These figures are connected by the relation:

$$\frac{\text{Revenue passengers per car-mile} \times \text{Average length of ride}}{\text{Average seating capacity of car}} = \text{Load factor}$$

This formula was used in the argument on the mail pay case.

It is evident at once, however, that the product of the average number of revenue passengers per car-mile by the average length of the ride is the average number of riders upon the car. This fact suggests at once a new method of determining the average length of ride and the load factor for the entire system, for any definite portion of the system, for any day of the week, for any definite hour of the day or even for a single trip.

This new method is extremely simple. It consists merely in placing a single observer on each car on a given line, in a position from which he can command a view of the interior of the car, and directing him to count the number of passengers actually on board the car at definite intervals on the system, that is, for each mile, half mile, or quarter mile. The sum total of his observations divided by the number of counts yields the average number of passengers riding upon the car. This number divided by the seating capacity of the car furnishes the load factor, or divided by the number of revenue passengers per car-mile gives the average length of ride upon that certain line.

The simplicity of this method and its relative inexpensiveness are evident when it is contrasted with the methods formerly in use. The original method, using an origin-to-destination check, involves not only a tremendous amount of clerical work, but also the full cooperation of the riding public. A later method, using on-and-off studies, involves two men upon each car studied and a large amount of clerical work in the determination of the total passenger-miles.

The new method involves only one man upon each car studied and no computation other than the addition of his counts and the division of the total by the number of counts made.

*This article is based on material included in the briefs submitted to the Charles A. Coffin Prize Committee of the American Electric Railway Association by the company named.

Striped Dasher of Little Advantage

THE method of painting car dashers with stripes to make the car appear wider as practiced at Schenectady, N. Y., and described in ELECTRIC RAILWAY JOURNAL for Nov. 1, page 760, has not given as good results as were anticipated. After keeping statistics of accidents for three or four months the practice was discontinued. Since that time there has been a steady reduction in the number of accidents and also in their cost, although there has been an increase in number of automobiles over two years ago, amounting to nearly 70 per cent. The improved accident record, however, may have come from the added experience of the newer automobile drivers as the summer season advanced.

The Berlin Street Railway is erecting apartment houses near its shops and depots for the housing of its personnel. On Oct. 17 one apartment block, containing 272 apartments, was officially opened. Altogether about 1,000 such apartments will be provided.

New Boston "L" Lumber Storage and Kiln

Second Article

The Lumber Storage Building, Outside Lumber Storage and Dry Kiln for the New Everett Shops, Boston, Illustrate Advanced Design and Practice—For Efficient Handling of Materials Improved Equipment Is Used

The Transferway Constitutes the Main Axis for the New Boston Shop—The Paint Shop Is on the Left and the Kiln Building and Wood Mill on the Right

IN THE present article on the new Everett car repair shops of the Boston Elevated Railway the improved facilities for handling and treating lumber are described. An outline of the reasons for the construction of the new shops, with a description of the boiler plant, heating installation and power supply, was published in the ELECTRIC RAILWAY JOURNAL for Nov. 22, page 871.

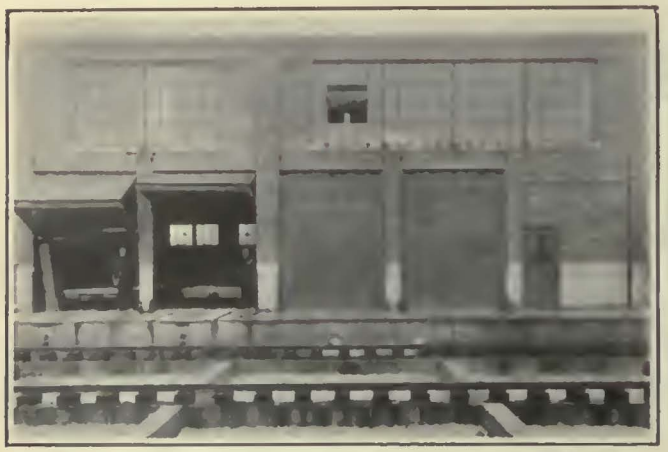
The main axis of the shops is a transferway 80 ft. wide, extending from the southerly end of the yard northerly to the site of the future wheel and axle shop. This may be seen by reference to the general plan on page 872 of the Nov. 22 article. On the west side of the transferway are already built the wood shop, dry kiln and lumber storage building, and in the upper southwest corner of the property is a section of the yard devoted to the outdoor storage of lumber. The lumber storage building and dry kiln building are each 80 ft. square, and are located between the wood mill and the lumber yard. Each is two stories high and the wood mill, about 364 x 158 ft., is one story in height with the exception of a balcony on the west side used as a carpenter shop.

THE HOT-BLAST DRY KILN HAS TWO TRACKS

The kiln building, also containing storage space, contains a modern two-track Sturtevant hot-blast lumber kiln with humidity feature, fully equipped, and has bi-folding doors of the jack-knife type set flush with steel-frame openings. Half the first floor is used in kiln work and has two tracks which extend from end to end and thence to the transferway. The remainder of the first story is used for heavy metal storage and the second floor for the storage of light parts and miscellaneous equipment. Details of the ducts for the heated air are shown in the accompanying line drawing.

The first floor of the lumber storage building is utilized for the storage of heavy lumber under cover, the second floor being employed in the storage of lumber under heat. In the northwest corner is a baling room for sawdust and shavings which are piped over from the millroom.

Most of the lumber used at the Everett shops arrives by the steam railroad connections on the west side of the property and is unloaded by hand from cars on spur tracks serving the yard on the west side of the transferway and south of the kiln building. The yard will hold about 350,000 ft. of lumber, or 7 months supply. From this yard a passageway about 15 ft. wide runs between the kiln and lumber storage buildings, terminating at the wood mill, and three tracks laid at right angles to the transferway axis facilitate shifting of cars along the sides of the kiln and storage buildings and parallel to the millroom doors. The lumber is piled as needed on four-wheeled hand trucks carrying



Exterior of Dry Kiln with Entrance to Provide Service from the Transferway

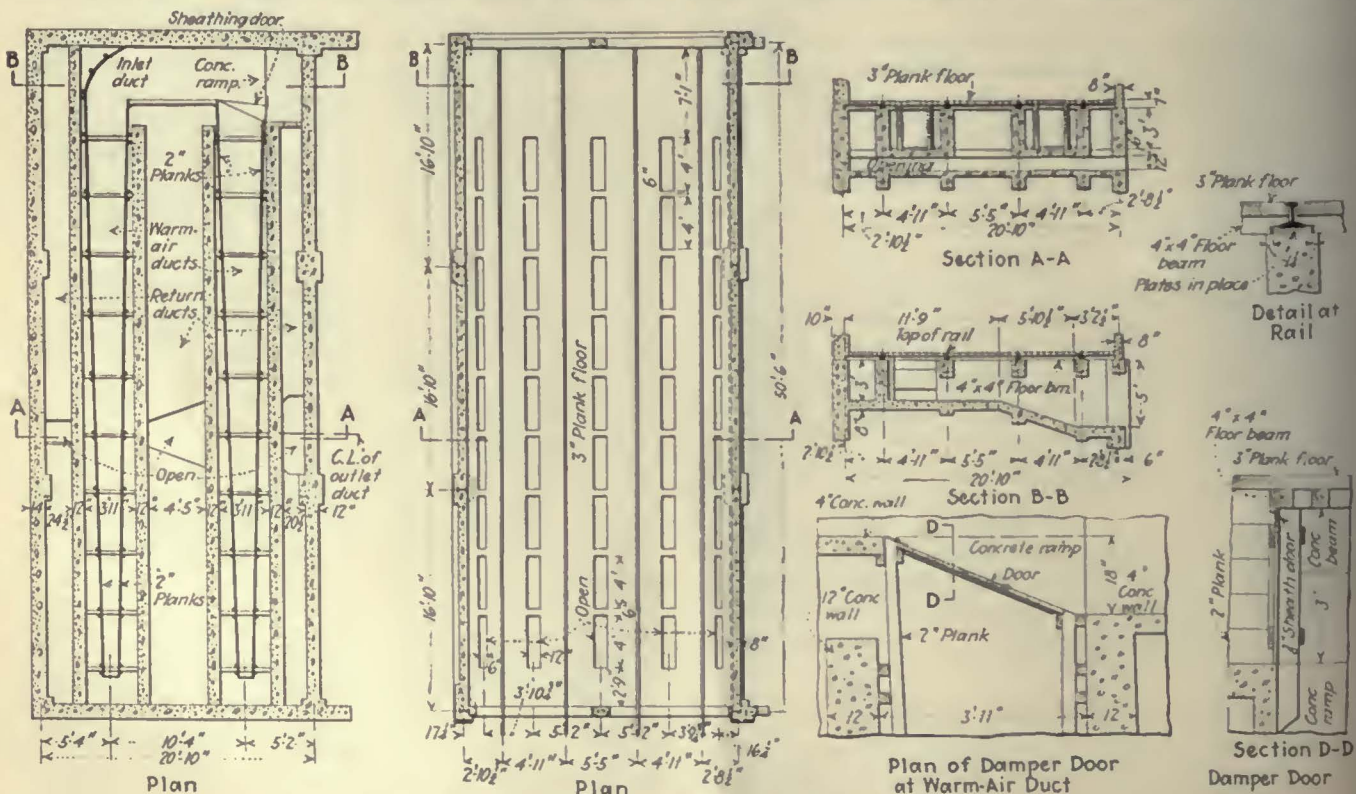
Interior of Dry Lumber Kiln Showing the Tracks, Gratings and Ventilating Arrangement

about 1,000 board-feet each for convenient distribution about the millroom or lumber storage building. For kiln drying it is stacked on special kiln cars or is moved on flat cars by the aid of the transfer table and a service car to any desired point served by the yard and building trackage. If desired, motor truck loads of lumber can easily be delivered into this group of buildings. It is also readily possible to unload lumber directly from the flat cars into the storage building by shifting them through the yard to the transferway and thence to the appropriate track paralleling the side doors of the building.

The kiln proper consists of a single heating compartment containing two parallel tracks, each capable of accommodating two special flat cars and giving a total capacity of 24,000 board-feet of lumber for simultaneous treatment. The kiln proper is about 50 ft. long by 21 ft. wide. The rails are laid to standard gage on reinforced concrete beams, and a 3-in. plank flooring is provided with the wearing surface flush with the rail top. Under each track between the rails a row of ducts supplies hot air to the charges of lumber. The return ducts are in the floor outside of the kiln tracks, with a single large return duct running through the center of the kiln. These ducts are covered with gratings assembled from iron bars of ¼-in. x 1¼-in. section, spaced 1 in. apart. In general these cover louvered openings 4 ft. long by 12 in. wide below the floor level and average 9 in. wide at the outlet. Forty-five gratings are provided for the complete kiln, of which 27 are used as returns to the duct system. The louvers are operated by a stick from the floor.

Circulating the Hot Air

Heated air for kiln service is supplied by a 5-hp. motor-driven fan mounted in the basement of the kiln building and arranged to draw air through a chamber containing steam coils before it enters the supply ducts. This heating chamber, a sheet-iron box adjoining the fan housing, is also equipped with a steam



Plan of Kiln Building with Sections of Duct Construction

t by which the degree of humidity in the entering can be controlled. The kiln room proper contains lines of 1½-in. pipe laid between the rails and ing a large number of ¼-in. outlets for the discharge ive steam directly into the kiln. The return ducts end the entire length of the two sides of the kiln under its center, the three being merged together he west end and carried back to the fan room for eating of the air. The ducts thus provide a con- ious recirculation of air from the supply ducts up the center of each load of lumber and outward ough the return ducts to the rear of the heating . The maximum steam pressure required is 10 lb. he fan is designed to supply five changes of air per ute through the lumber pile at approximately 1 in. ic pressure. The kiln will maintain temperatures to 150 deg. F. Thermostatic controls of temperature humidity are installed on the wall of the kiln room also in the fan room. A Powers regulating valve trols the steam supplied to the coils in the heating mber, and the installation includes a recording chrometer (registering continuous wet and dry bulb peratures) with tubing directly connected to a nt in the supply duct system where the maximum ing conditions prevail in the kiln; indicating rometers and testing instruments to determine the sture content of the lumber. A 660-watt, 110-volt tric oven supplied by E. H. Sargent & Company, cago, is provided to test the moisture content of ber samples. The kiln-drying system was furnished the B. F. Sturtevant Company, Boston, and the ording instruments by the Foxboro Company.

UMBER STACKED TO GIVE FREE AIR CIRCULATION

umber to be kiln-dried is stacked on special trucks, h air spaces between the boards, and is hauled by a vice car to the transferway. The spacers are x 1¾ in. cross-section. From the transfer table the ber trucks are pushed into the kiln. The kiln tment varies somewhat according to the kind of ber in hand and its condition. Whitewood of all s is first live-steamed for four hours at about 10 lb. square inch, in order to saturate the fibers thor- hly. The stock is then soaking wet to the heart of wood. Steam is shut off and the blower started, mall amount of steam being let into the hot-air mber of the air-duct system as air is admitted. supply of hot air is continued for 5 to 6 days, lumber being inspected daily to see if the sap is ing off at the proper rate and if the drying is ceeding normally. Should the temperature run too h the lumber tends to curl and if the heating is wed to continue at an excessive rate warping and eycombing may follow. The automatic control is iable in preventing fluctuations of temperature humidity after the proper values have been deter- ed. On the last day in drying whitewood the mois- is cut off and the work finished with hot air alone. ogany is given about the same treatment as white- d. The same is true of oak, except that in handling n wet-sawed stock it is steam-heated at 100 to 120 , followed by 6 to 8 days of kiln drying up to a imum of 140 deg. Three-inch maple is steamed n 3 to 5 hours at 100 to 120 deg., followed by 10 to lays of kiln drying at 140 to 150 deg. Eight days ng generally suffices for 1-in. and 1½-in. maple. ut 24,000 ft. of lumber was kiln-dried here in a nt 3-weeks period.

The lumber storage building is equipped with six dry rooms on the second floor, each having double-sheathed wooden partitions and doors, and heated by coils supported on the floor over which the lumber is piled. The central portion of the building is open and skylighted to provide for convenient handling of lumber to and from the lower floor. The lumber is either transported to the south door of the storage building on a kiln car or brought in on a hand truck. The compartments on the second floor are capable of holding 17,000 ft. of lumber each, packed 9 ft. high, and are each 16 ft. square inside. One is utilized in the hot storage of soft pine of 1½-in. size, the next for hot storage of 1-in. pine and the next for dry storage of mahogany and 1-in. whitewood. The bins on the opposite side are assigned to the dry storage of 1½-in. whitewood, oak, ash and cherry. The kiln-drying process is used on sizes of pine above 1½ in. thick, the smaller sizes being hot-dried in the storage house for about 2 weeks at temperatures of from 100 to 150 deg.

The Dry Lumber Storage Has Six Rooms, Each 16 Ft. Square, and Heated by Steam Coils

Air-dried stock is stored under the second floor compartments. These are provided with balconies 3 ft. wide reached by short ladders at the end of the building. They are electrically lighted and equipped with automatic sprinklers and ventilating openings near the top and bottom of the doors.

To facilitate handling lumber from the first floor to the bins above, a detachable wooden roller 4 ft. long and of 4 in. diameter is placed in sockets in front of the required bin at the walkway edge, this taking a considerable portion of the weight of the board from the handlers on the floor and balcony. On the ground floor another convenience in holding boards on the diagonal when passing them up or down is a metal pin inserted in a portable stanchion about 4 ft. high, the handler allowing the board to rest in part against this pin when pausing in the work. In general the steam valves controlling the heating coils in the storage compartments are near the second floor level and close to the doorways.

The kiln building cost $9.51 per square foot of floor space, including equipment, and the lumber storage building cost $7.89 per square foot.

The lumber storage building is connected with the wood mill by a bridge which provides access to the sawdust and shavings separating hopper above the baling room and helps support the dust discharge piping and a steam line feeding the hot storage compartment coils.

English Locomotives for Montreal

FOUR locomotives for use on the new electrified harbor railway at Montreal will be delivered in the near future. They are equipped for operation at 2,400 volts d.c. and have been built by the English Electric Company, Ltd., at a total cost of $478,650. The total weight on the drivers is 200,000 lb. Each locomotive will have a nominal 1-hour tractive effort of 40,000 lb. at a speed of 15 m.p.h. and a maximum tractive effort of 60,000 lb. for 5 minutes.

The locomotives are of the box-cab, double-truck, articulated running-gear type and are provided with twin-gear drive. All the weight is carried on the four driving axles. Each truck is side-equalized and one truck is cross-equalized. Total length inside the knuckles is 39 ft. The diameter of the driving wheels is 50 in.

The cab is divided into three compartments, the central of which contains the control gear and auxiliary machinery. On one end the driving compartment is wider than the main body of the locomotive and has windows in the rear so that a better view of the track can be obtained during shunting operations. This wider compartment is equipped with two driving positions, one facing the front and the other facing the rear. The interior of the cab is lined with heat-insulating material to prevent condensation which might occur on account of temperature changes.

Current collection is accomplished by two pa tographs. Control is of the camshaft type. Tw Dick-Kerr motors are mounted on each truck.

Arbitrations Have Favored Neither Party

A FIVE-YEAR view of the results of arbitratio of wage disputes between electric railways a their employees shows that one side has won about often as the other. The results of a study made by t JOURNAL are summarized and detailed in the accon

SUMMARY OF ARBITRATION RESULTS

	Number of Arbitrations	Won by Men	Won Compa
1920	21	19	2
1921	24	2	22
1922	12	1	11
1923	11	11	0
1924	14	12	2
Totals	82	45	37

panying two tables. Of a total of 82 cases during t years 1920–1924, the boards of arbitration found f the men in 42, while in 37 cases they found for the co pany. In 1920, practically all decisions were for t men. In 1921 and 1922 practically all were for t companies. In 1923 and 1924, the tables rever again, as practically all decisions favored the men.

DETAIL RESULTS OF WAGE ARBITRATIONS DURING LAST FIVE YEARS

Company	Awards; Cents or Per Cent Increase in Maximum Rate Per Hour	Reference to Journal
1920		
Key Route, Oakland, Calif.	12½%	Jan. 24, p. 210
Georgia Ry. & Pr. Co., Atlanta	15%	Mar. 27, p. 663
Denver Tramway	10c.	April 3, p. 720
Des Moines City Railway	13c.(2)	May 29, p. 1112
Boston Elevated	10c.	June 19, p. 1276
Ottawa Electric Railway	10c.	June 19, p. 1276
Colo. Springs & Cripple Creek Ry.	48c.*	June 26, p. 1321
N. Y. State Railways, Rochester, Syracuse & Utica Lines	33⅓%	July 3, p. 30
Toronto Railway	No change (3)	July 3, p. 33
Tri-City Railway & Light Co., Davenport, Iowa	10c.	July 10, p. 89
Scranton Railway	20%	July 10, p. 91
E. St. Louis & Suburban Railway	40 to 52%	July 24, p. 186
Twin City Rapid Transit Co.	10c.	July 31, p. 238
Montreal Tramways	25 to 30%	Aug. 21, p. 377
Cincinnati Traction Company	9c.	Aug. 21, p. 378
Winnipeg Electric Railway	10%	Aug. 21, p. 381
Omaha & Council Bluffs St. Ry.	No change (3)	Aug. 28, p. 428
Eastern Massachusetts St. Ry	11c.	Sept. 18, p. 562
Kentucky Traction & Term. Co.	7c.	
New Orleans Railway & Lt. Co.	30%	Sept. 25, p. 612
Cincinnati, Newport & Covington Railway	20%	Oct. 16, p. 841
1921		
Kentucky Traction & Term. Co.	— 5½c.	May 7, p. 869
Eastern Massachusetts St. Ry.	—12½%	May 21, p. 963
Utah Light & Traction Company	—12½%	June 18, p. 1143
Wheeling Traction Company	No change (4)	June 18, p. 1139
Cleveland, Southwestern & Columbus Traction Co. / Cleveland, Painesville & Eastern Traction Co.	—12c.	June 18, p. 1139
New York State Railways	—11.7%	
Cincinnati & Dayton Trac. Co.	— 7c.	June 25, p. 1178
Des Moines City Railway	—11c.	July 16, p. 108
Youngstown & Ohio River R.R.	— 5c.	July 30, p. 177
Rochester & Syracuse Railway	—16⅔%	July 30, p. 179
Northern Ohio Traction & Lt. Co.	(—15c.)—1 to 2c. lower than company asked	Aug. 6, p. 217
Mass. Northeastern Elec. Railway	—12%	Aug. 20, p. 293
Memphis Street Railway	— 4c.	Aug. 27, p. 332
Middlesex & Boston Street Ry.	—15%	Sept. 10, p. 414
Topeka Railway	— 7½ to 10%	Sept. 17, p. 453
Auburn & Syracuse Electric R.R.	—14c. freight / —14c. interburban / —12c. city	Sept. 24, p. 531
Schenectady Railway	No change (4)	Oct. 1, p. 562
Montreal Tramways	—12½%(1)	Oct. 1, p. 566
Connecticut Company	— 8⅓%	Oct. 22, p. 751
East St. Louis & Suburban Ry.	— 3c.	Dec. 10, p. 1042
British Columbia Electric Ry.	—10%	Dec. 24, p. 1125
Boston & Worcester Street Ry.	—10%	Dec. 31, p. 1155

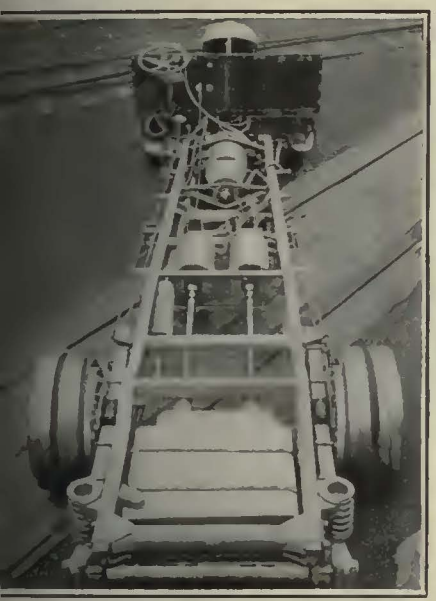
Company	Awards; Cents or Per Cent Increase in Maximum Rate Per Hour	Reference to Journal
1922		
British Columbia Electric Railway, Vancouver, B.C.	—10%	Jan. 14, p.
Cincinnati Traction	—20%	Jan. 21, p.
Hull Electric Railway	.....	Feb. 11, p.
Attleboro Branch Railroad / Interstate Consolidated St. Ry. / Milford, Attleboro & Woonsocket Street Railway / Springfield, Worcester Con. St. Ry. / Columbus, Newark & Zanesville Railway / Indiana, Columbus & Eastern Ry.	—10c.	Mar. 4, p.
	— 2c.	May 6, p.
Cleveland Railway	—10%	May 20, p.
Georgia Ry. & Pr. Co., Atlanta	—12½%	June 3, p.
Connecticut Company	— 5.45%	June 17, p.
Tri-City Railway	No change (3)	June 17, p.
Chicago Elevated Railways	—10%	Aug. 19, p.
Chicago Surface Lines	—10%	Aug. 19, p.
Cincinnati Street Railway	— 4%	July 29, p.
Berkshire Street Railway	No change (4)	Oct. 7, p.
1923		
Cleveland Railway	5c.	May 26, p.
Scranton Railway	3 to 5c.	July 7, p.
Youngstown & Ohio River R.R.	6c.	July 21, p.
Chicago Surface Lines	3c. for first year of contract; 2c. more for second.	July 28, p.
Chicago Rapid Transit Co.	3c. for first year of contract; 2c. more for second.	Aug. 4, p.
Cincinnati Traction Co.	5c.	Aug. 18, p.
Grand Rapids Railway	3c.	Aug. 18, p.
Detroit Department of St. Rys.	5½ to 7½c.	Aug. 25, p.
British Columbia Electric Railway, Vancouver, B.C.	3½c.	Oct. 6, p.
E. St. Louis & Suburban Railway	3c.	Sept. 29, p.
Boston Elevated Railway	9c.	Oct. 20, p.
1924		
Middlesex & Boston Street Ry.	4c.	Feb. 16, p.
Augusta-Aiken Ry. & Elec. Co.	2½c.	Mar. 15, p.
Georgia Ry. & Pr. Co., Atlanta	3c.	April 5, p.
Capital Traction Co., Wash., D.C.	2c.	April 18, p.
Memphis Street Railway	3c.	May 10, p.
Des Moines City Railway	5c.	May 24, p.
Springfield, Massachusetts Street Railway, Worcester	10c.	June 14, p.
Cleveland Railway	12c.	June 7, p.
Manchester & Nashua St. Ry. / Manchester & Derry Street Ry.	7c. for one-man cars / 5c. for two-man cars	July 5, p.
Trenton & Mercer Co. Trac. Co.	10%	Aug. 19, p.
Arkansas Valley Interurban Ry.	— 3c.	Aug. 30, p.
Peoria Railway—Trainmen only	— 7c.	Sept. 20, p.
Scranton Railway	1c.	Oct. 4, p.
Boston Elevated Railway	2½c.	Oct. 18, p.

* Hourly rate increased to 48c.; increase itself not known.

(1) Cut by company sustained.
(2) Set aside by court as excessive and reduced 10 cents.
(3) Men asked increase.
(4) Company asked reduction.

P. R. T. to Operate 225 Gas-Electric Buses

New Design Departs Materially from Previous Gas-Electric Drives — Entire Control Is by Throttle of Gasoline Engine Which Drives Generator—Motors Are Permanently Connected Direct to the Generator and Power Is Transmitted to Wheels by Bevel Gears—Elimination of Differential Is Expected to Lower Maintenance Costs



At Left, Chassis of Experimental Gas-Electric Bus, Showing Power Plant and Individual Motor Drive for Each Rear Wheel Eliminating Differential. At Right, the Gas-Electric Bus Is in General Appearance Similar to the Standard Yellow Coach Gasoline Bus

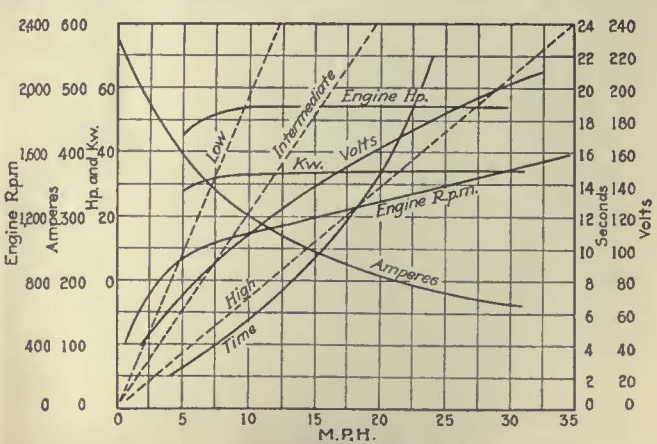
AFTER a series of exhaustive tests, the Philadelphia Rural Transit Company, a subsidiary of the Philadelphia Rapid Transit Company, has ordered 225 gas-electric buses which will differ in several important respects from earlier designs. The placing of the order was mentioned briefly in this paper, issue of Dec. 6. Engines, chassis, and bodies will be built by the Yellow Coach Manufacturing Company, while the electrical equipment will be supplied by the General Electric Company. Mitten Management has ordered 25 additional buses for use in Buffalo. The total cost will be about $3,000,000.

Power will be supplied by a standard six-cylinder engine of 4¼-in. bore and 5½-in. stroke, rated at 108 hp. at 2,200 r.p.m. This engine will drive a generator permanently connected electrically to two 20-hp. electric motors mounted side by side on the chassis frame. These in turn will be mechanically connected to the rear wheels by drive shafts and bevel gears.

The speed of the bus will be controlled by movement of the throttle of the gasoline engine. Clutch, transmission, and mechanical differential have been eliminated. Because of that and also because of the constant torque of the electric motors, the wear and tear on all moving parts, as well as the chassis and body, is expected to be much reduced, insuring a greater length of life for all equipment.

The generator, known as the GE-1098, is compound wound with a differential series field, the shunt winding being excited by a small generator which forms a part of the main generating unit. The exciter obtains its field current from a 12-volt storage battery. This arrangement of windings provides high current and low voltage at starting. Due to the inherent characteristics of the generator, as the vehicle accelerates the voltage increases and the current decreases automatically until normal running speed is reached. For a given throttle opening the output of the generator is substantially constant under all road conditions. In this manner the necessary torque for acceleration or hill climbing is provided without overloading the engine, and with a smooth change of speed. The generator is designed to transmit the output of the gas engine within practical limits of operation. The bus is designed for a normal maximum speed of 26 m.p.h. on a level roadway.

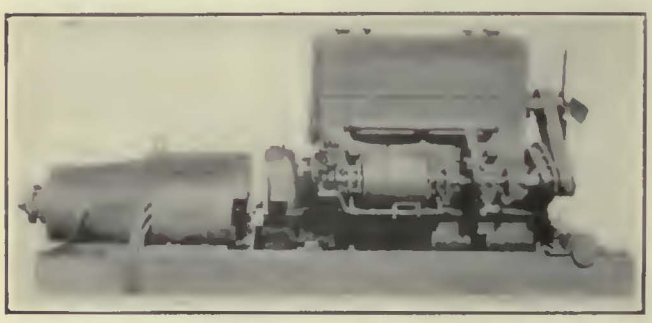
Both the generator and the motors, which are known as GE-1079, are designed on the basis of 125-volt operation, and are self-ventilated. The motor frames are long and of small diameter, permitting assembly on the chassis without sacrifice of road clearance.



Acceleration Curves of the Philadelphia Gas-Electric Bus. The Corresponding Speed Curves for the Gas-Mechanical Bus Are Given in Dotted Lines

Acceleration and all speed changes are obtained solely by variation of the engine throttle, which is controlled by the usual accelerator pedal. As the engine speed increases, the generator voltage rises. The operator need not remove his hands from the steering wheel except to apply the emergency brake. There is no electrical controller for the motors, nor are any electrical adjustments made by the driver when running the bus. A small switch is provided having an off position and reverse for backing. This is connected with a single hand lever to the left of the steering post.

Before this design was definitely selected, competitive tests were run with the experimental gas-electric bus and a bus having the usual gear drive, with clutch, transmission and differential. The accompanying illustrations show the chassis and exterior appearance of this experimental bus. Several minor changes in design will be made when the new buses are built. The gas-



Power Plant of the Gas-Electric Bus Includes a Variable Voltage Generator and a Separate Exciter Driven from the Engine Shaft

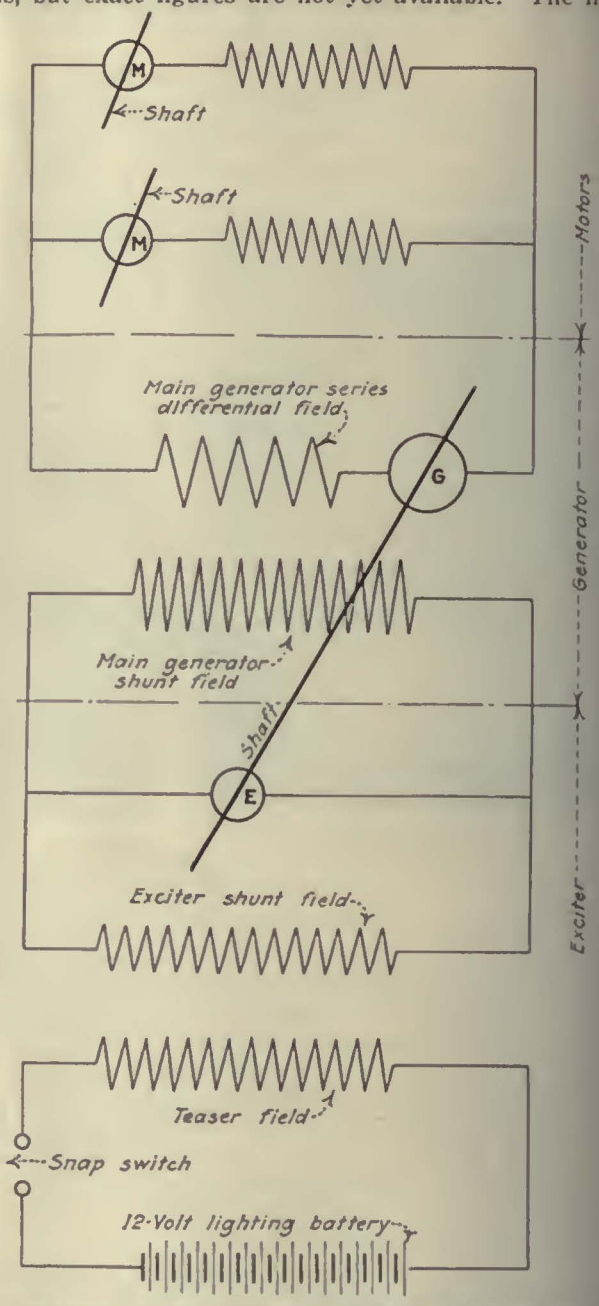
electric bus has been in regular service from Aug. 1 up to the present time and has covered more than 13,000 miles.

It is said that the tests made show somewhat lower fuel consumption for the gas-electric bus for a given service, and at the same time a higher rate of acceleration and schedule speeds. These are important factors in city bus operation. An important point which was developed was the fact that the engine of the gas-electric bus actually makes 20 per cent fewer revolutions when running under city conditions than does the engine of the bus equipped with mechanical drive. This is because with gas-electric transmission it is impossible for the driver to race the engine, and it is also difficult for him to stall it.

The great advantage claimed for the new design, however, is its simplicity. There is comparatively little electric wiring and no controller. The various parts are easily got at for inspection and repair. Elimination of more than 2,000 movements of the gear shift per bus per day is expected to reduce maintenance costs and prolong the life of the chassis and body. Moreover, the electric drive is silent and the customary noise and jerk of changing gears at the time of starting will be absent.

The two-motor drive permits a better distribution of power to the rear wheels when going around a curve. In the event of the failure of one motor, the bus can be brought back to the garage on the one remaining motor. The fact that the bus cannot be put in gear when going down hill is not considered a drawback because there are no steep grades on the routes where the buses will be operated.

The buses are of the double-deck type and have a seating capacity of 66. The weight of the completely equipped gas electric bus will probably be several hundred pounds greater than that of a mechanical drive bus, but exact figures are not yet available. The first



Schematic Wiring Diagram, Showing How Motors Are Permanently Connected to the Generator

of the buses will be operated on the Broad Street route for which a franchise was recently obtained. Additional routes, however, have been planned.

Purchasing Agents Aid Traffic Survey

AT A TIME when the time-table division of the Department of Street Railways, City of Detroit, was having trouble to keep pace with lay-offs at the factories, it occurred to the management to seek the aid of the purchasing agent. It was thought that as a member of the Purchasing Agents' Association of Detroit, the latter could readily get in touch with some 500 fellow agents in local manufacturing plants. This was in fact accomplished through the courtesy of the executive secretary of the association, who devoted most of the space in a circular letter to a statement on "Improving Your Street Railway Service."

He pointed out that the railway is a business operated or profit. A shortage of cars hurts traffic. A surplus f cars means excessive operating expense. The roblem is to keep the service adjusted to variations n demand. In view of these facts he requested the nembers to fill out and mail to him prepared postcards iving information concerning the number of men mployed. It was particularly requested that large mployers refrain from over-statement because the heory of securing "plenty of cars for every one" soon lefeats its own purpose. It is one thing to say that a housand men are employed and another to find that hese men are on a three-day week and that only 500 re on the job at one time.

Replies received to this card covered some 200 plants mploying from 300,000 to 400,000 men. During the wo or three weeks following many facts of value to the raffic division came to the purchasing agent.

The Readers' Forum

Best Results in Energy Saving Made with Instruments

ECONOMY ELECTRIC DEVICES COMPANY
CHICAGO, ILL., Nov. 26, 1924.

To the Editors:

I have read with interest the abstract, on page 776 n the Nov. 1 issue, of the paper read by Wilhelm Pforr, manager Berlin Street Railways, before the International Electric Railway Association meeting at Homburg von der Höhe.

A hurried examination of this abstract would indicate hat the author's findings were contrary to practices very widely adopted in the United States; but a more careful reading shows that Mr. Pforr's conclusions are based on his personal experience and are more or less contrary to the answers received to the questionnaire which he circulated with a view to summarizing opinions on the results obtained from all forms of energy-checking devices.

It is certain that the experiences of users of energy-checking devices in North America do not confirm Mr. Pforr's conclusions. Mr. Pforr finds that 30 per cent of the properties addressed were using instruments of some sort. In the United States approximately 25 per cent of the active motor cars are equipped with watt-hour meters and a substantial number are equipped with coasting time recorders or power-on time recorders. A large mass of data is therefore available in this country on which to base answers to the four points set forth by Mr. Pforr, who argues that it is better for his property and some others of similar size to encourage the saving of car propulsion energy by having additional power supervisors rather than by the joint use of energy-checking devices and power supervisors. He summarizes his objections as follows: (1) The appreciable expense of record-keeping personnel; (2) the maintenance cost of the instruments; (3) overloads occur oftener because the instruments tend to encourage high rates of acceleration and to discourage the series running, which is so valuable in congested areas; (4) false comparisons, which are drawn frequently, cause dissatisfaction among the motormen.

Our statements which follow are based on findings obtained over a period of 12 years use of Sangamo-Economy mercury type watt-hour meters with and without car inspection dials:

1. The average expense for clerical record keeping is less than $10 per meter year and this expense is made up largely of the accurate determination of all revenue car mileage. The results therefore are of value to the property in addition to simply that of checking the energy consumption. On some properties it has been found that a large part of this $10 was already being spent in obtaining car mileage.

2. The average expense for thoroughly maintaining—that is, cleaning and recalibrating—Economy watt-hour meters is less than $2 per meter per year, and the average cost for repair parts is less than 10 cents per meter per year.

3. Regarding the encouragement of high rates of acceleration and retardation through the use of a so-called "power-saving" device, the discussion of this point borders on competitive arguments between the devices which check a man through the use of the time element or by actual measurement of the energy. We argue that under the latter plan the watt-hour meter encourages rather than discourages series running and proper feeding of the controller in accordance with car and street traffic conditions. It does not put a premium on accelerating rates higher than those for which the electrical equipment of the car was originally designed.

I believe that the widespread experience in the United States has shown that not only with watt-hour meters but also with time-checking devices, the peaks at the substation bus are actually decreased. On one large property that made a special study of this, the 24-hour energy saving indicated through the use of meters at an average of 14 per cent, was accompanied by a reduction in the rush-hour peak of a little less than 10 per cent.

4. Under the system of rating the relative operating efficiencies of motormen through the use of the kilowatt-hour per car-mile, the meter does most of the engineering, and the question of false comparisions between men is hardly possible of justification when the usual operating constants are applied to the situation. With the kilowatt-hour as a unit the man is judged by what he does to avoid unnecessary losses and is measured by the actual expense he entails in the energy cost for operating his car.

We believe firmly in personal instruction, as Mr. Pforr recommends; but we have found that the best results cannot be obtained without the use of some checking device whereby a constant measure may be had on each motorman showing whether he is or is not following the instructions given. We have found that even where intensive instruction has been given, the use of the Economy watt-hour meter has increased the efficiency of operation from 10 to 20 per cent.

To summarize: Experience in this country, where more than 200 roads are using watt-hour meters as car energy checking devices, has shown that substantial savings result over and above those that can be obtained by the use of any number of instructors. This saving is far in excess of the overhead and operating costs. In fact, numerous roads have wiped off all operating and capital charges for the meters with the savings obtained during the first year. L. E. GOULD.

Association News & Discussions

Public Utility Problems Discussed in Pennsylvania

Relief from Paving Burdens, Quantity Production of Renewal Parts, Bus Operation, and Relations with Other Utilities Were Subjects at the Twentieth Annual Convention of the Pennsylvania Street Railway Association

DEPARTING somewhat from custom, the Pennsylvania Street Railway Association invited representatives of various municipalities to be present with the electric railway men of the state at their twentieth annual meeting at the Penn-Harris Hotel, Harrisburg, on Dec. 5. A lively interest in the proceedings was manifested by a number of the city officials who took part in the discussion which followed the presentation of papers.

An outstanding feature of the meeting was a paper on relief from paving burdens by A. T. Davison, general counsel Third Avenue Railway, New York City. An abstract appeara elsewhere in this issue. In discussing Mr. Davison's paper, D. L. Starr, a member of the Traction Conference Board of Pennsylvania, urged a more complete presentation of facts to the public. He said that many points in Mr. Davison's paper were new to him and that he believed greater efforts should be made to give auch information to the public. William LaFountaine, Director of Public Works, Scranton, Pa., said that the question of relief from paving burdens deserves careful consideration. The compromise suggested by Mr. Davison, whereby the city would construct the original paving between the tracks and the railway would maintain it, might be effected, he thought. The secretary of the Pennsylvania Chamber of Commerce said that the subject was one of great importance, and he would be glad to have all the available facts for presentation to the chamber.

Speaking of the relation of electric railways to other public utilities, P. H. Lantz, financial assistant to the president Philadelphia Company, Pittsburgh, said that in common with the other utilities the railways possess a huge investment and a relatively large number of employees coming in constant contact with the public. Their influence is tremendous in engendering and maintaining a friendly regard for their companies. The first step toward a better understanding of the motives of the railways and a better comprehension of their problems can well be taken by approaching those engaged in other public service occupations. They offer the distinct advantage of a sympathetic audience.

When new methods affecting customers are introduced, when schedules or routes are changed, when the rates are increased, nearly all human beings experience the same feeling. There is a natural disposition to criticise a change, and if not to resent it at least to question it. How does it sound, Mr. Lantz asked, to the man in the street, to hear an electric light man say that he "wonders what those fellows are up to now," when a street car schedule is changed? Or if a railway man is quite upset at the prospect of an advance in gas rates, it creates a bad impression. To some extent, people regard all those engaged in public utility service as pretty much in one class. They are supposed to have common characteristics. If those engaged in these services, therefore, are to be classed together, they should realize the advantages of standing together. In conclusion, Mr. Lantz told of the success which had attended the presentation of several short skits written with a view to showing the public some of the problems encountered by utility companies.

After mentioning the good results which were being obtained through the sale of securities to customers, Major J. S. S. Richardson, chairman of the Pennsylvania Public Service Information Committee, gave some good suggestions concerning publicity methods. He said that railway men should avoid the use of the phrase "educating the public." The public believes that it already is sufficiently educated and is not anxious for any more education handed out by the railway companies. In his opinion, the use of the phrase "informing the public" would avoid this difficulty.

Traffic problems were briefly discussed by Police Lieutenant Marshall, in charge of the traffic department in Pittsburgh. In his opinion, it is not feasible entirely to eliminate automobile parking. This, he considers, would interfere too greatly with the conduct of business. In Pittsburgh, by the establishment of a commercial unloading zone in the center of the block, it has been possible to prevent vehicles loading and unloading merchandise from standing alongside automobiles already parked and thus completely blocking the street.

A somewhat different point of view was expressed by C. F. Crane, assistant to the president Harrisburg Railways, who said that in Harrisburg the problem of traffic congestion is almo altogether a question of automobi parking. He thought that it was matter of all or none, and that a automobile parking in downtow streets should be eliminated, just as s railway passes were eliminated son years ago when this abuse had grow intolerable. In the same way, the t tal elimination of parking wou remedy the situation without discrin inating against individuals.

The morning session was opened b an address from F. R. Phillips, pres dent of the association. After dwellin briefly on the scope of the industry Pennsylvania, he said: "There ha been some who, because of the aut mobile and the bus, have felt that th electric railway has practically reache the limit of its usefulness. But whe we consider that, in the year of th greatest expansion of the automobi and bus, the electric railways of th state increased their usefulness at th same or even at a greater rate tha before, this should controvert any ide that they are going backward."

Mr. Phillips spoke also of the wor of the various committees. The com mittee on legislative matters repre sented the interest of the associatio in hearings before the State Tax Com mission. The committee on constitu tion and by-laws submitted a repo clarifying certain portions of the co stitution and by-laws. A committee o the joint use of poles was organize at the suggestion of the chief of th bureau of engineering of the Publ Service Commission. The enthusias with which the committees have s tacked their work has removed an doubt, Mr. Phillips said, as to the po sibilities which exist for the associa tion to be of real service to its mem bers.

Reports were read by the secretar and treasurer and committees wer appointed. A recommendation of th committee on constitution and by-law suggesting that only one meeting year be held instead of two, and th some minor changes be made in th matter of the dues, was approved. H M. Stine, secretary of the associatio warned of the difficulties that may en sue as a result of the attempt of th Pennsylvania Giant Power Survey t link together companies that are we situated geographically for this pur pose but not equally well situated eco nomically.

Commencing his remarks with th observation that maintenance is lik the poor—with us always—Harry E Meyer, development and supply divi sion, Westinghouse Electric & Manu facturing Company, presented a pape on the advantage of buying renewa parts from the manufacturer most in terested in their performance.

abstract of this paper will appear future issue.

s operations of the United Electric ays of Baltimore were outlined . H. Palmer, vice-president and al manager. He gave it as his on that buses are now a necessity hat their future utility lies in fur- ng feeder and connecting line ce. The possibilities of de luxe ce he considers problematical. ial service and chartered buses be a source of revenue to the iting company. Mr. Palmer spoke e satisfactory results which have obtained in Baltimore with in- d double-deck buses. In conclu- he emphasized the impossibility ses handling mass transportation, hich connection the fact that the fare must be higher than the rail- fare is an important considera- tending to limit the field of use- ss of the bus.

telegram was received from La- St. Clair, American Electric Rail- Association, who was to have en on the subject "How Best to Street Car Rides to Automobile ers." The telegram summarized ly the tenor of the remarks which St. Clair would have made, as ws: "Make comfort of street car g rather than cost of running an mobile the basis of appeal to auto- ile owners. They resent being told they cannot afford to run cars, the as they resent being told they ot afford fur coats for their wives. to the comfort text. Say it briefly often, and you will sell rides."

e meeting ended with a banquet, which a number of prominent men ennsylvania spoke. Major Richard- added to his remarks made earlier he day and stressed particularly fact that information given out by railways to the press must have news value or it will not be pub- ed. As an example of the way that time element affects news value, told of a number of sensational ies that were running on the front es of the newspapers in the sum- of 1914 and how they were dropped night when Austria declared war Serbia and Russia mobilized 14 y corps on the Austrian border.

ohn L. Stewart, member Pennsyl- ia Public Service Commission, spoke fly concerning the efforts of the com- sion to promote at the same time the rests of the utility companies and he public. A few reminiscences of early days of the street railway ustry were related by P. G. Wells, uty attorney-general of Pennsyl- ia. The financial condition of the te was outlined in an address by ditor-General Samuel Lewis. Mrs. C. Hughes, assistant to the vice-presi- t of the Pennsylvania Section of the tional Safety Council, spoke on the ject of safety. The concluding aker was former Lieut.-Gov. E. E. dleman, who emphasized the need for re business sense in the conduct of ry-day affairs.

The officers re-elected for the com- year included F. R. Phillips, presi- t; W. F. Bell, vice-president, and nry M. Stine, secretary and treas- r. On the executive committee F. R. illips, W. F. Bell, C. L. S. Tingley, Thomas Cooper and C. F. Crane were re-elected. New members of the execu- tive committee will be H. L. Mitchell, West Penn Railways; J. L. Adams, Philadelphia & Western Railway; W. A. Woolford, General Electric Com- pany, and Joseph Wayne, York Rail- ways.

Let the City Pave and the Railway Maintain the Pavement*

By A. T. Davison
General Counsel Third Avenue Railway, New York City

IT WOULD be a waste of time to point out to street railway repre- sentatives the gross injustice of the archaic paving burdens under which the railways of the entire country, ex- cept in a few enlightened states, are literally staggering. The real question before us is, "What are we going to do about it."

At the outset, we should all realize that the real source from which our relief must come is public opinion. That is the strongest influence in the life of any community, state or nation. No legislature or set of officials can, in the final analysis, act counter to public opinion. Once we can convince the pub- lic of the gross injustice of this burden and of how vitally it is affected by it the relief will follow as a matter of course.

First, then, as to the form of relief which we should ask for. The best way to drive out a bad idea is to put a good idea in its place, and similarly, the best way to get rid of this iniquitous paving burden is to substitute for it a plan which is so fair and reasonable that no one can possibly object to it.

I believe that we cannot convince, at this time, a majority of the people that we should be relieved of all paving bur- dens. It may come in time, but it will only come after we have obtained a modification of the present drastic obligation.

Coming, then, to the specific form of relief which we should now ask for: The obligation on street railways to do any original paving should unquestion- ably be entirely eliminated. The justice and fairness of this is self-evident. It has been judicially recognized that street railway companies derive no spe- cial or peculiar benefit from the con- struction of the paving, and, as stated by the Street Railway Investigation Commission of Connecticut:

"The trolley car can run satisfac- torily and give service to its patrons regardless of whether a street is paved or not."

Obviously, the only purpose of paving the railway area is to make it more convenient for purposes of travel by vehicles other than street cars.

The only reason ever advanced why street railways should do any paving has been that the operation of their cars caused a deterioration of the pave- ment. This might be an argument for an obligation to maintain a pavement after it has been laid, but certainly is no justification for requiring the street railway company to pay for the original pavement. The obligation to do original paving cannot be justified on any theory.

The idea, then, to instill into the minds of the public is this: that street railway companies should be required to restore to its former condition so much of the pavement of the street as shall have become in need of repair in consequence of the existence and use of their track.

The absolute fairness of such an obligation becomes the more apparent the more it is considered. It means that regardless of any specified rail- way area, if by any chance the com- panies because of the existence and use of their tracks in the streets, cause damage to the pavement anywhere be- tween the curbs, they are to pay for that damage. Nothing could be fairer than this.

It may be that in numerous instances this form of relief will be given volun- tarily by the municipalities, but it is important to bear in mind that in all the states of the Union this form of relief can be given by appropriate laws passed by the legislatures. There is no legal obstacle in the way of altering present paving obligations notwith- standing that such paving obligations are embodied in the franchise contracts themselves. The United States Su- preme Court has upheld the authority of the state to alter the obligations contained in franchises granted by mu- nicipalities and accepted by street rail- road companies, notwithstanding the argument that these franchise obliga- tions were in the nature of contracts between the municipalities and the street railway companies.

Our approach to the public should be along the lines that the street car riders are the ones who are in reality bearing this paving burden, either directly by way of increased fares or indirectly by being deprived of service which otherwise they would have. We ought to make the people see that street railway corporations do not and cannot, under our regulatory and public service commission laws, use the streets for private profit. All moneys paid by street railways for paving obligations must be charged to operating expenses and paid out of the fares collected. Therefore, if the operating expenses of street railways must include paving obligations, the public is required to pay just that much more on its rate of fare.

Furthermore, we ought to tell the public how many passengers we are carrying on our lines each year and show them that if those persons were not carried on street cars they would necessarily be carried in other vehicles which would use the streets in greatly increased numbers and thus increase

*Abstract of a paper presented at the convention of the Pennsylvania Street Rail- way Association, Harrisburg, Pa., Dec. 5.

the wear on and deterioration of the pavement.

Also, we should show that the tracks in the street are an asset to every community. These tracks are a guarantee to every business man and to prospective buyers of property that there is a permanent method of transportation in that locality, whereas if these tracks were removed and some other form of vehicular transportation were substituted, there is no guarantee that such other means of transportation will continue on that street. The street railways should explain how much of their income is paid to defray these paving obligations, and then compare these amounts with the taxes paid by other public utility corporations. We should also show that the amounts paid by street railway companies for paving do not render to the riders, who in reality pay these amounts, any more service than to the general public. Those who are really benefiting are the automobile users. We should make the car riders realize that they are paying the paving burden of the automobilist whose car they have just dodged at a street intersection or whose car is blocking their progress at the peak hour in congested territory.

We should show the public, and particularly the legislature, how absolutely fair the remedy we are asking for is, namely, that we should be required to restore to its former condition so much of the pavement as shall have become in need of repair in consequence of the existence and use of the track. In this connection, we should explain that if there is any damage caused by the weight of modern electric cars or vibration or flattened wheels or defective rolling stock, then the more that damage is, the more the company would be required to pay.

Furthermore, the obligation to maintain the pavement meets any claim that it is weakened at the points just adjacent to the tracks by reason of the lines of cleavage existing at such points, thus allowing considerable surface water to percolate through into the sub-surface and weaken the foundation of the roadbed. The remedy we propose fully meets this condition. The plan places a penalty on poor track construction and a premium on good track construction. Wherever we remove the pavement for track repairs we, of course, would be required to restore the pavement to its former condition.

And then, too, we should tell the public that in eleven states and one province in Canada a paving obligation has been adopted substantially in the form which we are now asking. In three of these states, Massachusetts, Rhode Island and Connecticut, the relief is statutory and state-wide. In the other eight states, Wisconsin, Washington, Kentucky, Indinna, California, Michigan, Illinois and Minnesota, and in the Province of Quebec, Canada, this form of relief has been adopted by one or more cities.

In the city of New York the Transit Commission has provided that the rate of fare on one of the lines in an outlying section shall be increased one cent for every $100,000 of paving which the company is required to pay. As a result, the paving program in that section has been very materially altered by the city authorities.

Of course the most important class of persons to be convinced are the members of the legislature. This, however, will follow of its own accord when public opinion has been sufficiently awakened. But until that time we should should improve all opportunities of getting information directly to the members of the legislature. One method of doing this and also of getting the matter before the public is to introduce in the legislature each year a bill which will give the relief which w asking for. The introduction o bill should be followed by hearing at all these hearings we have d strated in New York City that th reason why relief has been withh the desire of the city authorities t and collect from street railways a share of the municipal paving exp even though it be iniquitous, unjus an imposition on the car riders. only emphasizes the point that opinion must be so molded tha arbitrary retention of an unfair b can be ended.

Operating Experience with Buses*

Various Sources of Trouble Are Pointed Out—Better Brakes, Prov for Overloads, Six-Cylinder Engines for Smoother Starting, Mor Dependable Tires, Larger Capacity Generators and High Maintenance Standards Needed

By B. HILBURN
General Manager Tulsa Street Railway, Tulsa, Okla.

PERHAPS there is no more interesting subject relating to the transportation industry today than that of co-ordinating bus and street car service. The announcement in the October issue of *Bus Transportation* that 155 electric railways of the United States and Canada are operating 1,914 buses over 2,405 miles of route is conclusive evidence of the growing use of the bus by electric railway operators. It is also significant that more railways are operating buses in city service than in any other field.

Upon the advent of the unsightly jitney, without any semblance of regulation or responsibility, many of us unfortunately followed the practice of the ostrich and proceeded to cover our heads, in an attempt to ward off the danger of the approaching destructive competition. With our heads buried in the sand, we were unable to observe the rapid strides being made in the development of automotive equipment.

Before we realized it, many outsiders had begun to take advantage of the insistent demand for the newer mode of transportation. Where we have failed to supply this demand others have done it. It matters not that operation of the motor bus in city transportation has in most cases proved unprofitable; there are always those who are willing to take a chance. It is almost certain that ultimately a type of equipment will be designed that will prove practicable, and as operators get more experience many of the present operating problems will be solved. Therefore, it is absolutely essential that electric railways adopt the motor bus and proceed to find its place in the scheme of transportation. If this is not done there is grave danger of the business passing into other and more progressive hands.

Like many other street railways throughout the country, our city became infested with the "jitney" in 1914. The operation of this unsightly vehicle in competition with our lines has continued down to this day. There have been many attempts to eliminate them, but without any degree of success. have had, and now have, a city ministration that is willing to elim them, but the state laws have been that any ordinance passed with end in view has always been voide the courts.

In 1922, in an effort to eliminat jitneys from the streets, the city p an ordinance requiring all auto b or automobiles being used in t portation service, to be of not less 16-passenger seating capacity. was done upon our agreement to ate motor buses on some of the where jitneys were operating and w reached territory not served by lines. For the most part, the jit were covering routes that came direct competition with the street We purchased 15 Garford buses an White Model 50. Six of the Gar buses were of 16-passenger cap and the other nine Garfords, and White had a seating capacity f passengers.

We operated the buses on two ro One was 2.7 miles long. An e minute headway was maint throughout the day, with suff extra buses to give a 6-minute head in the peak hours. On the other r which was 2.5 miles long, we m tained a 6-minute headway throug the day and added additional buse give a 3½-minute headway in the hours. The operating results satisfactory, until the jitney op ra after about three months, went court and succeeded in having the dinance voided. Then they went onto the line with their buses. W the Supreme Court finally affirmed decision of the lower court, we w drew our buses and placed them route which was just half way betw the jitney line and the street car However, this operation was unpr able, and at the present time we only operating buses as short ex sions of two car lines. We are at p ent directing our efforts toward se ing a new franchise, which, if the grants, we think will take care of jitney situation. Then we will prob be required to place in operation m

*Abstract of paper presented before meeting of Midwest Electric Railway Association, St. Louis, Nov. 24, 25, 1924.

; to supplement our street car
ce.
ere seems to be no need to discuss
roposition as to whether buses are
; to be used, because, in my opin-
that question is already settled.
e electric railway doesn't operate
, some other agency will. It
is that losses are going to be in-
d and that the electric railways
going to have to carry the burden,
the bus manufacturers do their
rimenting and development. But
ll be much better for the railways
et in on the ground floor than to
ther agencies get the start, which
d mean that the electric railways
d suffer more than from the losses
red during the development stage.
erefore, it is apparent that we
ld put our shoulder to the wheel
exert our efforts toward solving
problems that are connected with
peration of the motor bus. And
Lord only knows, they are many.
n the things I have read and
things that I have heard I have
ed the impression that there are
operators of intercity or inter-
n buses who are making money.
ever, I have addressed letters of
ry to many operators of buses in
transportation and have failed to
one who is actually making money
hem. It is, I think, a favorable
acteristic that most of them are
nistic. I may say that I have not
ded in my list the large inde-
ent operators, such as the Fifth
ue Coach Company or the Chicago
r Coach Company.
e of the most serious problems
onting the bus operator is the
ing problem. While, no doubt, the
motive engineers have within the
year given this problem more con-
ation than in the past, I do not
ve they yet realize the vast dif-
ice in the strain on the brakes on
us compared with that on the or-
y service truck. The continued
ing and stopping to take on and
arge passengers necessitates the
f the brakes many hundred times
per day than on a truck. And,
if rapid schedules are to be main-
d the use of the brake must be
more severe. I mean by that, the
tor must run at a fast rate of
l up to the point where he is to
and then stop quickly. Some
od of giving more braking surface
be developed, and material more
ble than that now in use must be
d. It is not the exception, but the
ral rule, that brakes in perfect
ition when a bus goes out on its
will in a very short time be in such
ition as to make the bus unsafe
peration. Much of this could be
n care of by proper adjustment
isions. When you are in the mar-
for bus equipment, it will be wise
you to investigate thoroughly the
ing apparatus.
ght along with the braking prob-
I want to touch on the load capac-
rovisions. There has been no more
us mistake made by the bus manu-
rers than that of underestimating
load capacity requirements. In
instances they have placed on the
is a body which seats the entire
ber of passengers which the chassis is capable of carrying. It may be that under certain conditions loads can be limited to the seating capacity. It is most definite and certain that we cannot do that in our city, and I think the same condition holds true in most places. When you take into consideration the fact that more than 50 per cent of the traffic is handled in the peak hours, say from 6:30 to 8:30 in the morning, and from 4:30 to 6:30 in the afternoon, it can readily be seen that the equipment must carry overloads. If we should attempt to place in service sufficient additional equipment to provide seats for everybody in the rush hours, then the equipment could not possibly earn sufficient at current rates of fare to pay the operating expenses, because of the light traffic in the off-peak hours. So the bus manufacturers must so design their equipment that it will carry the overloads, just as the street cars have always done. And that is another thing you should go into carefully when purchasing bus equipment.

The constant starting and stopping of buses in city service is, perhaps, the cause of most of the mechanical troubles that occur. Therefore, automotive engineers should strive to achieve the utmost in flexibility of the driving mechanism of the equipment. I have discussed this feature with many of the engineers in the industry. It is my theory that a six-cylinder motor is preferable to the four-cylinder motor, in that it will afford a greater degree of smoothness in starting. We have never had much trouble with our motors, even though they have been greatly overloaded. But we have had much trouble from the clutch back to the rear end. It is my opinion that most all of this is due to rough starting. I have not always had the engineers agree with me that a six-cylinder motor would afford any relief. However, I note that some of them are now coming out with that type of motor. It will be exceedingly interesting to see how it works out. It may be that some sort of hydraulic clutch could be worked out to give greater flexibility.

When a bus gets so it does not start smoothly, and all buses will get that way as they grow older, then the process of battering at the transmission, universal joints and finally and probably most seriously the rear, or differential gears, begins. These shocks soon have an effect on hubs and wheel bearings.

Tires are also a serious matter. There is no doubt of the desirability of pneumatic tires from a resiliency standpoint. They are more comfortable to ride on and they are less destructive to the equipment. However, from the standpoint of regularity of service and dependability of service they are not so satisfactory. A flat tire is certain to lay the bus out for a trip, and this causes an interruption of the schedule. I think that in time a satisfactory type of solid cushion tire will be developed that will make the use of the pneumatic unnecessary, and when it is, that will do away with a lot of trouble.

Another important item is the electric generator. The current necessary to light up the interior agreeably, and at the same time keep the outside lights going, has proved such a drain on the batteries and generators on our equipment that they could not carry the load. That, no doubt, is being taken care of, but don't overlook that feature in your specifications. And let me remind you that while the manufacturers of bus equipment are earnestly striving to overcome all the difficulties, they are less familiar with transportation requirements than you are. They have for several years been engaged in the manufacture of equipment for use in other lines of business, in which the requirements cannot be compared with those of passenger transportation.

It seems entirely out of place to suggest to a body of street railway men the necessity for rigid inspection of equipment. Yet our experience has taught us that the maintenance problems of buses are so much greater than those of street cars that it has been difficult for our maintenance department to inspect frequently and thoroughly enough. There are so many more working parts in a motor bus, and so many more adjustments that the average mechanic is prone to release his job before all final adjustments are made. The work does not stand up, as does the mechanical work done on the street car. We have found that our bus maintenance requires much attention. Greatest effort should be made to keep complete harmony between the shopmen and the operators on the road. Friction between these two groups can cause much trouble.

C.E.R.A. Annual Meeting Jan. 8 and 9

THE annual meeting of the Central Electric Railway Association will be held Jan. 8 and 9, 1925, at the Miami Hotel, Dayton, Ohio. Following a meeting of the executive committee at 9 a.m. the sessions will be opened by the presidential address of Harry Reid, president of the association and president Interstate Public Service Company, Indianapolis.

After the presidential address, A. E. Magee, president Ohio Association for Prevention of Grade Crossing and Highway Accidents, will present a paper, "Elimination of Grade Crossing and Highway Accidents." The discussion on this paper will be led by Wallace Muir, Charles L. Henry and J. B. Dugan.

The report of a special committee appointed to review recommendations of state committees on elimination of grade crossing and highway accidents will be presented and followed by a general discussion.

In the afternoon the delegates will visit the McCook experimental flying field of the United States government.

The annual dinner will be held at 6:30 p.m. at the hotel.

The Friday session, which will be called to order at 9:30 a.m., will be devoted to the subject "Super-Power and the Railways," by E. H. Sniffin, manager power department Westinghouse Electric & Manufacturing Company. Following the discussion there will be an election of officers, and immediately after adjournment the new executive committee will meet

Spheres of Motor and Railway Transport Discussed at New England Conference

Use of Buses and Trucks to Handle Traffic Formerly Carried at a Loss Described—Some Bus-Mile Costs Questioned—Co-ordination of All Transportation Agencies Urged

TO DEFINE better the fields of service of the steam railroad, the electric railway, the motor truck and the motor bus, a conference under the auspices of the National Automobile Chamber of Commerce was held at Boston, Mass., on Monday and Tuesday of this week. About 300 transportation men and public officials attended, among the speakers being a number of prominent electric railway executives.

At the opening session Frederic S. Snyder of Boston presided, and the first speaker was Alfred H. Swayne, president General Motors Corporation, who discussed "The Relation of Highway Transport to Other Transportation Facilities." He pointed out that New England is demanding better transportation facilities and at lower cost. Either the railroads, the electric railways and the existing independents will develop motor routes to meet present and future needs or outside groups will come in and build up a profitable business by giving this service. Road conditions in Massachusetts, Rhode Island and Connecticut are unusually well adapted to motor transport, which is largely confined to manufactured products of high value. More than two-thirds of the total motor truck movement is in distances of from 1 to 30 miles. Motor vehicle transport should be subject to the regulation of rates and service given other carriers. In taxation, the common carrier motor vehicle should be granted no favors which give it an undue advantage over the other agencies. The best interests of the public and the rail, waterway and motor interests lie in co-operation between them rather than in wasteful competition, and the greatest opportunity for co-operation is in the terminal areas of great cities.

C. L. Bardo, general manager of the New York, New Haven & Hartford Railroad, read a paper picturing the magnitude of the railroad industry in this country, the investment involved and the necessity of co-ordinating transportation by highway and rail to eliminate wasteful competition. He stated that the New Haven road stands ready to co-operate in the co-ordination of agencies for the better distribution of local traffic from the rail heads —particularly in the industrial centers and cities.

ELECTRIC RAILWAYS AND HIGHWAY TRANSPORT

A masterly résumé of the development of the electric railway and its economic place in modern life was presented by L. S. Storrs, president of the Connecticut Company, New Haven, Conn. An abstract of this paper is printed elsewhere in this issue.

"Independent Highway Transport" was discussed by James M. Swift of Boston, president Interstate Limited Motor Coach Company and counsel for the Motor Coach Association of New England. Mr. Swift outlined the demand of the public for bus transportation, declaring that it has come to stay, as it fills a new place in transport service.

A warm discussion of the place of the motor bus in New England occupied an afternoon session under the chairmanship of A. J. Brosseau, president Mack Trucks, Inc.

R. H. Newcomb, assistant to the vice-president New York, New Haven & Hartford Railroad, said that all steam railroad employees realize that the motor coach is here to stay. The railroads have consistently advocated the reduction of economically unsound competition and the real problem is one of co-ordination. It is unfair, said the speaker, that the bus should have no regulation whatever in Massachusetts, when the steam and electric roads have it. All forms of transportation should have the same general regulation. Taxation should also be levied on motor buses on a fair basis.

R. M. Sparks, vice-president Interstate Limited Motor Coach Company, sketched the development of highway transport up to the present day of bus application. He affirmed his belief in the special service rendered by the motor coach to the public and vigorously declared that this service will be maintained and expanded as fast as the traffic demands.

H. F. Fritch, Boston & Maine Railroad, said that his company is studying its unprofitable branch mileage with the possibility of doing away with train service and substituting the motor vehicle. The private automobile is a primary factor in the lack of patronage on these branches. He commended the firm stand of the electric railways of the country in 1919-1920 against the jitney, which led to success in the battle against these invaders. It is no proof, the speaker declared, that the bus is economically sound because the public patronizes it in particular localities. When equitable tax adjustments are made in relation to the motor bus, the allurements of this new form of transportation will diminish somewhat. A broad study of the entire passenger and freight carrying problem is essential to a solution of the motor bus situation.

A. R. Williams, counsel of the United Electric Railways, Providence, R. I., maintained that the field traversed by the motor bus is already served by steam or street railways. If these two agencies cannot afford to lose to the motor bus they will have to go out of business where the bus has taken the patronage. If the public has reached the period of non-regulation of any such transport agency as the motor bus, Sovietism once removed has arrived. It is impossible for the rail carrier economically to handle mass transportation unless it also handl the middle-of-the-day business. If t public really demands the privilege riding on rubber the service shou be properly regulated and rendered existing carriers. The speaker charg that a motor bus line has taken or third of the income of the New Hav road between Providence and F River.

Mr. Sparks said that New Engla is from 3 to 5 years behind the tim in motor coach service. George Gariepy, Pawtucket (R. I.) Chamber Commerce, bemoaned the increased c of bus and trolley riding. In reply nn inquiry, Mr. Sparks said that motor coach company proposes to velop the Providence-Fall River tra to the utmost and to handle it the ye round. T. H. Benton, of the Springfie Mass., city transportation board, s that the city authorities approve gra ing the existing transport agencies fullest opportunity to develop the for of service required by the public bef turning over such rights to others.

Clark V. Wood, president Springfi Street Railway, pointed out his willi ness to supply any form of service ceptable to the public and for which latter will pay a reasonable price. F A. Cummings, assistant to the cha man of the board of trustees, East Massachusetts Street Railway, agr that the motor coach has come to s and said that his company is willi to operate any bus line so long as yields 6 per cent on the investment provides the required service. Bus eration will be put on wherever proves more economical, but the c pany will not parallel a bus line wh the latter is not under regulation.

H. B. Freeman, receiver Hartford Springfield Street Railway, pointed that buses on that road have sup seded electric cars and are giving improved service. The running t is now but 1 hour 20 minutes betw the terminal cities against a form time of 2 hours 15 minutes by troll De luxe buses are operated on a fare $1 each way. A new class of traffic being developed, including business m formerly driving private automobi over the route and women who frained from boarding trolley cars the center of the highways because traffic density.

Mr. Freeman pointed out that substitution of motor buses on Asylum Avenue line in Hartford by Connecticut Company has apparen reduced street congestion, partly a result of the stopping of the buses the curb. George E. Pellissier, Holy Street Railway, emphasized the need more studies of costs, bearing in mi however, that cost alone does not dicate the public's willingness to for a service. P. G. Carleton, coun Eastern Massachusetts Street Railw contended that the Massachusetts should require independent buses secure licenses from the Departm of Public Utilities, as is required electric railways before the latter operate motor vehicles.

Mr. Williams pointed out that m communities would be in a seri transportation plight if the elect railways should take up certain lo trackage, install bus service and t

ıe bus service inadequate. One say how permanent the motor ll be, at this time.

closing the session, Chairman au said that a large majority of ɔtor vehicle manufacturers favor te regulation of buses.

ard Dana, general manager Elevated Railway, presented ening paper on Tuesday morning motor bus session on "The nics of Motor Bus Operation." ıthor recounted the development tor bus service on the Boston and gave some significant data financial aspects of motor bus on sparsely patronized trolley here the handling of mass trans- on is not a feature of the day's An abstract of Mr. Dana's s is published elsewhere in this paper.

J. Flickinger, assistant to the ent the Connecticut Company, Haven, read a paper on the de- ent and experience of his com- n the motor bus field. This is ted elsewhere in this issue.

. Wood, Springfield, Mass., said ıe motor bus has been "sold" to blic and that the electric rail- have been appointed the col- but some question exists as to llingness of the public to pay t of such service in addition to cars. H. W. Johnston of the England Motor Tours Company, ton, Mass., said that his oper- cost per mile, including taxes charges, is from 23 to 26 cents. figures were vigorously ques- by several speakers, the con- of opinion being that the cost or bus operation would run well his amount in average practice.

Sparks, Boston, supported the of costs presented by Mr. John- Mr. Dana again urged his s to beware of motor vehicle e cost statistics, on account of mense range of conditions en- red. There is no more hazy in the electric railway field, l, than undigested data on costs ehicle or car-mile. Mr. Flick- concurred, and after the state- that taxes and return on the nent were not included, said that gh approximate cost per motor- -mile of the Connecticut Com- bus service is about 28 cents.

Dean, Commerce Motor Truck ny, cited a cost per mile on one for single-deck buses of 31 and 38 to 39 cents for double- s. He cautioned his audience take "fly-by-night" estimates as robable operation costs.

A. Cummings of the Eastern chusetts Street Railway said o competition exists between his ny and the Boston Elevated y over the Park Square-Arling- eights bus route toward Lowell Eastern Massachusetts, as no raffic is handled. It was main- that little or no competition between the electric railway bus in the eastern New England t and the steam railroad service. an for uniting automobile motor nd bus owners under the banner American Automobile Associa- as discussed by Ernest N. Smith, general manager of the A.A.A. Under the plan of organization two new departments will be created, a truck department and a motor bus department, with the necessary trained personnel. There will be no effort to compete with existing state organizations of truck and bus owners, but efforts will be directed toward co-operation with such organizations with a view toward solving national problems which continue to be a stumbling block to the freer use of commercial vehicles. There is at present considerable variation in truck tonnage laws, handicapping truck freight seriously in many quarters. Smoothing out matters of this sort will be among the many aims of the truck division of the A.A.A.

In its activities along legislative lines the new division will function through representation in the Motor Vehicle Conference Committee. At present the bus and truck owners of the country are not entitled to representation and cannot function in co-ordination with the committee because they are not represented by a national organization.

Resolutions Sum Up Meeting

Resolutions were adopted by the conference looking toward co-operation of rail, motor and water carriers rather than unregulated and wasteful competition. Other resolutions indorsed regulation of motor vehicle common carriers similar to that for other utilities, the requirement of certificates of public convenience and necessity and the requirement of adequate liability insurance.

It was resolved that taxes should consist of (a) state motor vehicle taxes, the proceeds of which should apply to highway maintenance; (b) taxes in exchange for franchise rights, providing an amount equivalent to that paid under the preceding item be deducted.

Uniform common carrier regulatory statutes throughout New England, and uniform regulation of highway traffic were recommended. Enabling legislation was recommended to permit steam railroads, trolleys and other public utilities to acquire, own and operate motor vehicles.

It was the sense of the conference that to promote co-operation of the various parties and co-ordinate railroad and truck service, a permanent committee should be created to be known as the New England Transportation Council. This should consist of equal representation from each of the several agencies represented in the conference, together with representatives of the general public.

The traffic program of the conference was summed up as follows:

Resolved: That it is the sense of the session that the approach to the problem of traffic congestion should be broadened to comprehend all the agencies contributing to or affected by transport traffic; that the traffic policy should develop the basic physical plan of the city; encourage higher efficiency and organization in traffic and transport operation and administration; that all large traffic centers should promptly organize for thorough study of their complete traffic-transport plan, in a manner best suited to the community, to the end that a broad co-operative effort of all groups of our city population may be secured to provide for both present relief and future needs.

Railway Operation of Buses in Connecticut*

Increasing Traffic Has Necessitated the Use of Larger Vehicles, but the Bus Has Been Found Unsuited for Mass Transportation— Maintenance Methods Are Described

By W. J. Flickinger
Assistant to the President the Connecticut Company

With the policy of the state in regard to bus operation clearly defined, the management of this company was in a position to take advantage of the bus as an auxiliary. The first bus route was established in July, 1921, additional routes having been added, until at the present time we operate 15 bus routes in New Haven, Hartford, Stamford, Bridgeport, Westport, Waterbury, Meriden and New Britain. These are divided into three classes:

1. Extensions into unserved territory which had developed some distance from the rail facilities.

2. Replacement of trolley service on routes where the revenue was low and which were faced with the necessity of making large expenditures for track and overhead rehabilitation.

3. Between terminals where the highway offers a shorter route than the rail line which was built along a circuitous route to serve the greatest amount of intervening territory.

There is one other instance where it was necessary for passengers to travel from the north to the south part of the city over the main business street and numerous requests were made for an alternate route to avoid delays incident to the heavy traffic on the main street. This would have necessitated the construction of track at a cost of at least $125,000. A bus line about one-half mile in length, connecting with the rail lines, has satisfactorily met this situation at a much lower cost.

In the first two classes the rate of fare on the bus is the same as on the trolley, with free interchange of transfers. In the third class, the expedited service by the bus is recognized by a slightly higher rate.

Our original bus equipment included 3 27-Passenger Packards, 2 21-passenger Whites, 2 18-passenger Whites, 1 Duplex, 1 Mack and 19 Reo Speed

*Abstract of a paper presented at the New England Motor Transport Conference, Boston, Mass., Dec. 9.

Wagons, all on truck chassis with cheaply constructed bodies. By that time the motor truck industry and the body manufacturers became actively engaged in developing equipment which would be more suitable for the transportation of passengers than the truck and the lightly constructed, inconvenient and uncomfortable body. The first buses of improved type were purchased in November, 1921, to which new equipment has been added from time to time as required, until at the present time we own 4 Pierce-Arrows, 2 Fageols, 8 Yellow Coaches, 2 Macks and 2 Whites with a seating capacity of 29, 10 Macks, 13 Whites and 5 Republics with a seating capacity of 25, 2 Whites with a seating capacity of 21, 1 White and 2 Brockways with a seating capacity of 18, 1 Duplex with a seating capacity of 20 and 8 Reos with a seating capacity of from 12 to 14, a total of 60 buses. This equipment, together with garage facilities, represents an investment of approximately $500,000.

At the close of 1922 we were operating 79,000 bus-miles per month; at the close of 1923, 92,000 bus-miles per month, and at the present time we are operating 134,000 bus-miles per month, an increase of nearly 70 per cent over 1922.

With the increase in traffic, we have found it necessary to discontinue nearly all of our 12 to 14-seat buses, substituting buses of larger capacity. We have also discontinued from passenger service all but three of the original buses which were on truck chassis. This investment was not, however, a total loss as we had for several years been working on a budget to motorize the line department, and the completion of this budget was made possible by converting this equipment into tower and signal maintenance trucks, in which service they will have some further years of usefulness. The amount which it was necessary to charge against bus equipment, therefore, was more a matter of obsolescence than depreciation.

In an industrial community such as we serve there is a very heavy peak load demand, which adds materially to the cost of the service because of the necessity for stand-by equipment. Under the law in Connecticut the maximum number of passengers allowed on a 25-passenger bus is 27 and on a 29-passenger bus 31, which makes the ratio between bus and trolley on the basis of carrying capacity 1 to 3. As an illustration of how this works in actual practice, we have one route serving a highly developed industrial community on which the traffic demands are such as to require 2 buses for 18 hours, 3 buses for 12 hours, 4 buses for 4 hours and 9 buses for one hour, so that we have 5 buses which operate only one hour out of 18, carrying only a one-way load; 1 which operates only 4 hours and one 12 hours, the 7 part-time buses operating only a total of 21 bus-hours per day. In the same city it requires 40 trolley cars to operate the base schedule, while during the peak-load period of about 2 hours 90 cars are required. Due to the lighter traffic in the off-peak hours, it would probably require a very few more buses than trolley cars to handle the traffic, but during the peak-load period of 2 hours it would require three times as many buses as trolley cars, or about 370 buses. This would result in an investment in over 200 buses for rush-hour service as against 50 trolley cars.

Going a little further and taking a concrete example, there is one industry located on the outskirts of the city at which 1,150 employees finish their day's work at the same time in the afternoon. These men are carried to the city in 14 trolley cars. To perform this same service would require 40 buses. I offer this as food for thought to any who may have conceived the idea that the time is not far away when buses will be the sole means of mass transportation, as it must be recognized, of course, that the transportation agency is under obligation to meet the full transportation requirements at all hours of the day and under all conditions.

I believe it is necessary to study the traffic situation very carefully on individual routes, as where the number of passengers on a bus at any one time is limited an increase in the size of the bus may produce a very desirable effect on the net revenue. I have one case in mind where the substitution of 29-passenger buses for 25-passenger increased the net several cents per bus-mile because additional business was there and all that was needed was the increased capacity for handling it without a corresponding increase in the bus mileage. There was practically no difference in the operating cost between the 25 and 29-passenger vehicles.

When we commenced to operate buses we felt that complete cost records would be necessary to guide us in making decisions from time to time, particularly as we were inexperienced and would have to watch results very carefully. Accordingly, we immediately established a classification of accounts along lines similar to those used in our railway accounting and gave detailed instructions as to the distribution of expenses to all of our employees having anything to do with bus operation. We have a detailed record of the maintenance and operating cost, gasoline and oil mileage of each individual bus, also the mileage of each individual tire. Having found the speedometer unreliable for the purpose of computing bus mileage, we have equipped each bus with a hubodometer, and the odometer readings are, from time to time, checked against the route mileage, to see that the odometers are in proper working order. As all of our costs are analyzed on a bus-mile basis, it is very important that we get the mileage as nearly accurate as possible. A failure to credit a bus with all mileage operated would give it an unfair disadvantage in making comparisons.

Each driver is provided with a card on which any defect developing is noted. The card is turned in with the bus at the end of the run and the defect is taken care of before the bus again goes on the road. In so far as possible, buses are assigned to the drivers. By this method, a driver is more careful in handling his bus and will give it a great many small attentions owing to his personal interest in it.

The scheduling and operation under the supervision of the same s ordinate official who has charge of trolley operation, although where c ditions require it street supervisors assigned to bus operation exclusive By this method the bus and trol schedules are more readily co-ordina to make a unified transportation s tem. I might say, incidentally, t between Dec. 1, 1923, and March 1924, out of 37,700 scheduled bus-hou our buses lost, due to mechanical tr bles or bad road conditions, a total only 92 hours.

The bus maintenance organizati so far as the chassis is concerned, entirely separate from the organizat which maintains the trolley cars. believe this to be essential as the work requires an entirely different of experience. The bodies, howev are practically the same as our t ley car bodies and they are maintai by the regular car shop organizati

We have a central garage in N Haven, which not only takes care of maintenance of the New Haven bu but also has an overhauling shop wh the buses from the entire system taken for general overhauling, bodies, however, being removed overhauled in the local shop while chassis is being overhauled in the c tral garage. The work on both usually completed at about the sa time and when the chassis goes b to its division the body is placed o and it is then ready to return to se ice. So far, this arrangement see to be working satisfactorily.

It is our practice thoroughly to spect each bus every 7 days, at wh time it is thoroughly greased and crank case oil changed if necessa We change the crank case oil ev 1,500 miles.

While we have adopted no defi general overhauling schedule, we that after a bus has operated betw 50,000 and 60,000 miles it is to advantage to take it down and re all worn parts. In this connection depend very largely on the judgm of our foreman as to the necessity general overhauling as he is fa familiar with the physical condit of each unit.

One item of expense which we h had to adopt more or less blindly that of depreciation. We origin adopted the straight line depreciat basis over a period of three ye With the improvement in the type equipment and the discovery that buses would average from 35,000 40,000 miles per annum, we felt t our charge was too high, as with ca ful maintenance and periodical o haul we felt we should get at le 200,000 miles per bus. Most ma facturers with whom I have discu the matter claim that a greater m age can be expected. We prefer however, to be conservative and the fore adopted the mileage basis of dep ciation on a life of 200,000 miles. experience shows us that we will a greater life, it will, of course, a pleasure to change our depreciat basis.

It seems to me that the experie gained, not only in Connecticut but nearly all of the other states wh

operation has for the past few rs been a live issue, leads to the owing conclusions:

. That the bus is an established nsportation facility, useful as an iliary to existing rail transportation serving new territory where there not sufficient revenue in sight to rrant the investment necessary to struct rail facilities, or to substie for trolleys where rail facilities no longer be maintained except h the expenditure of money out of proportion to the earning capacity.

. To permit competition between forms of public transportation is economic waste.

3. In territory where there is a chartered transportation agency, such agency, by reason of the training of its officers and employees, is equipped to meet best all of the transportation requirements and the people will receive at the hands of that agency a regular and dependable service.

4. Whether it be a street railway company operating rail cars or buses, or a legally established bus company, it is only by protection from competition and regulation by the constituted state authority that the investment in these enterprises can be safeguarded and the public receive the best transportation service at reasonable rates.

Economics of Motor Bus Operation*

On the Boston Elevated System Motor Buses Have Been Used Advantageously to Solve Difficult Situations—Overenthusiasm Warned Against

By Edward Dana
General Manager Boston Elevated Railway

OU have heard it said that the transportation of a modern city is essarily a monopoly. I think the rd in unfortunate, for it is a monop- only in the same sense that our department, our police department water department are necessary nopolies. Nevertheless, this is a l-established basic fact and because its soundness there came into exist- e the regulating bodies clothed with authority to insure fair treatment the agency rendering transportation well as to prevent those agencies ctising upon those it served the ls of unregulated monopoly.

am referring to these facts adedly before attempting specifically to e up the motor bus itself because if advocates of the motor bus are ler the impression that this vehicle change this basic principle they ocate a destructive transportation ncy, and like most destructive agen- they usually contain the seeds of ir own destruction within themves.

Many motor bus advocates really ieved that it would be possible to counter to the basic principles ich had been developed during the quarter of a century in this coun- . They put lines in operation and them only when the greatest oppority to get traffic existed. With such load factor, the elements were in stence to assure a low fare and y gave low fares and usurped the eet railway business and at the same e created new business.

Let us examine this condition and ply it under our basic principles. street railway system functions for entire area served. It has to main- a readiness to serve over the en- district and cars are operated 18 20 hours a day, 365 days a year, ardless of the amount of traffic, for good of the district as a whole. instance, the Boston Elevated car- 1,100,000 passengers on a week and runs 161,000 car-miles. On a nday it carries only 600,000 but runs 108,000 car-miles. The receipts on Sunday are 14 cents per car-mile less than on weekdays. That is what I mean by readiness to serve.

Suppose, for instance, that the street railway was not affected by the basic principles I have referred to, but instead functioned according to the underlying principle which is characterized by the jitney line I referred to, what would result? Some lines would have a low fare of 5 cents and other lines would have a fare of possibly 25 cents if they were to have any service at all.

Now let us turn to the constructive aspect of the motor bus. The economics of the motor bus comes down to the management of a new tool to do work which has been done in some instances with an improper tool and to do work for which we were not equipped with any tool before.

The motor bus, it would seem, has established its place as a part of a unified transportation system. It has its proper place, just as does a one-man car or a two-man car or a multiple-unit train. In 1923, 95 railways operated 925 buses. I understand today 168 railways operate 2,633 or more buses. Progressive railway officials apparently see that in the motor bus there exists a very useful ally to the electrically operated units. A combination of facilities is therefore afforded which can give the traveling public the service which can best serve its needs.

The story of the motor bus as it has unfolded in the territory served by the Boston Elevated Railway may be of interest generally.

Under the 1918 act, the Elevated was required to be operated on a service-at-cost basis and fares were increased. On July 10, 1919, a flat 10-cent fare had been reached. This flat fare was accompanied by a substantial decrease in revenue passengers, even though the fare was sufficient to prevent deficits and cover the full cost of service.

Naturally, there has been some discussion and advocacy of competitive buses, but the assessment against the taxpayers of $3,980,151.67 for the first year's deficit under public operation and the fact that this amount had to be repaid before fares could be decreased had a very real effect upon those in authority by whose action motor buses could be permitted.

The consequences of the act were understood by most municipal officers, and it was realized that if competitive motor buses were permitted and the revenue of this great system diminished one of three things must occur under the laws:

1. An increase in fare above 10 cents to offset the loss, or

2. Additional deficits against the taxpayers, or

3. Loss of service in the district affected, in an effort by the state trustees to localize the competition and place no burden upon the system as a whole which might result in a higher fare or a tax assessment.

The result was that the cities and towns refused licenses to competitive jitneys with a single exception, where the city later revoked the competitive jitney license.

The Boston Elevated Railway began the operation of motor buses on Feb. 24, 1922, between Union Square, Brighton, and the Boston-Watertown line on North Beacon Street. Bus service has increased from that time and we are now operating bus lines requiring for regular schedules 46 buses and for extra service a total of 66 ·ses. During the month of October w operated 97,680 bus-miles and carried 676,005 passengers in buses.

As an instance of the use of this new ally on the Boston Elevated Railway the so-called Cottage Farm line may be cited. This line was 2.219 miles long, operated through narrow streets and served 3,600 people in both directions daily. The rebuilding of the Cottage Farm Bridge was up for consideration. Following established custom the car rider was to be assessed approximately $60,000 of the cost. The rebuilding of the tracks over which the line operated would cost $180,000. The 8 cars on the line represented a capital outlay for both car and power plant capacity of approximately $200,000. To serve 3,600 people by cars a plant investment was called for of $440,000. The plant investment if buses were to be substituted would not exceed $100,000, a fixed charge saving of no inconsiderable proportion.

Referring again to the use of a tool, why use a sledgehammer if a tack-hammer will get results? Or in railway vernacular, why put the Twentieth Century on the Skowhegan branch?

But let not the pendulum swing on the strength of such a performance and bus enthusiasts rush in where angels fear to tread and proclaim its ability to supplant, replace and relegate to the Dark Ages the mass transportation agency—the street railway—than which no more economical agency exists today to perform its task. Ridiculous and absurb. We might as well urge that a Ford was all that is necessary in the form of an automobile, so why have so many other makes.

I referred to the hope of new territory in the use of the motor vehicle. The Boston Elevated has several lines of this very character where no previous trolley service existed but where

*Abstract of a paper before the New land Motor Transport Conference, Boss., Mass., Dec. 9, 1924.

today the district is served as an integral part of the Elevated system.

There is still another use, the ultimate development of which by street railways has not been appreciated, and that is chartered bus service. Street railway service of this sort was limited by the proximity of the terminal points of the trip to car lines. The bus removes this limitation and permits the street railway to utilize its personnel and its equipment when not otherwise engaged, except for the very peak hour.

Summarized, therefore, the bus in some instances can replace trolley lines; in others, reach out into new territory, and in a third way become a business getter in the way of special parties.

As regards the vehicle itself, its mechanical efficiency and its appointments for the service to be rendered opens up a fascinating field for a multitude of detailed discussion. Suffice it to say that I have unlimited confidence in the enthusiasm and the ability of the motor vehicle builders to co-operate, study and improve almost from day to day this agency once the underlying basic principles of its regulation, control and field have been definitely indicated.

But there is one thought which comes to my mind in this connection, and that is that over the doors of most Roman villas there usually was an inscription, *Cave Canum*, which, translated, means "Beware of the dog," and I offer for the consideration of the bus men an inscription over the door of the electric railway, "Beware of bus-mile statistics."

Providing Complete Transportation Service*

There Are Many Uses of the Bus in Connection with the Electric Railway and the Two Should Be Used Together Where Best Suited

By L. S. STORRS
President the Connecticut Company,
New Haven, Conn.

ONE often hears the statement that the electric railways are in a transition period. To a certain extent this is true, but this utility has constantly undergone change. From the days of the horse car, one modification after another has been adopted in the effort to keep ahead of the reasonable requirements of the communities.

In an effort to supply necessary public service and in order that full transportation facilities may be offered, railways are rapidly adopting the motor bus as an auxiliary. At the present time there are at least 3,000 motor buses operated by electric railways in the United States, 300 of which are in New England.

The task confronting the transportation utility is not that of providing regular service to the people of the cities during the 18 to 24 hours of the day, for that would only mean running cars over the tracks on even schedules, a relatively simple matter. The real job of this servant of the people is providing sufficient service to take care of their needs in going to work in the morning and returning home in the afternoon.

This mass transportation period is but four hours in duration, or at the most four and one-half hours, during which approximately one-half of the total daily passengers must be taken care of. That is, of the 44,000,000 passengers per day in the United States, at least 20,000,000 must be transported in 4 hours, or at the rate of 5,000,000 per hour.

This mass movement is the real problem, and one that large-capacity cars, or trains, running along the streets of our cities or through subways or upon elevated structures in the metropolitan areas, alone can cope with. The requirement for added facilities to take care of this mass movement in the growing American cities is ever confronting the transportation executives.

We are so familiar with the inconvenience in travel, during the peak hours, in street cars or subway, that the common impulse is to complain of the service or criticise the management when as a fact the most efficient service is being rendered. Either the subway facility is taxed way beyond the capacity which it was expected to care for when planned; or the number of street cars, operated through streets already congested to the point of saturation, will not permit any further addition. But try to visualize the results with bus operation. I have in mind one of the bus routes in Connecticut on which the travel requires the following service:

For 18 hours, two buses; for 12 hours, three buses; for 4 hours, four buses, and for 1 hour, nine buses. So we have five buses which operate only 1 hour out of 18 carrying a one-way load; one which operates only 4 hours and one 12 hours, the seven part-time buses operating only a total of 21 hours per day. This is mass transportation with a vengeance—and it is a nice question as to whether rail transportation to serve this route would not be more efficient and economical.

The great growth of American cities has been made possible solely through a thoroughly efficient and dependable system of transportation. Dependable service, not only that of today, but throughout the days to come, cannot be obtained unless supplied by a responsible organization depending upon its patronage for its own financial success. If the service is rendered by groups of individuals jointly, or by each in his own interest there can be no assurance of continued service. It will depend upon the personal whims or ability to carry on, and that solely during periods of prosperous operation.

In any city there are lean areas from the transportation standpoint through which dependable service is as much of a necessity as it is in the districts that make possible profitable operations. Complete service through all portions of a city is needed for the growth of the city.

The development of the motor bus has placed in the control of the electric railways a very efficient aid in providing improved service in the city and surrounding districts. The greater flexibility of a transportation unit which is not confined to fixed routes makes it possible to extend service into areas that have been developed since the electric railway trackage was constructed, and, by co-ordinating this service with street railway service, give a more adequate facility to the community.

It must be apparent that the need for a well-planned system of transportation within any community must include all types of service that the present stage of the art has developed; that each type of service must be utilized in that particular work which it is best designed to perform; that both types must be placed under the same obligations and restrictions and that both must be under the identical regulatory body in order that the ultimate end of a perfect transportation system may be attained.

By far the best results are possible when both types of service are operated under the control of one transportation organization with the obligation to make the most efficient use of each. Only under such a policy can a thoroughly co-ordinated service be produced and the maximum benefit obtained.

A great deal has been said of the probable substitution of the motor bus for the electric cars, but it is apparent that the bus is not capable of efficiently serving mass transportation in the large cities. It is equally apparent that there are many uses to which this unit can be put in providing essential service, and the electric railways must be prepared to adopt the motor bus as an integral part of their plant, and by adopting a broad view of their obligations abandon the idea of being merely electric railways and take on their real function, that of being the agents of the public in supplying all of the transportation requirements of the communities.

The time has come for the use of the bus by the experts. It can be made to be of great service, but its full utility cannot be determined until serious efforts have been made thoroughly to co-ordinate the two types of service. This new facility is as yet too recent a development for anyone to predict with any degree of certainty the particular instances of its actual value in the general transportation needs of any city. The efforts that have thus far been made to co-ordinate the bus service with existing trolley service are of too recent date to have more than pointed the way to possible other uses.

Without question the first obligation of the railway is to fill the unserved

*Abstract of a paper read at the New England Motor Transport Conference, Boston, Mass., Dec. 9, 1924.

reas, after which there is the gradual pportunity to economize by substitution of the motor bus for electric cars n thin traffic areas, when confronted vith excessive track reconstruction xpenditures. There are opportunities o develop new business by a combination of the above two bus operations. The possession of a sufficient fleet of us units will develop the incentive to nd new uses for these units. While t is unlikely that there will ever be a arge amount of supersession of the treet cars by the bus in city areas of ense riding, experience in the actual ost of bus operation as compared with he cost of operation and upkeep of lectric railway plants will serve as a uide to direct the gradual expansion f bus operations.

There is a field for the development f a higher grade of service than that ossible in mass transportation, or hat has come to be termed de luxe ervice, at rates considerably higher han traction fares, as well as high rade special service along non-served outes, such as that performed by the ifth Avenue Coach Company, at lightly higher rates. These are all natters that the transportation experts hould determine, but it is certain that ney will be determined by someone.

It has been said that the good will of the community is the greatest single asset of a public utility and no steps can possibly be taken that will be productive of so large a measure of this good will as the adoption by the railway of the bus and the active development of such service necessities as exist within the various communities.

There is one phase of the matter that warrants serious consideration, the result upon the securities of the electric railway, provided there is any large amount of substitution. The superseded physical property has a definite value which is represented by issues of stock or bonds. It will be necessary to permit the new service to earn a net in excess of the allowed "fair return" sufficient to amortize the physical value so superseded over a term of years. This is but one of the problems that will be presented during the period of readjustment.

The experience of electric railway companies in New England with bus operation has encouraged some of us to believe that we shall be operating many more buses in the near future. At the same time, we have no reason to believe that the bus will supersede the electric railway in its most important function—the carrying of the millions of persons to and from work during the rush hours of the day.

New Englanders Discuss Maintenance and Employee Relations

SO MUCH interest was aroused in the subject of rolling stock maintenance at the November meeting of ie New England Street Railway Club iat at the meeting on Dec. 4 another aper was presented on this topic by . S. Day, Westinghouse Electric & anufacturing Company, Boston, Mass. resident T. H. Kendrigan occupied the iair. Mr. Day's paper will be published next week.

In opening the discussion President endrigan pointed out that a sleet orm is hardest on railway motors and iat where snow is dry much less difficulty is encountered in maintaining ervice. Mr. Day admitted the influice of weather effect on motors, but eclared if the insulation of motor coils well varnished and if the snow-fighting equipment is in good shape, much ss trouble will occur than where oorer maintenance holds sway. Good aintenance implies that field coils are roperly dipped and baked, that insution is "live," motors are tight and iat the roads are open. It is a pity to minish service during storms for on iese occasions many opportunities ise to carry patrons who ordinarily se private automobiles.

W. C. Bolt, Eastern Massachusetts treet Railway, Boston, said that he is udying the problem of when to reace old with new equipment and Mr. ay stated that he is making a simir investigation.

John Lindall, Boston Elevated Railay, concurred in the value of sysmatic inspection and overhauling, but eclared that local service conditions e often controlling. In the same city single storm will sometimes tie up e cars on one division and leave those on another free from interrupted service. Poor track is responsible for a multitude of car failures, and after track is relaid it often happens that the pull-ins in a district begin to diminish after a few months' service over the new rails. "Two years ago," said Mr. Lindall, "we had 300 motors that gave us a good deal of trouble and I recommended their replacement but could get only money enough to replace 100. We took out the worst motors and put the new ones into the hardest service. This step has reduced maintenance costs on these 75 cars so much that I question whether I could now make out a case for replacing the other 200 motors."

Mr. Bolt emphasized the generally good condition of tracks on the Eastern Massachusetts system as a factor in lowered car repairs. Special attention has been given to drainage to prevent water accumulating on the tracks. Nothing is more damaging to a motor than salt water. Passenger car equipment is not built for snow fighting, and an adequate snow-fighting equipment is important as a factor in relation to car maintenance. In a typical storm eight to twelve motors were burned out on one car line in 2 or 3 hours where the snow had not been properly removed, and yet there were no motor failures on the rest of the system where similar cars were operating.

F. B. Walker, chief engineer of maintenance Eastern Massachusetts system, pointed out the importance of keeping up the voltage in reducing car pull-ins from motor burnouts. Of 180,000 joints on the system about 125,000 have been replaced and many bonds test 100 per cent in conductivity. "We credit our department," said he, "with about $100,000 in motor repair savings as a result of joint and bond maintenance." R. D. Hood, Haverhill, Mass., said that much good has been effected by the use of negative feeders. In hard winds it is the practice on the Massachusetts Northeastern to put up the voltage to 650 and fewer motor failures result.

Following the usual dinner, S. F. Fannon, director division of public service, Sherman Service, Inc., Boston, addressed the club on "A New Conception of the Job," and Prof. T. N. Carver of the department of economics, Harvard University, gave a talk on "Economic Tendencies." Mr. Fannon's paper appears elsewhere in this issue.

Professor Carver depicted the causes of many modern economic wastes and emphasized the trend toward their reduction resulting from the diffusion of wealth, employee and customer ownership. He predicted further advances in the cost of labor in this country, but drew the conclusion that as relations improve and as the investing class increases in numbers many present causes of conflict will disappear.

Kentucky Association Meets Jan. 15-16

THE annual meeting of the Kentucky Association of Public Utilities will meet at the Seelbach Hotel, Louisville, on Jan. 15 and 16. There will be a get-together dinner for members on the night of Jan. 15, with an all-day business conference on Jan. 16.

American Association News

Special Reports Available

THE following special reports have been prepared by the Bureau of Information and Service and are available to member companies in good standing upon request:

Motor Bus Operations in the United States.—List of motor bus lines showing name and address of the operators and where the information is available, statistical data on the character of their operations. Part I, motor bus lines in Arizona, Colorado, Connecticut, Delaware (Wilmington), Indiana, District of Columbia, Maine, Maryland, Michigan, New Hampshire, North Dakota, Rhode Island, Utah, Vermont, Wisconsin, Wyoming.

Accident Statistics of Electric Railways for 1923.—Analysis and summary of the statistical data on accidents reported by more than 150 companies on association questionnaire. The information covers the number of accidents, ratio of cost to gross earnings and comparison of accident records on unit bases, all of which is also compared with the record for the year 1922. A summary of safety work carried on by electric railways is also included.

In addition to the above, supplements to the Wage Bulletin, Fare Bulletin and Cost of Living Studies have been prepared, bringing them up to date.

Maintenance of Equipment

Utilizing Worn Axle Brasses

OBTAINING double life out of split axle brasses by replacing the worn top half of the lining with the bottom half is accomplished in the Wheaton shops of the Chicago, Aurora & Elgin Railroad. Finding that an excess supply of lower halves of axle lining were accumulating, an investigation was made to see if they could not be used for some other purpose. By filling in the bearing window with babbitt, and building up the flange by welding, it was possible to utilize the bottom half as a top half. The accompanying illustration shows a babbitt lined split bearing before and after closing the window with babbitt.

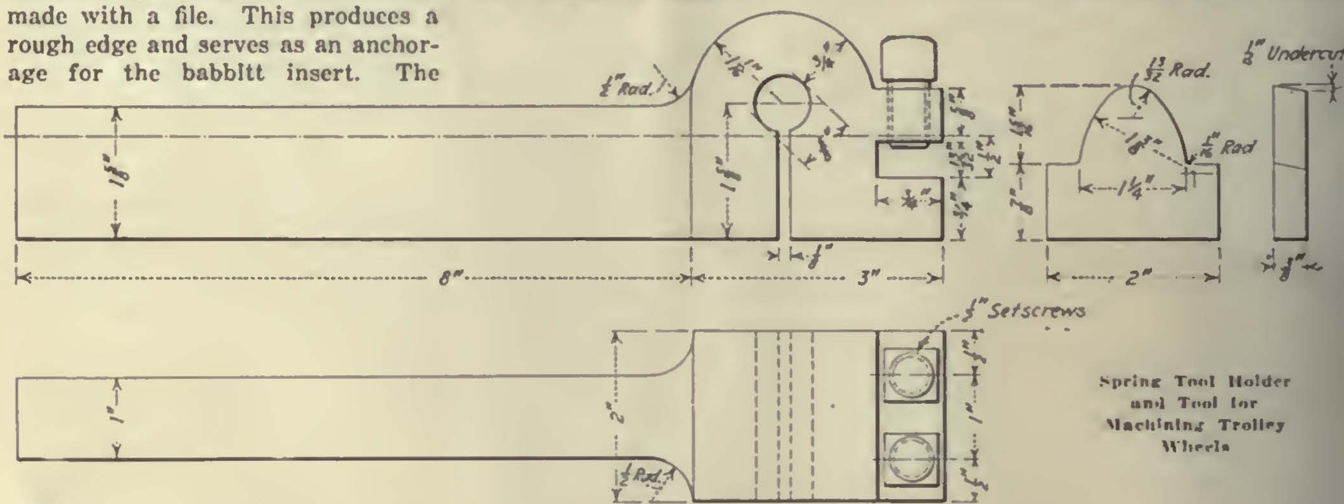
The edges of the window are serrated by means of indentations made with a file. This produces a rough edge and serves as an anchorage for the babbitt insert. The

Bottom Half Axle-Lining Brass with Window Babbitted for Use as a Top Half

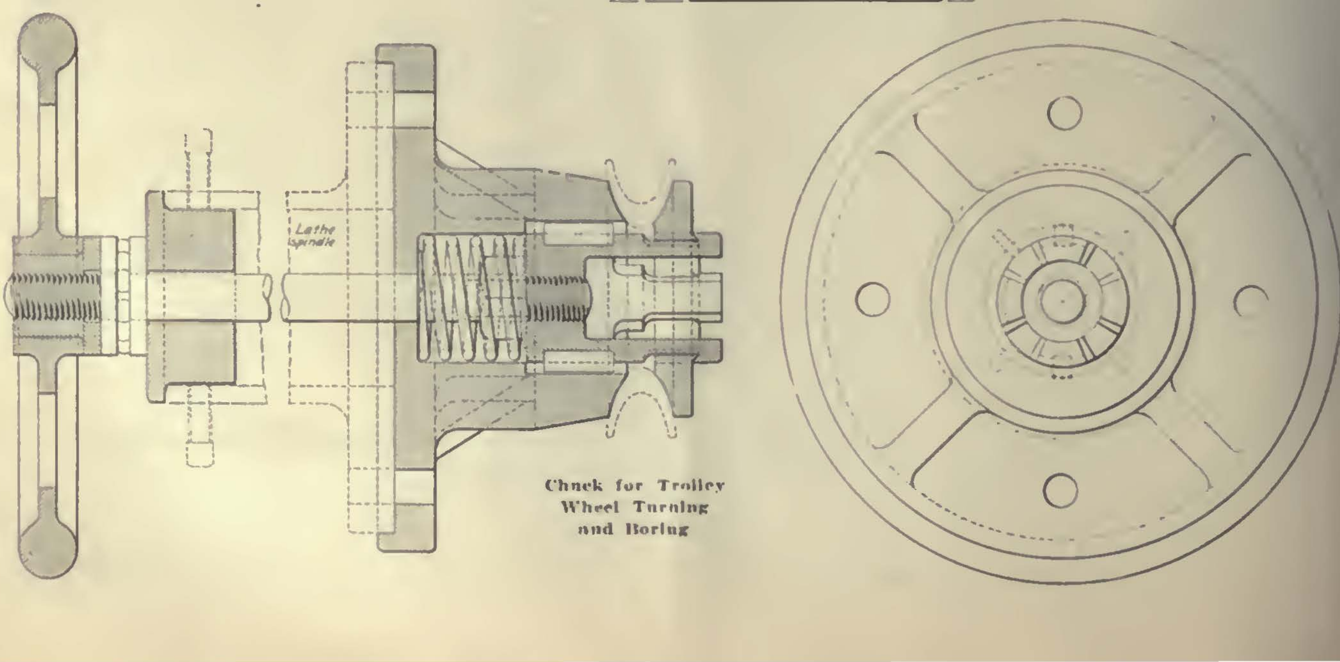
bearing is then placed around a mandrel and the window poured full of babbitt. It is machined inside and out, and is suitable for use as an upper half of an axle bearing. This practice has resulted in the use of material which heretofore had been considered scrap.

Chuck for Machining Trolley Wheels

IN THE new Hillcrest shops of th Toronto Transportation Commission, Toronto, Canada, a new form o chuck has been developed that make it possible to bore and turn trolle wheels at one operation. The mai casting of the chuck is attached t the lathe, and the outer end is turne to fit the inside contour of the trolle wheel. An arbor fits inside the mai casting which is arranged with arm which project through the spoke of the wheel, and these in turn ar provided with projections to act a chuck jaws. A locking ring wit slots to fit over the chuck jaws i shaped to fit inside the contour o the trolley wheel and hold it firml



Spring Tool Holder and Tool for Machining Trolley Wheels



Chuck for Trolley Wheel Turning and Boring

hen in position. After the trolley heel is inserted, the retaining ring n be shoved over the chuck jaw and en with a 45-deg. turn the retain- g ring is locked so as to hold the heel tight. With this design of uck, both the hub of the wheel and e grooved portion are left free for achining.

The groove is turned in the wheel a special tool, as shown in the ac- mpanying illustration. This gives e correct shape in one operation. he tool holder is arranged with a ot so as to provide a spring action. se of this chuck, together with the ecial tool, has made it possible to aintain trolley wheels at a much educed cost, and in addition, they e uniform in size and shape. The uck was designed under the super- sion of W. R. McRae, superin- ndent of rolling stock.

Wheel and Gear Pressed Off Together

T IS the practice in the Albany Street shops of the Boston Elevated Railway to press wheels and ears on and off together. This is one on a Wood hydraulic press, hich is arranged as shown in an ccompanying illustration. An axle ith wheels and gear attached is wung into position in the machine. he gear rests against the large

ears and Wheels Are Pressed Off Together by a Hydraulic Machine in the Boston "L" Shops

lock in the center, while pressure s applied to the end of the axle at he right. For 33-in. wheels a force f about 130 tons is required for ressing off.

When it is desired to press off a vheel without removing the gear lso, the force is applied at the rim. This procedure destroys the shape of the wheel, but inasmuch as the wheel is to be scrapped anyhow this is no drawback. No pressing is ever done by means of rods placed through holes in the web of the gear.

Special Truck for Baking Armatures on End

BY F. C. LYNCH
Shop Supervisor Kansas City Railways

THE accompanying illustration shows a small truck used by the Kansas City Railways for moving armatures in and out of the baking

This Simple Truck Enables Armatures to Be Conveniently Handled on End in Connection with Dipping and Baking Work

oven, and for storing them while they are in the oven. Two trucks of the same design are used for this work.

Armatures are dipped with the pinion end down, and are stored in this same position on the baking truck. The truck itself is made up of angle-iron framing, mounted on cast-iron flanged wheels. A wood floor is bored out so that the pinion and that end of the shaft protrudes through. It has a capacity for eight of the larger sized armatures.

Burning Insulation Off Flat Conductors

WHERE strap-wound field coils are to be rewound or repaired the removal of the old insulation presents quite a problem. In the shops of the United Traction Company, Albany, N. Y., this is accomplished by passing the insulated conductor through a gas flame and then drawing it through a pair of rotating wire brushes. In order that the gas flame may extend along a section of the insulated conductor the flame is fed into a cylinder and the insulated conductor is pulled through this. Immediately after it comes out of the gas flame it passes between the motor-driven wire brushes, which remove any remnants of insulation and clean the conductor. A galvanized iron housing around the brushes prevents the dust and refuse from flying about.

Salvaging Controller Segments

WHEN the ends of the longer controller segments become burned from arcing, it is the practice of the mechanical department of the Twin City Rapid Transit Company to shear off the burned ends and utilize the pieces thus salvaged for replacement of some of the smaller segments on the controller cylinder.

Due to the curved contour of the segments this is a rather awkward shearing job. A simple shearing jig shown in the accompanying illustration speeds up this work materially. It consists of a small curved block of the proper shape to fit the segment which is to be cut off, and has a guard under which the segment fits. The outfit is set up in a punch press.

The Burned Ends of Long Controller Contact Segments Are Sheared Off in a Simple Jig, Set Up in a Punch Press in the Twin City Rapid Transit Company's Shop

New Equipment Available

Improved Door Operator

MANY improvements in design and refinements in manufacture have been incorporated in its latest type of door operator for folding doors and steps by the Consolidated Car Heating Company, Albany, N. Y. By providing for installation of the door engine so that its shaft will be vertical, the levers that operate the door are brought into a horizontal position. This insures a tight fit at all joints and minimizes wear. On installations with doors of the usual size but two ¾-in. air pipes are needed to serve the door engine. Phosphor-bronze bearing liners are provided for the operating shaft, and a honed finish is given the inside of the cylinder in which the piston slides.

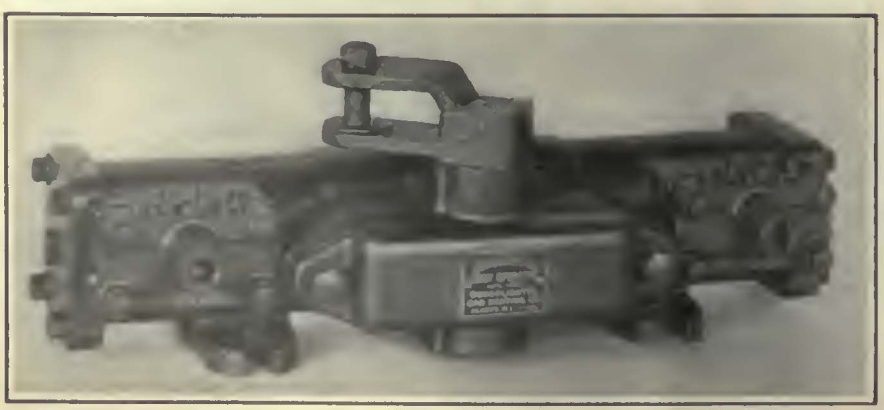
The connection between the operating shaft and the piston is through a quadrant gear and rack, which constitutes the spindle for the pistons. A hexagonal fit between the gear and shaft insures an accurate fit without likelihood of wear. By removing the cover, which is held in place by two cap screws, the gear and shaft can be lifted out for inspection. In operation, the chamber about the gear is kept filled with a light grease. This can be replenished from a grease gun through a hole with filling plug without disturbing other parts of the door engine. The gear and rack have machine-cut teeth, which insure smooth operation and long life.

The piston leathers and phosphor-bronze expanders at the ends of the rack are held in place by nuts. The exhaust end of the rack is provided with a by-pass valve which prevents pressure building up in the closing cylinder while the door is being shut.

If closure of the door is stopped by a passenger or some obstruction the air is vented to the atmosphere from the closing cylinder, so that when the obstruction is removed the door continues to close at regular speed with no tendency to slam. The by-pass has a ball valve held against its seat by spring pressure. With the door fully closed this spring pressure is increased to prevent operation of the by-pass. This construction permits the use of separate speed control valves, so that the door-closing speed can be adjusted independently of the cushioning, which slows down movement of the door just as it reaches the end of its stroke. These adjustable speed-control valves provide for regulation of the speed with which the air is exhausted from the cylinder, while there is no check on the speed with which air is admitted.

The door engines are controlled either by a straight pneumatic control valve or electrically by push buttons. On cars provided with Safety Car Devices equipment the engine is controlled from the brake valve. With straight pneumatic control only two connections are used, one for the air supply and the other for exhaust.

For the electro-pneumatic control, a new magnet valve or duplex valve, as it is termed by the manufacturer, has been designed in which a single valve controls both opening and closing of the door. The valve is energized to open and de-energized to close, so that an open circuit or ground ahead of the valve coil will close all doors. The single unit construction for the master valve simplifies wiring and piping connections and also results in considerable reduction of maintenance cost, as there are fewer parts to be inspected and looked after. For cars which are equipped with single folding doors and steps, or where selective control of doors is desired and where the work of the door engine is light, a smaller differential engine has been developed.



Improved Door Operator for Folding Doors and Steps

Glue Pot with Rheostatic Heat Control

TO RETAIN those qualities that give it maximum adhesiveness, glue must be carefully heated and handled. With the requirements of different temperatures to produce certain results has come a demand for a glue pot with heat control. The Westinghouse Electric & Manufacturing Company has brought out such a pot, which gives a wide range of heat control and at the same time keeps the unit simple and inexpensive. It also permits almost unlimited variation in the power input and in temperature.

Dry-Type Glue Pot with Rheostat for Heat Control

The unit is portable, as the rheostat can be laid on a bench or shelf or hung on a wall, while a flexible cable permits the glue pot being moved over a large radius, so that it may be placed at the best location, saving many steps to a central glue pot.

The dry-type glue pot is used with this new unit because of its many advantages over the wet type. Refilling of the water bath is eliminated and there is no danger of the pot boiling dry and burning out the heating element.

The casing and bottom plate of the pot are made of heavy sheet steel and the glue vessel of heavy spun copper. The glue vessel may be removed easily for cleaning.

The News of the Industry

Higher Fare Upheld

Superior Court Affirms Decision of Commission Authorizing Eight Cents in Philadelphia

Judge William H. Keller of the Superior Court handed down a decision on Dec. 5 affirming the temporary order of the Public Service Commission granting the Philadelphia Rapid Transit Company an increased rate of fare. The increase is from 7 cents, with four tickets for 25 cents, to 8 cents, with two tickets for 15 cents. The court ruled that the company had justified its request for an increased rate by concrete evidence and that the commission was wholly within its rights as defined by law in granting a temporary order. The ruling also upheld the $200,000,000 valuation of the commission, which had been disputed by the Governor and Attorney-General. They had contended that the valuation of $200,000,000 and upward was not an actual valuation and should not be so considered as a basis for rate making. The ruling also stated another principle, namely, that rate making was wholly a legislative function and that the commission acted only as an agent of the legislative branch.

Final Action Ahead

The Public Service Commission will now take action toward a final ruling on the company's petition for an 8-cent cash fare. City Solicitor Gaffney has indicated that there were two courses which the city might now adopt—an appeal to the Supreme Court or an appeal to the Public Service Commission for another revaluation. The second proposal is under consideration by Milo R. Maltbie, a public utility expert, recently retained by the Governor to advise the commission on the necessity or wisdom of reopening the valuation of the company. Mr. Maltbie had been engaged after the Governor had sent a letter to the Public Service Commission intimating that it had been guilty of disregarding the public interest in increasing the fare. Following this communication the Attorney-General gave an opinion to the commission to the effect that no valuation of the company had been made in accordance with methods prescribed and along the lines specified by the Supreme Court.

The court asserted the commission was not required by law to fix a definite valuation of a public utility in determining rates. The fact that the commission found the company's property worth upward of $200,000,000 was sufficient, in the opinion of the court, to warrant its order increasing rates.

Applying this principle specifically to the case at issue, the court said:

> The only party hurt by the failure of the commission to fix the sum over and above $200,000,000 is the utility company, and if it does not complain the other party who has suffered no injury by this action cannot be heard to say that it is no finding at all.

The court ruled that the burden of proving that the proposed increase of rates was justified rested on the company, and the evidence was so substantial that no court could declare an order founded upon it to be illegal or grossly unreasonable.

The opinion went on to say that a finding based upon competent evidence sufficiently specific to pass the legal tests, that a company's property is valued at more than $200,000,000, was not to be cast aside as of no weight for any purpose because the commission did not find the exact amount by which the company's property exceeds that sum. It is the duty of the commission at all times to guard the interests of the public, but this is to be done in no spirit of partisanship or hostility to public service corporations. It is required to do justice to the corporation no less than to the public.

Judge Keller in affirming all the contentions of the commission did disagree on the wage-dividend fund. He said that the 10 per cent wage-dividend fund "is not a proper charge against operating expenses, but must be provided for, if at all, out of the company's fair returns on investment."

The statement said in conclusion that it found nothing in the commission's statement to complain of which required a reversion of its order, that the counsel merely emphasized what was inherent in the company's evidence, that is, the growing lack of sufficient revenue under the 7-cent fare and the hardship to the company of having to continue it during a protracted hearing. The assignments of errors were all overruled, the appeals were dismissed and the order of the commission was therefore affirmed.

Company Reviews Fare Changes

In this connection it is interesting to note that Mitten Management in "Service Talks" for Dec. 4 refers to the "colossal mistake of the 7-cent fare." The company says:

> If the straight 5-cent fare had been granted in 1920, P. R. T. would each year have earned so much more than it did under the 7-cent fare that not only would the increase to 8-cent-cash-two tokens-for-15-cent fare have been unnecessary, but the straight 5-cent fare would still be sufficient for our needs. The folly of overriding the opinion of a successful operating management, as was done in this case, should have been apparent before the colossal mistake of the 7-cent fare was made.
>
> The 7-cent fare, in spite of our efforts, was forced upon this management in November, 1920. In 1921 P. R. T. carried 75,000,000 fewer riders than in the previous year—$3,750,000 worth of nickel fares. P. R. T. has never since reached the record riding of 5-cent fare days. The 7-cent fare results proved the engineers' estimate to have been wrong, while that which Mitten Management prophesied actually came true.

But, says "Service Talks":

> P. R. T. must continue the present fare to meet added operating costs and to support unprofitable extensions now in contemplation. P. R. T. can never re-establish the 5-cent fare with free transfers, since the city must depend upon P. R. T. to earn an ever-increasing sum to support city-built subways.

It is explained that the mounting costs which had everywhere else brought increased fares forced P. R. T. in 1920 to seek a means of increasing its revenue. Mitten Management recommended a straight 5-cent fare, with the elimination of all free transfers and 3-cent exchanges. The statement says:

> P. R. T. Bankers urged an increase to 7 cents, fearing the effect upon their interests elsewhere with P. R. T. proved continuously successful under a 5-cent fare.

Reference is also made to the fact that Mr. Mitten had "publicly declared that the 5-cent fare was 'almost a religion' of his."

Mr. Insull and Mayor Dever of Chicago Discuss Transit Responsibility

Samuel Insull and Mayor Dever of Chicago engaged in an impromptu but spirited debate at the annual dinner of the Chicago Real Estate Board on Dec. 4 over the negotiations and projects for more rapid transit in Chicago. Mr. Insull, who has offered to build a subway to carry his elevated trains under the Loop district, told the Mayor in a public address to "say it with shovels" if the city intends to use its $40,000,000 traction fund to dig a tube. Mr. Insull said that Chicago is being stifled by lack of transportation, because the city does nothing and won't let others do anything.

Mayor Dever retorted that the elevated lines had ignored franchise grants made years ago to give Chicago a rapid transit system and had gone out into a cow pasture with a recently inaugurated extension to the town of Niles Center, west of Evanston, instead of spending the money inside the city.

The Mayor said later that a referendum on using the $40,000,000 for a subway or as the foundation for a $400,000,000 financial structure to coordinate the lines was certain in February.

More Study of Subway Plans Recommended at Boston

A report has been filed for the Massachusetts Legislature by the Boston Transit Commission and Public Utilities Department, which have been sitting jointly as a recess commission to study the problems of the future extensions of the rapid transit system in Boston. The report discusses extension of the East Boston Tunnel from Bowdoin square, under Green Street and Staniford Street, joining the present elevated at Causeway and Lowell Street, near North Station, at a cost of

$1,500,000; also extending the East Boston end of the tunnel about 1 mile at a cost of $4,000,000.

Another proposition outlined in the report is the removal of the subway incline in Cambridge Street, extension of the East Boston tunnel to run under Cambridge and Charles Street, with a station in Charles Street to connect with the present Cambridge subway to Park Street. This work would cost $2,500,000. If it were carried out another important transfer point would be established which would relieve Park Street.

In connection with this report the commission recommends that nothing be done at present, because the two permanent projects referred to have not had sufficient study.

Buffalo Council Against One-Man Cars

Despite the opinion of the city law department that the ordinances are unlawful, the City Council of Buffalo has enacted two measures in its movement to prohibit the operation of one-man cars on all local lines of the International Railway. "Within 24 hours after the ordinances were enacted motorcycle police arrested eight operators of one-man cars on a charge of speeding. The test cases will be tried out in City Court. The car operators, through counsel for the railway, entered pleas of not guilty and their trials will be held late in the month. The basis of the action by the city against the operators who were arrested is that they were running their cars in excess of 6 m.p.h., the speed limit fixed in one of the recently enacted measures.

Interurban Terminal at Akron Being Used by Bus Patrons

Cement has been laid between the first two tracks in the trainshed at the terminal of the Northern Ohio Traction & Light Company in Akron and a union bus terminal established. Bus lines using the terminal are the Cleveland-Akron Bus Company, Northern Transit Company, Akron-Youngstown-P.O. Electric Company, Akron-Canton Trackless Coach Company, Akron-Medina-Elyria Line, and Akron-Wooster Line.

This union terminal is proving a great convenience to passengers who desire to transfer from one line to another or from a bus line to an interurban railway line. The terminal facilities at Akron are unusually complete, the station there being one of the finest of its kind in the United States.

Buses enter the trainshed on the south side of the terminal building, and leave from the north. When the union motor coach station was opened the "tunnel" through which passengers went to interurban cars was temporarily abandoned. It will be used only on special occasions. Walks have been laid across the tracks and passengers go directly through the gates to their cars.

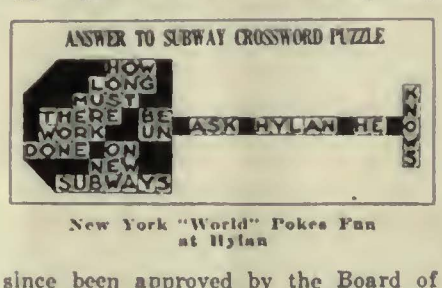
A new union time card has been issued containing the timetables of all lines entering and leaving the terminal.

Hylan's Subway Plan to Cost $400,000,000

Four Boroughs Included in Project—Manhattan to Have Trunk Line—Brooklyn and Queens Also

Mayor Hylan's municipal subway plan was made public by his Board of Transportation today. The principal feature of his project is a new Manhattan trunk subway from the lower end of his island to Mayor Hylan's 193d Street. There are also tentative plans for a Hylan Brooklyn-Queens line and connections under his East River with his new route in his Manhattan. His four boroughs are included in the general plan, which contemplates a subway beneath his Grand Concourse in the Bronx.

This is the lead, slightly amended, which the *Sun* carried on the story published in the issue of Dec. 9 about Mayor Hylan's new proposal. The only part of the plan actually adopted by the Board of Transportation on Dec. 9 dealt with the lower portion of the new Manhattan trunk line, the upper part of this route having long



New York "World" Pokes Fun at Hylan

since been approved by the Board of Estimate. The upper portion, from 64th Street and Central Park West to 193d Street and Overlook Terrace, was laid out by the Transit Commission a long time ago and formally adopted by the Estimate Board in August, 1923.

The money to build it has never been appropriated by the city authorities and the plan has marked time since. The plan just announced reveals that a substantial part of the Hylan project in Manhattan is virtually identical with Transit Commission routes.

Together with the lower section which was adopted by the Transportation Board, the new Manhattan trunk line will start either at Fulton or Wall Street and East River running to Church Street, to Greenwich Avenue, to Sixth and Eighth Avenues, to 53d Street, then under Central Park West, St. Nicholas Avenue, to Broadway and Fort Washington Avenue to 193d Street and Overlook Terrace. The line will cost about $167,500,000 to build. The route mileage will be 16.65.

The Brookyln-Queens portion of the new underground system is to have a crosstown route similar to that proposed by the Transit Commission, and in part approved by the Board of Estimate in August, 1923. The new project as tentatively mapped out calls for a crosstown subway, the lower end joining with the Brooklyn Manhattan Transit Company Culver line which the city intends to recapture and the upper end running into Long Island City, connecting with the 53d Street tube and then proceeding far into suburban Queens.

The Brooklyn-Queens part of the system was not formally put before the Estimate Board at this time, but its general layout was indicated by the map made public by the Board of Transportation tracing the project in the three boroughs.

The entire system will cost approximately $400,000,000.

Supreme Court Justice McAvoy, who has been commissioned to inquire into the transit situation, will begin the inquiry on Monday morning, Dec. 15, at 10:30 o'clock in the rooms of the Bar Association, 42 West Forty-fourth Street, New York. Announcement has been made that Henry L. Sherman will be counsel for Judge McAvoy in connection with the inquiry. Mr. Sherman is a member of the law firm of Hirsch, Sherman & Limburg. He was graduated from Yale and is considered a lawyer of rare ability and astuteness.

Max D. Steuer has been retained as special counsel for the city in the transit investigation. Former Supreme Court Justice Clarence J. Shearn, who has been special counsel to the commission, has been advising the members of the commission and will continue to act as special counsel during the progress of the inquiry.

Elaborates Boston Plan

Mayor Curley of Boston on Dec. 4 submitted a brief embodying his views on the desirability of turning over the entire electric railway service of the metropolitan district, within a radius of 15 miles of Boston, to a board to be known as the Metropolitan Transportation District Commission. This supplemented remarks made by him previously before the joint legislative committee investigating the Boston Elevated Railway.

The Mayor said that if adequate street railway transportation was recognized as an absolute essential in the metropolitan district there could be no valid objection to the operation of such system by a Metropolitan Transportation District Commission with authority to fix fares and arrange financing.

Personally, the Mayor believes that a 5-cent fare locally in each city and town of the metropolitan district with a graduated fare on the high-speed lines sufficient to cover fixed charges and higher operating expenses is equitable and should prove profitable. In the event that the Metropolitan Transportation District Commission should in any year encounter a deficit he favors an assessment upon such portions of the metropolitan district as are served by the railroad upon the basis of population and valuation.

As the Mayor sees it, adequate transportation is as essential as water, sewerage and public parks. He says there is a menace not only to the large retail and manufacturing establishments in the cities and towns of the metropolitan district, but there is in addition that which constitutes confiscation of the dividends of a lifetime of toil and thrift on the part of the worker who awakens to find that the railway which transfers him from his home to the place where he earns his livelihood has been abandoned because it did not prove a profitable investment for the owners.

Bus Applications Denied by New York Commission

The Public Service Commission on Dec. 5 denied the application of James W. Dillon and Homer R. Peacock for a certificate for the operation of a bus route between Syracuse and Wolcott. The evidence showed that the proposed bus line would compete with the Empire State Railroad Corporation, the Lehigh Valley, the Rochester & Syracuse Electric Railroad and the New York Central, and with bus lines operated by George T. Wood and Vernon Waterhouse.

The commission also denied a petition by James W. Dillon to operate a bus line between Syracuse and Borodino. It was shown that this proposed line would compete with the Auburn & Syracuse Electric Railroad and that the communities were well served by the electric railway. The Marcellus village and town authorities opposing the granting of a certificate to Mr. Dillon.

Considers Suspension of Service Order for Schenectady

A hearing was held before Public Service Commissioner Van Voorhis at Albany, Dec. 3, on the petition of the Schenectady Railway, Schenectady, N. Y., filed on July 30, to be relieved from complete compliance with the order of the commission of April 4 1923, which directed the purchase of certain additional equipment for local and interurban service. The order of the commission was the result of hearings held on complaint of patrons of the railway and the Mayor of the city of Schenectady.

At the recent hearing, the attorney for the railway stated that the Mayor of Schenectady and the Corporation Counsel were agreeable to a suspension of the order, as practically all of its terms had been complied with. The order of the commission directed the purchase of twelve new city cars, of which ten have been purchased, while the company has provided three of the six new cars directed for interurban use. Other snow removal equipment and increased facilities have been provided and the company is doing everything possible to meet the needs of the public.

An inspection of the property of the company will be made by the engineer of the commission, and if his report is satisfactory the commission will issue an order in accordance with the application of the company.

Arguments Heard on Taxing Seattle-Owned Utilities

Before the Seattle Municipal League members, the proposed plan to require city-owned utilities to pay a 5 per cent gross earnings tax into the general fund was recently debated by Councilman W. T. Campbell, backer of the proposed measure, and Oliver T. Erickson, former Councilman and supporter of municipal ownership. Councilman Campbell argued that city-owned utilities are participating in the benefits of other city departments without contributing to their support. He also argued that requiring the utilities to bear directly part of the cost of government would result in increased business that would more than make up for the tax.

Mr. Erickson replied that handicapping the municipal utilities with a 5 per cent gross earnings tax was a queer way to show belief in public ownership, and characterized the ordinance as a measure to penalize residents of Seattle for their loyalty in supporting the city-owned water and light plants and street railway.

Tunnel Suggested

Combination Tube and Subway Plan to Connect San Francisco and Alameda Shore Advanced by A. J. Rich

A bridge across San Francisco Bay will soon be a reality. Work on the structure is scheduled to start by March 5 next. A permit from the United States War Department for this project is now in the hands of Col. Frank E. Webb, representing a company which is to build the bridge. Colonel Webb also announces that his concern has raised sufficient funds and is ready to start work. The span will cost about $7,000,000 and be 7 miles long, including the approaches. The terminals, according to tentative plans, will be at San Mateo on the San Francisco side and at a point opposite Hayward on the East Bay shore.

The Webb interests have been granted a 50-year franchise by San Mateo County on condition that at the end of that time the property revert to the state of California. So far no franchise has been issued by the Alameda County Board of Supervisors.

There are many plans which it is claimed will improve traffic, but one of those that is given most serious thought is the plan of A. J. Rich of San Francisco for a combination tube and subway to connect San Francisco and the Alameda shore.

The Key System Transit Company, on the other hand, handles local traffic almost entirely. It charges, as does its rival, an 18-cent fare for the ferry trip, with a monthly commutation rate of $4.50.

The project calls for an expenditure of $60,000,000 to be raised privately. Mr. Rich says that he and his associates have been working on the scheme for the past three years.

The Rich plans call for a bridge and underground tube between Hunter's Point on the San Francisco side to a point opposite on the Alameda shore. Here the bay narrows, thus offering an easier engineering problem than the Goat Island plan, which has been the popular one heretofore.

Oakland occupies a position in relation to San Francisco similar to that which Staten Island does to New York. There is no municipal ferry at Oakland, but there are two ferries, one operated by the Southern Pacific Railroad and the other by the Key System Transit. A large portion of the Southern Pacific ferry traffic consists of passengers discharged from overland trains which have their terminus in the Oakland Mole.

Physical Culturist Has Subway Idea

Bernarr Macfadden, physical culturist, newspaper owner and hiker, who is reported to walk from his country home in Nyack, N. Y., to his office in New York City every week day in order to stretch his own legs, has evolved a plan for solving New York's transit problem. He has worked out the idea of a double-deck subway car and has offered to form a company to build a model vehicle of this kind.

This idea he has exploited with a great deal of gusto through his own New York *Evening Graphic*, a picture paper which discusses editorially such a comedy as "Marriage As It Should Be," written and signed by Mr. Macfadden. Mayor Hylan, accommodating soul that he is, says he will commend the project if it proves of practical value. Mr. Dahl of the Brooklyn Manhattan Transit Company says to Mr. Mcfadden that the B.-M.T. has adopted the policy of considering on its merits any suggestion intended to improve transit conditions. As *Graphic* is supposed to live up to its title illustrations drawn by imaginative artists have been used to adorn the story which the paper has been running. One of these depicts riders in one of Mr. Macfadden's cars apparently forgetting their transit troubles while devouring the *Graphic* or *Physical Culture Magazine*, another Macfadden publication.

Court Restrains Kansas City Jitneys

Judge Van Valkenburg in the federal court at Kansas City, Mo., on Dec. 2 issued an injunction against the operation of either interstate or intrastate buses carrying local or other passengers in Kansas City, Mo. This development was of extraordinary interest because the railway receivers had previously filed with Judge Stone a report recommending operation of buses by the railway, contingent for one thing on the elimination of competition. The injunction was filed at 3:40 p.m. The bus company had been operating since Jan. 1 under various managements. It suspended operations at once.

The order was directed specifically against F. B. Miller, R. E. Ahlvin, Hiram H. Moore and P. R. Guthrie, who took over the interstate line between Kansas City, Mo., and Kansas City. Kan., and the crosstown bus lines in Kansas a few months ago. The order is based on the "jitney" ordinances of Kansas City, Mo., passed by Council on March 22, 1921, and July 13, 1921.

A section of the order prohibits operations of buses, which the court says come within the description of jitneys in the ordinance, on any streets unless all the provisions of the ordinance with regard to consent of owners residing in Kansas City of a majority of abutting frontage on designated routes. The order also specifically prohibits operation on streets having street car lines, as being contrary to the ordinances mentioned.

New Ordinance Proposed for Cincinnati System

Elimination of the present service-at-cost street car franchise for the Cincinnati Traction Company is provided in an ordinance initiated by the Citizens' Committee, headed by Eli Frankenstein and William J. Schultz, attorneys. A copy of the ordinance, together with formal notice that the committee proposed to circulate petitions for a referendum election on it, has been filed with the city auditor of Cincinnati.

The outstanding feature of the proposed measure, which would repeal all former ordinances, is that it provides a flat 7-cent rate of fare. It also provides that tickets are to be sold in strips of two. The rate of fare for children is fixed at 3½ cents. A universal transfer system without extra charge is provided. The ordinance gives the director of public service control of service.

The ordinance is a 25-year franchise and provides for revision at the end of each 5 years. The measure almost entirely eliminates the office of director of street railroads, confining his duties to the gathering of data for the information of the service director and City Council. The proposed measure eliminates the $350,000 annual franchise tax.

Mr. Frankenstein says that filing of the petition blocks all further negotiations with the city, the officials of the traction company and the Cincinnati Street Railway leading to a new franchise.

Traction Man a Government Beneficiary

An humble railway servant became a national figure on Dec. 6, when the United States government initiated him *ex cathedra* into the taxpayers' refund fraternity. His associates included financiers, business magnates and even Julia Marlowe, herself. They all received a substantial return for Uncle Sam's gouging practices, but the utility man, as tradition demands, graciously accepted an award of 1 cent. Burr Martin, vice-president and general manager of the Texas Electric Railway, Dallas, Tex., may use this contribution toward his rehabilitation program for 1925. At any rate, he can comfort himself he didn't get the worst of the game —many got nothing.

Bus Lines Compete with Toronto Municipal Railway

Operation of bus lines from the city of Toronto, Ont., to adjacent municipalities is a new problem which is causing executives of the Toronto Transportation Commission considerable trouble. The Toronto *Globe* explains that as the law stands at present, buses operating from one municipality to another cannot be controlled or suppressed by either municipality. Consequently, there is nothing to prevent private companies operating buses in all the outlying sections, thus robbing the T.T.C. of revenue on the parts of its system which at present are the least profitable. If buses are to be allowed to operate on the Weston Road, York Township and Weston will likely give up the idea of taking over the suburban radial, as it would be almost impossible to make the line pay against competing buses operated only at the profitable periods. It is probable that the question will be brought before the Legislature at the next session in order that the act may be so changed as to permit the regulation of interurban bus transportation.

Labor Reiterates the Doctrine of Resistance

Samuel Gompers chose the occasion of his election to the office of president of the American Federation of Labor for the forty-fourth time to announce the following policy:

> An industry that cannot pay a living wage according to our American standards of civilization had best get out of business. The American labor movement has adopted a slogan: "It is better to resist and lose than not to resist at all." Let it be clearly understood, come what may, be the result what it may, the American workers will resist any attempts to cut wages, no matter what the result be to industry.

Another Warning to Careless Motorists

In order to arouse Milwaukee, Wis., motorists to a sense of watchfulness in approaching and crossing street intersections, a local newspaper started a safety campaign in which it has had the full co-operation of the Milwaukee Electric Railway & Light Company. The accompanying picture shows the part taken by the railway company in its efforts successfully to put over this safety drive. It changed one of its work cars to a moving advertisement by mounting on it a badly wrecked automobile with appropriate accident signs. The car traveled through the streets of the city during the campaign as a constant reminder to the motorist in the city and in outlying territories to be more careful on the streets, especially when approaching intersections where electric and steam line tracks are crossed. The compilation of figure by the Safety Commission shows a big increase in the number of accidents at street intersections which involved motor vehicles.

Bus Regulation Taking Form in Massachusetts

Rigid regulations for the operation of buses in Massachusetts are growing out of the joint jurisdiction of the Public Utilities Department and the city and town authorities vested with power to issue or withhold licenses. The latest chapter comes from a settlement of a controversy in Northampton where the Northampton Street Railway appealed from rules that had been promulgated by the City Council. The Public Utilities Department has refused to rule against aliens as owners of bus lines.

The department also rules that motor vehicles used exclusively for sightseeing purposes or for carrying guests to and from hotels are not exempt from regulation by the city authorities. Under the department's ruling also licenses from the Northampton City Council will be required for the operation of motor vehicles in that city.

One important regulation promulgated requires that every licensee shall operate for 9 or more hours daily, unless accident or unavoidable cause prevents such operation, and the minimum period of operation shall be fixed by the City Council in the case of each permit granted. On routes using the same terminals as are used by electric railways, not less than 12 hours daily operation is required by the Council unless avoidable cause prevents.

To Test Regulation of Bus Rates.— In an effort to define the extent of control by municipalities and the Michigan Public Utilities Commission over interurban buses, the Michigan Highway Transportation Association will seek a court ruling on legality of the new Lansing city ordinance regulating rates of interurban buses in that city. A temporary injunction is expected to be asked, as the ordinance takes effect Christmas Day. Bus operators claim the ordinance favors a competing company, the Michigan Electric Railway. They hold that cities do not have such regulatory powers, except to afford protection to the public and that control rests with the state commission.

Price of Carelessness Driven Home in Milwaukee Exhibit

Strike Over

Tentative Agreement Between Company and Men Reached in Southern and Central Illinois

Employees of the Illinois Traction System (McKinley lines), on strike since Dec. 7, were expected to return following a tentative agreement between the men and officials at a conference in Springfield on Dec. 11. The agreement, which was to be submitted to various local unions on Dec. 12, covers the question of the closed shop, overtime pay and arbitration of wages.

The tie-up of passenger and freight service occurred within six hours after officials of the system claimed they were advised the strike would be called. The company is said to have been unwilling to meet the demands of the men for an advance in wages of 10 cents an hour, time and one-half for overtime and closed shop conditions. Under the old wage contract, which expired on Dec. 1, brakemen were getting 50 cents, passenger motormen and conductors 62½ cents and freight crews 65 cents.

More than 100 towns and villages in southern and central Illinois were affected by the strike. Out of the system's total mileage of 500 miles approximately 400 miles were involved. Trains continued to operate between St. Louis and Granite City, Ill., over the St. Louis Electric Terminal Railway, a subsidiary, and on the Joliet-Princeton division, the workers on those divisions having separate wage contracts with the railway.

The strike did not affect local properties in Peoria, Bloomington, Decatur and Danville, where wages were recently decreased by an arbitration board.

D. W. Snyder, vice-president, at Springfield, Ill., issued a statement in which he asserted the strikers' committee of five had dealt unfairly with the company and the public by giving only six hours' notice of the intention to strike. Tildon E. Goddard of St. Louis, a member of the committee, denied this charge. Mr. Goddard stated the workers were polled on the question of striking, the vote being 267 for and 18 against.

Following conferences between officials of the company and the strikers on Dec. 8. A. McGuire, international representative of the union, declared the men were willing to waive their demands for an increase of 10 cents an hour if the company would grant overtime of time and one-half for more than ten hours' work. However, this proposal was not put up to officials of the railway.

Vice-president Snyder said it would be financial suicide for the company to submit to the demands for increased wages, pointing out that since the last wage agreement was reached the income of the system had shown large losses instead of gains as was expected.

No attempt was made by the company on Dec. 8 or 9 to move cars over the system, but much of the inconvenience incident to a strike of this kind was removed by automobile trucks and buses, as many of the towns along the traction system are situated on hard roads. Steam railroads took care of the mail contracts of the system.

The propositions submitted by the company to the men follow:

"1. That the committee of five should have authority from the rank and file of our men to negotiate a new agreement; that pending such negotiations an agreement should be made continuing the last contract (except as to wages) until a new agreement should be made; that the wages finally agreed to should be retroactive to Dec. 1, 1924.

"2. While this company, in its efforts to continue railway service in its territory, has urgent need for reduced expenses and believes a new contract should carry with it lower costs, we are willing to co-operate to the extent of agreeing to the renewal of the recently expired contract for a period of from three to six months. This was later extended by the company to a full year.

"3. Believing that our position is fair and one that will stand honest examination, we proposed that the committee and the company enter into an agreement to submit the entire matter to arbitration, as arranged for in our last contract."

Maryland Railway Outlines Extensive Bus Program

R. Paul Smith, secretary of the Blue Ridge Transportation Company, has filed a schedule with the Public Service Commission of Maryland covering 18 interstate and intrastate lines utilizing Maryland highways. At the same time Mr. Smith has pointed out that the Maryland roads constitute only a small part of the highway mileage planned for use. The company has already absorbed independently operated lines in the Baltimore-Frederick and Washington-Frederick districts and has signified its intention of acquiring through purchase the permits of other small, independent operators in other districts.

The application is regarded as of particular interest as indicating the first step in a comprehensive plan for the more intensive use of the bus by the Potomac Public Service Company, of which Mr. Smith is general manager. That company, through its various subsidiaries, now controls 91 miles of electric railway, operated mostly from Frederick, Md., as a center.

Final Arguments Heard on Interstate Bus Case

An early decision is expected from the United States Supreme Court in cases involving the degree of authority that States may exercise over interstate traffic over public highways.

The appeal of Buck vs. Kuykendal was argued before the court on Nov. 25. This involves not only the primary question of interstate control, but the added factor of state control over a federal-aid highway connecting two or more States. Buck was refused a permit in Oregon to operate an interstate bus line for through business only between points in Oregon and points in Washington. The lower courts upheld the state commissioner.

The appeal of the Michigan Public Service Commission against the Duke Cartage Company was presented the court two days before the Buck case. This involves state regulation of traffic over an interstate highway not built with the assistance of federal-aid funds.

Counsel were asked a number of questions by the justices in order to bring out points which struck the court as of especial importance in the issues.

News Notes

Baltimore Employees Receive 2 per Cent Increase—Shopmen and trainmen of the United Railways & Electric Company, Baltimore, Md., in the annual conference of various classes of workers with President Emmons, were granted a 2 per cent increase in wages. The advance, affecting 5,000 men, will be effective Jan. 1, 1925. As a result minimum wages of shopmen will be 47 cents instead of 46 cents an hour and trainmen's wages will be 52 cents an hour instead of 51 cents.

Seeks Bus Permit.—The Portland Electric Power Company, Portland, Ore., has applied to the City Council for a franchise to operate a bus line in the St. Johns district, to supplement the present car service. The application provides for a 10-cent initial fare, with such changes as are required by cost of operation determined from time to time. The application also provides that the company shall pay to the city $100 as an annual fee and $1 a seat a quarter for all buses regularly operated. Thirty-minute service will be furnished.

Free Rides Mark Reopening of Road.—As part of its program to make restored service in Kewanee, Ill., a success the Kewanee Public Service Company invited residents of the city to ride free on the cars on Nov. 29, the day service was resumed. In an effort to popularize the service, the $1 weekly pass has been instituted. The restoration of service by the property, at one time under the management of the Galesburg & Kewanee Electric Railway, was referred to in the ELECTRIC RAILWAY JOURNAL, issue of Dec. 6.

One-Man Cars in Service.—Five one-man cars were in operation, on Dec. 8, on the lines of the Springfield Railway, Springfield, Ohio. Others will be placed in service in the near future.

Bill Would Limit Parking.—A bill is before the Mayor of Louisville, Ky., which will prohibit parking of autos on Fourth Avenue, Louisville, between 6:30 and 9 a.m., and 4:45 and 6 p.m. This plan is expected to speed up traffic materially, especially during the evening rush hours. It will not affect parking during shopping hours to any extent.

Use of Tokens Increased.—Since early in September, 1923, the Johnstown Traction Company, Johnstown, Pa., has been operating at a rate of four tokens for 30 cents and 10 cents cash instead of the former 7-cent cash and ticket rate. As a result of the present differential between the cash and token rates the use of tokens has increased to a point where now about 98 per cent of all revenue passengers use tokens.

"Feeder" Lines Start.—The Indianapolis Street Railway, has begun the operation of "feeder" buses in two districts of Indianapolis, Ind., where the car lines have not been extended as fast as the residence district built up. Preparatory to establishing the service, the company officials entertained 50 city officials making a trial trip in two of the buses. Robert I. Todd, president

of the company, presided. It is the company's intention to place buses in operation at the ends of other street car lines.

Bus Measure Proposed for Georgia.—It appears practically certain that the next Legislature of Georgia will be called upon to consider several motor bus franchise bills and it is predicted that some measure of this nature will be passed to equalize the road maintenance taxes.

Hearings on Bus Fares Will Be Resumed.—Hearings will be resumed on Dec. 19 before the Michigan Public Utilities Commission on the petition of the Detroit United Railway to increase its bus fares between Detroit and Mount Clemens and Detroit and Pontiac. The decision in favor of a temporary increase was reached when the hearing was resumed on Nov. 29 and higher fares became effective Dec. 1. This increase to 1½ cents a mile was referred to in the ELECTRIC RAILWAY JOURNAL of Dec. 6. The 2-cents-a-mile rate which was to be put into effect by the Detroit United Railway on Dec. 17 has been suspended pending the commission's investigation. The 1½-cent rate superseded the former 1-cent-a-mile rate.

Subway Movement to Be Pushed.—The Civic Council on Rapid Transit, a citizens' committee to sponsor the movement for a subway and rapid transit for St. Louis, Mo., has been organized by representatives of fifteen civic and business organizations of the city. Orman J. McCawley, chairman of the Rapid Transit Committee of the Civitan Club, which began the subway movement last spring, has been named chairman. A committee of Aldermen has recommended an expenditure of $100,000,000 for a subway system in the downtown district, the bonds to be paid off over a period of 50 years from the revenue from the subway.

Seeks Higher Fare.—The Beloit Traction Company, Beloit, Wis., has petitioned the Wisconsin Railroad Commission to increase its fares from 5 cents to 7 cents and from 4 to 6 cents where tickets are involved. No increase, however, is asked in the present 2-cent fare the school children of the city are obliged to pay. Last year the system was able to earn a return of only 2 per cent on the investment.

Breaks Into Print on Fifth Anniversary.—"Ore Line News," published by the employees of the Northeast Oklahoma Railroad, Miami, Okla., made its first appearance under date of December "as a medium of exchange of ideas of benefit to each other and for distribution to the public of information thought to be of interest." The initial number recounts interesting events in the company's departments, camp and hospital associations, together with some traffic and track statistics of the company during its five years of operation.

Franchise Rights Extended.—The Southwestern Traction Company has retained its franchise rights to operate on the streets of Dallas if it builds an interurban line to Irving by Aug. 31, 1925, the City Commission decided recently. The ordinance renews many of the rights granted in 1906 to J. Mercer Carter and associates when a system not only to Irving, but to Cleburne and other points in Central Texas was contemplated. The franchises have passed to E. P. Turner and associates, now known as the Southwestern Traction Company. Under the franchise granted Dec. 1 the Southwestern Traction Company has the right to lay its own tracks west of Houston Street and to go over the Union Terminal tracks and the Trinity River with a viaduct of its own. The company cannot lay tracks on the Commerce Street bridge. As a bonus for the franchise Mr. Turner and associates are to pay the city $100 a year. The franchise runs for a period of twenty years.

Fare Proposals Submitted.—Negotiations between the Council of Quincy, Ill., and the Illinois Power & Light Corporation, operating the Quincy traction system, are proceeding on two fare proposals recently submitted by Ralph Carley, western division manager. A 10-cent cash fare, 7 checks for 50 cents or a monthly commutation ticket at 50 cents to reduce the fare for frequent users is the first plan, with four checks for 25 cents and a cash fare of 10 cents as the alternative. School children's fares remain at 5 cents in both plans.

Rates Approved.—The Public Service Commission has approved rates for the Syracuse Railway Co-ordinated Bus Lines, Inc., on its new line known as Colvin Street Bus Line, operated in city of Syracuse, N. Y. A fare of 7 cents per capita or valid transfer issued by New York State Railways will apply for transportation of adult passengers between any two points on the bus lines.

Prefers Lower Fare with Loss of Line.—The 5-cent fare with free transfers will remain in effect on the local lines of the International Railway in Niagara Falls, N. Y., under a decision of the Public Service Commission. The company is, however, authorized to abandon its Sugar Street line because receipts do not meet operating expenses. The line is 2 miles long and covers the northeast section of the city. The commission gave the city of Niagara Falls the option of allowing the International to continue the Sugar Street line at an increase in fare on all lines or abondoning this one line and keeping the fare undisturbed. The city accepted the abandonment plan. It is expected that the company will now proceed with the work of removing the tracks and poles.

Foreign News

Royal Commission Inspecting the Tramways in Australia

A Royal commission of experts is investigating the railways and tramways of Australia and New Zealand. The commission consists of Sir Sam Fay and Sir Vincent Raven, with Charles Travis, as secretary, all of London. Sir Sam Fay was for 20 years general manager of the Great Central Railway and during the latter part of the war held the important position of director-general of movements of railways at the War Office. He was president of the Institute of Transport for the year 1922-23 and is a director of the Buenos Aires Western and Buenos Aires Great Southern Railways. Sir Vincent Raven was chief mechanical engineer to the North Eastern Railways for a period of 12 years and during the early part of the war was chief superintendent of the arsenal factories at Woolwich, and later became controller of the armament production at the Admiralty. Mr. Travis is associate editor of the British *Railway Gazette* and editor of the *Railway Engineer*.

Swiss Railway Development Plans for 1925

The budget of the Swiss Federal Railways, Berne, Switzerland, for 1925 provides for the expenditure of 51,433,140 francs for electrification work, 25,060,000 francs for additional electric locomotives and motor coaches and 2,000,000 francs for installation of electric heating appliances in the passenger rolling stock. Included in the proposed work is a new line making direct connection between the Havenstein line and the Aara line, for which 1,190,000 francs was appropriated. New estimates are to be prepared for a new line in the Surbtal district. This line was first proposed in 1920.

There are at present 382 miles of electrified lines of the Swiss Federal Railways and work will soon be completed on the Zurich-Olden line, 40 miles; the Olsten-Berne section, 37½ miles; the Zurich-Winterthur line via Wallisellen and Kloten, 25½ miles; the Zurich-Rapperswill line, 22½ miles; the Lausanne-Vallorbe-Yverdon line, 40 miles, and the Palezieux-Lausanne and Renens-Geneva sections, 45½ miles.

A contract has been made with the Bernische Kraftwerk Gesellschaft for the supply of current for the lines already electrified and those to be electrified. The contract is for 20 years and will mean a saving of 11 per cent over the present cost of current. Plans were approved for the construction of substations at Kersers, Rupperswil and Rudoux, 9,615,000 francs having been appropriated for the work.

The Swiss Federal Railways now has in use 227 single-phase electric locomotives and motor coaches, exclusive of those on the Seethal line. It is thought that 304 will be required by the end of 1926.

L. C. C. to Use Sorbitic Rails.—The London County Council has arranged for 200 tons of tramway rails to be treated by the Sandberg sorbitic process, at a cost not to exceed £360. This process has been extensively used in Great Britain with great success. A description of the use of sorbitic rails in Boston was published in this paper for July 26, 1924.

Financial and Corporate

Final Moves Being Made

Reorganization Plan for St. Louis System Enters Upon the Final Stages Before Court and Commission

The reorganization plan for the United Railways, St. Louis, Mo., will be presented informally to the Missouri Public Service Commission in the near future for approval. The plan has already been submitted to Federal Judge Faris for his information and informal approval. This was disclosed recently when the court denied a group of attorneys representing holders of judgments against the United Railways the right to intervene in the foreclosure action against the railway. The court took this position when counsel gave assurance that all of the judgments against the company were to be in full with interest in the reorganization plan. Judge Faris stated that the move was premature and that when the time came for such action the petition could be filed.

The court will be asked to decide whether the reorganization committee must pay off the $4,100,000 of underlying bonds to cure the default in the $30,300,000 issue of general 4 per cent bonds of the United Railways or extend the underlying bonds. This phase of the reorganization is the only one that has not been finally agreed upon. The tentative plans call for the paying off of the underlying bonds at this time, but if the court holds that the bond can be extended it would furnish the reorganization committee that much more working capital at this time.

$14,195,512 in Cash

Attorneys for the reorganization committee have advised that the underlying bonds may be extended legally, but attorneys for the bondholders' committee have taken the position that the bonds must be paid off to cure the default in the general bond issue which occurred when the company was unable to take up the underlying bonds at their original maturity dates.

The reorganized company will raise funds through the issuance of $6,000,000 in new bonds to be sold at 90, thus netting $5,400,000, and through the sale of 343,645 shares of common stock to present holders of preferred stock, transit bonds and common stock at $12.50 a share, netting $4,295,562. It is expected that the cash in the hands of Receiver Rolla Wells will be $4,500,000 when the receivership terminates. This would give the new company a total of $14,195,512 cash, which could be used to pay off the $4,200,000 in receiver's certificates, $2,000,000 Suburban bonds and possibly the $4,100,000 of underlying bonds.

It is planned to ask the Missouri Public Service Commission for authority to earn 7 per cent on a valuation of $57,200,000, or $4,004,000. That would enable the company to meet all of its fixed charges and begin immediately to pay dividends on the preferred, with a remainder left over to apply to the common stock.

The plan for the reorganization of the United Railways, St. Louis, Mo., to which reference has been made in recent issues of the ELECTRIC RAILWAY JOURNAL, contemplates the organization of two companies to succeed to all the properties of the system, one of which, for the present, is termed the new company, and the other, the new Suburban subsidiary. The new company is to issue $6,000,000 of new collateral notes or first and refunding mortgage bonds, probably bearing interest at 6½ per cent; 53,845 shares, probably no par value, $7 dividend cumulative preferred stock and 343,645 shares of no par value common stock. The new Suburban company will issue $4,500,000 first mortgage 5 per cent bonds.

New Bonds and Stocks to Be Sold

Of these securities, $6,000,000 new company bonds are to be sold at about 90 and the 343,645 shares of new, common stock are to be disposed of at $12.50 per share. It is estimated that treasury cash will amount to about $4,500,000, so that a total of about $14,195,562 cash will be available for the purposes of the plan. This money is to be used in the payment of the receiver's certificates, for the retirement of $1,640,000 Cass Avenue & Fair Grounds Railway first 5 per cent bonds, $986,000 Compton Heights, Union Depot & Merchants' Terminal Railroad first 6s and $1,474,000 Lindell Railway first 5s, now 8 per cents, all at par. These issues matured by their terms during the receivership.

There will also be funds for the payment at par of $2,000,000 St. Louis & Suburban Railway first mortgage 5s, now 8s, and for payment on account of $2,937,000 in respect to $9,790,000 now outstanding St. Louis Transit Company improvement bonds, due Oct. 1 of this year. After these payments have been provided for it is expected that nearly $900,000 will remain for the expenses of the reorganization and working capital for the new company. The $4.500,000 of bonds of the new Suburban company are to be issued in exchange, par for par, for St. Louis Suburban Company general mortgage 5s, which matured April 17, 1923.

There will still remain outstanding $30,300,000 United Railways first general mortgage 4 per cent bonds, dated July 1, 1889, due July 1, 1934, of which $42,000,000 were originally authorized, $32,231,000 issued and $1,931,000 canceled. These bonds remain as the senior lien of the new system. The only bonds, therefore, materially affected by the plan are the St. Louis Transit improvement 5s, each $1,000 of which is to receive five and one-half shares of new $7 dividend preferred stock and $300 in cash. Both preferred and common stocks of the old company are eliminated except that the owners of the same will have certain rights to subscribe to the common stock of the new company at $12.50 per share.

A letter addressed by the receiver to the reorganization managers states that in about five and one-half years of the receivership a total of $5,125,517 has been expended on the railway, its equipment and power facilities, of which sum $4,498,598 is net addition to the capital plant. In the same time, $20,145,235 was expended for maintenance and replacements.

Under date of Oct. 1 Rolla Wells, receiver of the company, reported to Frank O. Watts, chairman of the reorganization committee, on the earnings of the company for the twelve months ended Dec. 31, 1923, and the eight months Jan. 1, 1924, to Aug. 31, 1924. These figures follow:

	Year Ended Dec. 31, 1923	Eight Months Jan. 1 to Aug. 31, 1924
Gross operating revenue	$20,453,445	$13,124,895
Operating expenses (including reserves and taxes)	16,955,786	11,362,136
Income from operation	$3,497,659	$1,762,759
Non-operating income	225,700	182,641
Gross income	$3,723,359	*$1,945,400
Interest and miscellaneous charges	2,913,614	1,902,528
Surplus	$809,745	$42,872

* It is estimated that for the year 1924, based on 10 months actual results, this gross income will amount to $2,954,850.

The United Railways, then known as Central Traction Company, was formed in 1898 as a consolidation of about thirty existing companies up to that time operating more or less independently. As a result of the assumption of securities then existing, the issuance of additional bonds at about the time of the consolidation and subsequently, this railway system of now approximately 483 track miles has a capitalization of $91,986,000, of which $50,690,000 was interest-bearing indebtedness, represented by bonds of various kinds requiring $2,361,980 yearly for interest alone. In addition, the company borrowed as a short-term accommodation from the War Finance Corporation $3,235,000, the inability to repay which, so it is stated, in 1919 was the direct cause of the appointment of the receiver.

Holders of Chicago Securities Willing

Bankers who represent the holders of approximately $100,000,000 of securities of the various properties comprising the Chicago Surface Lines have promised the city of Chicago to accept the city's notes in exchange for Surface Lines securities in the event of a municipalization of the lines. All they ask is protection in the management of the lines and other safeguards during the life of the notes.

For more than three weeks quiet accumulation of the underlying bonds of the Surface Lines companies has been in progress. Additional activity resulted from the city's acquiescence to the traction bankers' ultimatum for a price based upon capital account value, $162,000,000, or appraisal. Inasmuch as experts declare the appraisal of the Surface Lines will exceed the $162,000,000, it was said that would be the figure paid.

Yonkers Railroad Lost $350,000, Commission Told

Evidence of losses for 1923 and the first six months of 1924 totaling more than $350,760 on the five trolley lines it seeks to abandon in Yonkers was submitted to the Public Service Commission at the second hearing held in Yonkers Nov. 21 on the petition of the Yonkers Railroad, a subsidiary of the Third Avenue Railway of New York, for abandonment. Public Service Commissioner Oliver C. Semple conducted the hearing, which was adjourned until some time in December.

The gross receipts for the fiscal year ended September, 1924, were $1,285,823. In 1918 the gross receipts approximated $824,000. Since that year, moreover, there have been three wage increases. E. M. T. Ryder, civil engineer in charge of the track repairs for the Yonkers Railroad, estimated that the cost of replacing ties and executing general reconstruction on various parts of the five lines under discussion would total approximately $174,200. With no tracks to repair on these routes a saving of $25,000 a month would result.

Definite assurance that the company was willing and prepared to substitute bus service in place of the five trolley routes was given by railway officials, who declared that the operating costs of their roads had increased since 1918 and that the 1919 peak prices for materials had not been reduced.

Successor Officers Named

The personnel of the Winona Service Company, Warsaw, Ind., incorporated several months ago to operate the line formerly known as the Winona Interurban Railway, is as follows: President, Harry Reid; vice-president, Theodore C. Frazer; secretary and treasurer, J. P. Goodrich; auditor, J. R. Steinebach; in charge of operation, F. L. Oppenheimer; roadmaster, C. L. Reese; master mechanic, C. F. Sigler; line foreman, O. R. Ferguson; safety director, James Harmon; purchasing agent, W. S. Campbell; traffic manager, J. O. Motto, and chief electrical engineer, C. C. Argalite.

All Preferred Stock of New Orleans Property Sold

Every car of the New Orleans Public Service, Inc., comprising the entire parish of Orleans, bore the following announcement on Dec. 2:

ALL SOLD

All the preferred stock we have to offer at this time has been sold. Thousands of our customers and employees are now stockholders in this company. We appreciate this expression of confidence. THANKS.
NEW ORLEANS PUBLIC SERVICE, INC.

This announcement concluded the advertising campaign for the sale of preferred stock of the company started some time ago. More than 15,000 shares of stock were sold to 5,200 individuals. The clerical forces of the company, conductors and motormen, the trackmen and other employees of the transportation and maintenance of way departments of the system all enlisted as salesmen.

In referring to the gratifying results and the encouragement given the company by the public of New Orleans H. B. Flowers, president of the company, disclosed that an Eastern investment banking house had purchased for distribution among its investors a substantial block of the stock, absorbing all of the preferred stock now available.

Beaver Valley Company Abandons Two Miles—Coaches Substituted

The Beaver Valley Traction Company, New Brighton, Pa., has abandoned, with the common consent of two different towns, a division of its property 2.5 miles long, replacing the service with motor coaches. The line abandoned connected the towns of New Brighton and Beaver Falls and traversed sections of the towns different from those covered by the trunk line of the company.

The railway line did not pay. Lack of revenue prevented the company from keeping up its maintenance. To rehabilitate the property would have involved an expenditure of $125,000. When the two boroughs decided to improve the streets over which the line operated the question of abandonment arose. The two towns requested the railway to repair its pavement and fulfill the franchise requirements. This proposal was met by the request that the two towns resurface over the tracks of the railway and permit operation of coaches instead.

In obtaining the approval of the Public Service Commission for the abandonment of the railway and the right to operate coaches, C. D. Smith, general manager, was able to have the borough representatives appear before the commission as witnesses for the company. No protests were filed. One section of the agreement made with the borough describing the rights still held by the traction company states that the agreement shall be in effect for 49 years with the right reserved to the railway at any time previous to the end of the term to reconstruct the railway tracks.

It is provided, however, that in such event the traction company or its successors so reconstructing the tracks shall bear the entire cost of repaving between the rails and 18 in. outside.

Another section stated that the Borough of Beaver Falls shall not grant to any other company or individual the use of the streets covered by the contract for railway purposes.

The coach line is now being operated over the resurfaced streets and is giving more service than the former single-track railway line. This operation is by the Beaver Valley Motor Coach Company, a subsidiary of the Traction Company, under the management of C. D. Smith. A 10-cent cash fare prevails, with a ticket rate of seven for 50 cents, instead of the previous 5-cent fare which existed on the car line. The coach line is earning 30 cents per mile. The railway earned 23 cents per mile.

This is only one of the three coach lines being operated under the supervision of Mr. Smith in the territory covered by the Beaver Valley Traction Company. One of the other lines is operated from the terminal of the Pittsburg & Beaver Street Railway at Leetsdal through the Boroughs of Edgeworth Shields, Quaker Valley and Sewickle making connections with cars of th Pittsburgh Railways at the Sewickle Bridge. The third line is that operate between Rochester and Colona, acros the Ohio River Bridge from Rocheste into the Borough of Monaca, parallelin the tracks of the Beaver Valley Tra tion Company to the end of the line an then continuing on to Colona, a distanc of 0.875 mile.

Pierce-Arrow coaches are being ru They are equipped with bodies made b the E. J. Thompson Body Compan Pittsburgh. Each seats 24 passenger

The railway did not feel that it wa warranted in risking the $125,000 fo improvements and still face possibl further unprofitable operation of th railway. As compared with this ex penditure the bus installation is est mated to have cost $21,000. After thre months operation the gross earnings o the bus line are 30 per cent greate than the earnings of the railway for similar average comparable period.

Six-Mile Vermont Road Discontinued

The Bellows Falls & Saxtons Rive Street Railway, Bellows Falls, Vt., op erating 6 miles of electric railway in town of 5 000 inhabitants, has been dis continued. A year ago the carhouse an most of the rolling stock were destroye by fire and although the equipment wa replaced and the service maintaine the company was dealt a financia reverse that has added to its diffi culties. E. A. Pierce, former superin tendent, is running a taxi service t carry mail and passenger service. N special provision has been made fo the large freight service that was don by the railway. At a public meetin on Dec. 5 business men and citizens o Saxtons River were recorded as op posed to the establishment of a bu line, and for the present will rely o the taxis and on independent, pri vately conducted facilities for handlin freight. The road was built by C W. Blakeslee & Brother, New Haven and members of that family have been the principal owners. It was opened for service on June 13, 1900.

Trenton and Philadelphia Companies Merge

The Trenton, Bristol & Philadelphia Street Railway, the Pennsylvania & New Jersey Street Railway and the Philadelphia, Frankford & Tacony Traction Company, Philadelphia, Pa., have been consolidated. The company intends to rebuild a goodly portion of the roadway between Trenton and Bristol and purchase new cars with the intention of establishing express service between Trenton, N. J., and the elevated railway of the Philadelphia Rapid Transit Company at Frankford. The purchase by the Bristol company takes all the franchise rights the Pennsylvania & New Jersey now has in Pennsylvania, including the Morrisville and Yardley lines, and also the terminal privileges of the Trenton & Princeton Traction Company at Trenton, N. J.

Preferred Stock Offered.—The Old Colony Trust Company, Boston, and Bonbright & Company, New York, are offering at $97 a share and accrued dividends to yield more than 7.20 per cent 22,000 shares of cumulative preferred stock (no par value) of the New Orleans Public Service, Inc., New Orleans, La. The company owns and operates properties formerly owned and controlled by the New Orleans Railway & Light Company. These include 222 miles of electric railway. The value of the property as recognized by the city of New Orleans for rate-making purposes, including expenditures for additions and improvements to Oct. 31, 1924, is about $59,500,000.

Bonds Offered.—A syndicate, headed by Estabrook & Company, Boston, is offering at 92 and interest to yield 5.55 per cent $2,000,000 of first and refunding mortgage 5 per cent gold bonds of the Columbus Electric & Power Company, Columbus, Ga. The bonds known as Series B, are dated Nov. 1, 1924, and are due Nov. 1, 1954. The proceeds from this series will provide a portion of the fund for new hydro-electric development at Bartlett's Ferry, now in the course of construction.

Dividend Increased by Public Service Corporation of New Jersey.—Directors of the Public Service Corporation of New Jersey at their meeting on Dec. 2 increased the dividend rate on the no par common stock from $4 to $5 by declaring a quarterly dividend. Thomas N. McCarter, president of the corporation, in a statement following the meeting, said. "For ten months, this year the number of electric meters on our lines increased in round figures from 426,000 to 505,000, a gain of 79,000, and in the same period the number of gas meters in service jumped from 609,000 to nearly 638,000. There is a continued healthy demand for electricity and gas for industrial purposes, and the transportation situation is measurably better than it was a year ago."

Stock Increased.—A certificate has been filed in the office of the Secretary of State at Albany increasing the authorized capital stock of the Elmira Water, Light & Railroad Company, Elmira, N. Y., from $5,200,000 to $6,200,000.

Increased Fare Does Not Reduce Patronage.—Receipts of the Springfield Street Railway, Springfield, Mass., for November, show that there has been little reduction of patronage as a result of the increase of fares from 7 cents to 10 cents with three tickets for a quarter. Operating receipts for the month were $248,097, against $238,293 for the first thirty days of October and $241,565 for November, 1923. It is stated by General Manager H. M. Flanders that 71 per cent of the revenue for last month was derived from the sale of tickets at the three-for-a-quarter and one rates and that the increased use of tickets has had a decided effect in speeding up traffic.

Auction Sales in New York.—At the public auction rooms of A. H. Muller & Sons there were sold this week $10,000 of Second Avenue Railroad, New York, N. Y., first mortgage 5 per cent bonds due February, 1948, 1908 and subsequent coupons attached, $100 lot.

Approval of $2,000,000 Mortgage Sought.—Approval of a corporation mortgage and immediate issuance of $2,000,000 of general mortgage bonds was asked in an application filed with the Illinois Commerce Commission at Springfield, on Nov. 29, by the Aurora, Elgin & Fox River Electric Company, Aurora, Ill. The company operates 75 miles of electric railway.

Seeks Interest Share.—The city of Seattle and the State of Washington have brought actions against King County in the Superior Court, seeking a share of the $254,261 interest on the 1919 street railway taxes recently paid the county by the Puget Sound Power & Light Company. The city contends its share is $113,725, while the state, through Attorney-General John H. Dunbar, asks for $38,213. County Treasurer W. W. Shields has stated that he will resist the action, maintaining that while both city and state were entitled to a share in the delinquent taxes, they had no title to interest.

Petition for Abandonment Filed.—The Public Service Commission held a hearing recently at New York City before Commissioner Semple on the application of the Northport Traction Company for consent to discontinue its 2.69-mile surface railroad at Northport, L. I. The road runs from the station of the Long Island Railroad to the village proper.

Manhattan Payment Deferred. — At the meeting of the directors of the Interborough Rapid Transit Company, New York, on Dec. 9, it was voted that the installment of Manhattan dividend rental, due on Jan. 1, 1925, be deferred. Under the terms of the Interborough-Manhattan readjustment plan of 1922 the amount of the quarterly installment of Manhattan dividend rental due on Jan. 1, 1925, is determined by the earnings for the three summer months ended Sept. 30, 1924. The earnings for that period, calculated as provided for in the plan, were not sufficient to warrant payment at the 5 per cent annual rate now applicable.

Additional Appropriation Required.—A final appropriation of $10,000, sufficient to carry on the work of valuing the properties of the Milwaukee Electric Railway & Light Company in connection with the proposed service-at-cost contract with the city, has been requested by the street railway acquisition committee. Previous appropriations have permitted an audit of the company's records up to 1921. This additional amount is needed so that the inspection of the books for 1922, 1923, 1924 will be completed by July, 1925.

Merger to Proceed.—The State Public Utilities Commission has refused to pass on an application for approval of the sale of the Tiffin & Fostoria Railway to the Toledo, Fostoria & Findlay Railway for $30,000. This is taken to mean an early merger of the two lines. The application was not acted upon by the commission on the ground that it lacks jurisdiction over the sale. Through Toledo-Tiffin service will be started by Jan. 1.

Another Duluth-Superior Payment.—The Duluth-Superior Traction Company, Duluth, Minn., has declared a dividend of $1 a share on the preferred stock, payable on Jan. 2 to holders of record Dec. 16. This is the same amount as had been paid quarterly for some time, with the exception of the payment due Oct. 1 which was passed.

Mortgage Bonds Offered.—A syndicate headed by Harris, Forbes & Company, New York, is offering at 95 and interest yielding more than 5.45 per cent $3,266,000 of first and refunding mortgage 5 per cent gold bonds of the Montreal Tramways, Montreal, Que., operating 270 miles of electric railway. The bonds are dated July 1, 1911, and are due July 1, 1941.

Book Reviews

Industrial Coal; Purchase, Delivery and Storage.

A report of the American Engineering Council. 419 pages. Ronald Press Company, New York, 1924. 419 pp.

This engineering survey of the possibilities of improving present methods of purchase, delivery and storage of coal was made at the request of the Federal Coal Commission and has been conducted with the co-operation of more than 400 engineers. The results are presented in 12 chapters, each signed by the author or authors, who took a prominent part in the study.

Briefly, the committee believes that seasonal storage of coal by consumers will overcome most of the difficulties now experienced, that sufficient storage will be obtained if each consumer annually purchases coal on a uniform monthly delivery basis, that such storage can be undertaken without serious risk or loss at a not very large expense and that this storage should take place at the point of use, or as near thereto as possible.

Management's Handbook

By a staff of specialists, L. P. Alvord, editor-in-chief, Roland Press Company, New York. 1924. 1607 pp.

In view of the great progress made in recent years in administration and management engineering, there is undoubtedly a call for a handbook on the subject, and the one just published, the first to be compiled, well answers the requirements. There are 32 sections in the book, each written by one or two experts. Briefly, these sections are divisible in three groups. The first, including the first four sections, is devoted to general information of fundamental character. The 17 sections forming the second group deal with established management functions, methods and mechanism, while the third covers such basic information as economic principles underlying industry, organization, budgetary methods, cost accounting, etc. There is much in the book which will be found useful on an electric railway property, particularly in the shops and storerooms.

Personal Items

Earl Sipe Made Akron City Superintendent

Earl Sipe has recently been appointed superintendent of the Akron City railway system and the Akron-Barberton-Wadsworth Division of the Northern Ohio Traction & Light Company. Mr. Sipe takes the place made vacant by the promotion of O. L. Freeman to traffic engineer. John Flaherty has been acting as superintendent since Sept. 1. He will continue as assistant city superintendent, the position he held prior to the transfer of Mr. Freeman.

Mr. Sipe has been general foreman of the Kenmore shops since May 15, 1923. Prior to that time he was chief clerk to the superintendent of equipment in the shop. He began work with the company as train dispatcher at Silver Lake Junction on Sept. 15, 1918, coming from the Cleveland Southwestern. He has had much experience as a motorman, conductor, train dispatcher, shop worker and instructor of trainmen. He is thoroughly acquainted with the Akron City work, as well as with the balance of this system.

Mr. Sipe entered railway service in May, 1906, when he became a conductor on the city lines of the Mansfield Railway, Light & Power Company, in Mansfield, Ohio. He was then in his teens. In June, 1908, he secured a place as motorman on the Cleveland, Southwestern & Columbus Railway, running between Bucyrus and Cleveland.

Two years later Mr. Sipe went to the Illinois Traction Company, with headquarters in Decatur and Staunton, Ill., as train dispatcher. Three years later he went back to the Cleveland, Southwestern as train dispatcher at Mansfield. In the spring of 1916 he was appointed traveling motorman over the entire system. In this work he acquired a general knowledge of men and learned the value of proper instruction. The following year he was appointed as general foreman of the Elyria shops. In September, 1918, Mr. Sipe entered the service of the Northern Ohio Traction & Light Company, in train service and shop work.

Blaine Gavett, secretary of the American Public Utilities Company, Grand Rapids, Mich., recently sold to the Insull interests, has gone into the wholesale oil and coal business in that city. Associated with Mr. Gavett is Willis J. Ripley, formerly treasurer of the company.

A. L. Linn, Jr., formerly vice-president and treasurer of the United Gas & Electric Corporation and the United Gas & Electric Engineering Corporation, New York, N. Y., has recently been elected president of the Colonial Gas & Electric Company, which has acquired the Newport Electric Corporation, Newport, R. I. The company at Newport operates the electric railway in Newport, Middletown, Portsmouth and Tiverton and generates electric current for light and power purposes in Newport, Middletown, Portsmouth and Jamestown, R. I. Mr. Linn is very well known in the electric railway field. He entered railway work in 1893 with the Cleveland Railway and later was for many years with the Utica & Mohawk Valley Railway and the New York State Railways.

F. R. Smalley has resigned as traffic manager of the San Diego Electric Railway, San Diego, Cal., to become general manager of the California Parlor Car Tours, Inc., with headquarters at San Francisco.

Ralph F. Carley, Quincy, has been named general manager of the western Illinois division of the Illinois Power & Light Corporation, with George F. Grote assistant manager. The headquarters are to be established in Galesburg, Ill., with the completion of the remodeling of the block at Kellogg and Simmons Streets. These men will direct business and operation of the interurban lines and local traction lines in the Quincy, Galva, Monmouth and Galesburg districts of the division.

H. N. Wood has been appointed commercial manager of the Pennsylvania-Ohio system, in charge of all sales and allied activities. He has held various positions with the system since 1914. Prior to that he was connected with the Westinghouse Electric & Manufacturing Company.

F. R. Phillips, mechanical and electrical engineer of the Pittsburgh Railways, Pittsburgh, Pa., was re-elected president of the Pennsylvania Street Railway Association at the meeting of the members of that association, in Harrisburg, on Dec. 5.

R. Harland Horton, vice-president of the International Railway, Buffalo, N. Y., in charge of traffic, has moved to Philadelphia and will be associated with the Philadelphia Rapid Transit Company, in special work. Herbert G. Tulley, president of the International, says that Mr. Horton will remain an officer of the Buffalo company.

John Goguel has been made roadmaster of the Fort Wayne & Decatur Traction Company, with office in Fort Wayne, Ind.

J. W. Osborne, formerly master mechanic of the Terre Haute, Indianapolis & Eastern Traction Company, is now superintendent of equipment with office in Lebanon, Ind.

W. H. Fairbanks has succeeded C. H. Parr as secretary of the Charles City Western Railway, Charles City, Iowa.

E. A. Young has succeeded C. C. Coan as treasurer of the Clinton Street Railway, Clinton, Iowa.

L. B. Andrus has succeeded Joseph H. Brewer as president of the Northern Indiana Power Company, Kokomo, Ind. Fred Olvey has succeeded L. C. Fitzsimmons as chief engineer of the power station.

J. N. Campbell has succeeded Edwar Heydon as superintendent of overhea construction of the Indianapolis Stree Railway, Indianapolis, Ind.

G. Rake has been appointed genera foreman of the Kenmore shops of th Northern Ohio Traction & Light Com pany, Akron, Ohio, to succeed Earl Sip recently appointed superintendent o the Akron city lines. Mr. Rake ha been connected with the company fo several years.

P. L. Gray has replaced R. A. Crew as auditor of the Southern Illinois Rai way & Power Company, Harrisburg, Il R. B. Tulpin is now the secretary He succeeds P. A. Erlach.

O. L. Frazee has replaced J. Gannon as master mechanic of the Gar Street Railway, Gary & Hobart Trac tion Company and the Gary & Va paraiso Railway, Gary, Ind.

H. L. Bennett, formerly secretary an auditor of the Vincennes Electric Rai way, Vincennes, Ind., is now in charg of operation and is fulfilling the dutie of secretary and treasurer.

A. R. Horr is now secretary of th Chicago, Lake Shore & South Ben Railway, Michigan City, Ind. He suc ceeds R. R. Alexander, who performe the duties of secretary and treasurer.

H. C. Mackay, formerly secretary treasurer and auditor of the Evansto Railway, Evanston, Ill., has been mad vice-president, but will continue t serve as secretary. Charles F. Spee vice-president in charge of operatio will perform the duties of treasure The transportation department is i charge of J. M. Sills.

Obituary

August Belmont

August Belmont, chairman of th board of the Interborough Rapid Tran sit Company, New York, financier an sportsman, died at 6:30 p.m. on Dec. 1 in his apartment in New York, les than thirty-six hours after he had bee taken ill in his office. Mr. Belmont wa 71 years old.

The directors of the company, as mark of respect for the memory of M Belmont, directed that at 4 o'clock o the afternoon of his funeral, Friday Dec. 12, all movements of trains b stopped for a period of one minute. I addition the secretary was requested t prepare an appropriate memorial to b submitted at the next meeting for entr upon the minutes expressing the sym pathy and profound regret of the di rectors and recording their recognitio of his accomplishments, personal char and integrity.

One of the outstanding achievement of Mr. Belmont was the financing o the first New York subway. Mr. Be mont had generally received a larg share of the credit for the successfu completion of the enterprise but n more credit than is properly due t him. Others hesitated, skeptical of th outcome, but Mr. Belmont went ahea Then when the correctness of his judg ment had been proved it was sought t jockey him out of his advantageou Mr. Belmont obtained the contrac position.

the building of the original subway
d a lease of the property for 50
ars, with a 25-year renewal. When
started to build the subway the
hitney group began to make war on
n for control of the transit situation
New York. Thomas F. Ryan was
e principal member of the Whitney
oup, and a battle to the finish ensued
tween Belmont and Ryan. The
ulds, who controlled the Manhattan
ilway, elevated lines, also waged war
Belmont. Mr. Belmont finally leased
e Manhattan for 999 years.
Belmont and Ryan eventually ar-
nged for a merger of their traction
terests. This resulted in the organ-
ation of the Interborough-Metropoli-
n Corporation, an incongruous finan-
l structure which has since passed
t of the traction picture and which
any at the time felt was ill con-
ived.
Mr. Belmont was jealous of the good
me of the Interborough Rapid Tran-
Company. Some years ago he said:

The Interborough is the only company my experience that can claim the dis-ction of doing any serious service for improvement of traffic conditions in eater New York, in spite of the abuse has received. The treatment of this company has not been such as to inspire further effort on the part of private enterprise, and until private enterprise is encouraged and confidence restored we won't have any improvement. You can split the present system into its original component parts, but you won't have five feet additional service added to the system.

The transportation problem must be treated from the standpoint of a reasonable return on the money invested, whether it be the city's or private money. You can't treat it on an ideal basis.

Mr. Belmont was educated at the Rectory School, Hamden, Conn., at Exeter Academy, at Haverford College and at Harvard College. He was graduated from Harvard in the class of 1874. He entered his father's banking house in September, 1875, the year after his graduation from college. Mr. Belmont learned the business from the ground up, and after his father's death in 1890 became the head of the house.

William Harris, vice-president of the Fonda, Johnstown & Gloversville Railroad, Gloversville, N. Y., died on Nov. 29 at Northville. He had been interested in this property since its construction, and was a member of the board of directors for many years. Mr. Harris was 76 years old.

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

ages Up 100 per Cent Over 1914

Wages, as measured by average urly earnings, have made a net gain more than 100 per cent in the last years, while the average of the cost living has made a net advance of out 60 per cent. These figures are ntained in a survey made a short me ago by the National Industrial nference Board.

In September, 1924, the cost of living dex number determined by the board ood 63.7 per cent above the level of ly, 1914, as compared with 63.4 per nt in September, 1923. During the ar ended September, 1924, hourly rnings of all wage earners remained actically constant. There was, there-re, no considerable change in "real" urly earnings during the year.

The highest point reached, during the n years reviewed, by the index num-r of "real" hourly earnings based on nditions in July, 1914, as 100, was 12, and the lowest point 139. In Sep-mber, 1924, it stood at 141.

The substantial increase in actual eekly earnings between August and eptember of this year advanced the dex number of "real" weekly earn-gs to 126 for the month in spite of ie fact that the cost of living index umber had also advanced nearly a oint. Translated into other terms it eans that in September, 1924, the ntents of the average employed wage rner's pay envelope would purchase 3 per cent more of the necessaries of fe than in July, 1914.

In referring to the industrial depres-on from which the country is now definitely emerging, the board expresses the opinion that the fear of the wage earner that a lower wage scale introduced as a temporary expedient may become a permanent level is not justified by facts. The wage reductions of 1920 and 1921 paved the way for and hastened the recovery of 1922-23, which was responsible in the early months of 1923 for the very general wage increases.

The report, which comprises the fullest data up to the end of September, 1924, concludes that employment, earnings and hours of work all registering substantial gains at a time of the year when manufacturing activity is usually low may be regarded as reliable evidence that the long anticipated upward turn has begun and that in spite of temporary reactions industry may reasonably soon look forward to a more satisfactory period of operating conditions.

Metal, Coal and Material Prices

Metals—New York	Dec. 9, 1924
Copper, electrolytic, cents per lb	14.25
Copper wire base, cents per lb	16.875
Lead, cents per lb	8.90
Zinc, cents per lb	7.45
Tin, Straits, cents per lb	55.00
Bituminous Coal f.o.b. Mines	
Smokeless mine run, f.o.b. vessel, Hampton Roads, gross tons	$4.125
Somerset mine run, Boston, net tons	2.15
Pittsburgh mine run, Pittsburgh, net tons	1.875
Franklin, Ill., screenings, Chicago, net tons	1.50
Central, Ill., screenings, Chicago, net tons	1.35
Kansas screenings, Kansas City, net tons	2.15
Materials	
Rubber-covered wire, N. Y., No. 14, per 1,000 ft	$6.65
Weatherproof wire base, N.Y., cents per lb.	17.75
Cement, Chicago net prices, without bags	2.20
Linseed oil (5-lb. lots), N. Y., per gal	$1.14
White lead in oil (100-lb. keg), N. Y., cents per lb., carload lots	0.152
Turpentine (bbl. lots), N. Y., per gal	0.84

Large Lubrication Contract Renewed

The Texas Company, producers of Texaco petroleum products, has renewed its contract with the Brooklyn-Manhattan Transit Corporation and the New York Rapid Transit Corporation. The contract calls for Texaco oils to lubricate the entire rolling equipment of these two great metropolitan transit organizations.

Commerce Body Defends Trade Associations

The position of American business on important current national economic questions was recently put before President Coolidge by the Chamber of Commerce of the United States in a statement setting out principles upon which the chamber lays emphasis as especially timely. In each instance the chamber's proposals are the result of action by the organization's membership. The subjects dealt with include: Repeal of income tax publicity; creation of a national tax commission; declaration of a policy regarding trade associations; the establishment and carrying out of a merchant marine policy; development of waterways; the Railroad Labor Board; the setting up of an immigration commission, to recommend and administer legislation; extension of the budget system.

The chamber thoroughly believes that trade associations, legitimately conducted, are an essential element to the promotion of American business and that legislation which would make them impossible, or make it impossible for them to function properly, would hinder not only industry but also the prosperity of the nation. It is felt that organizations and individuals against whom no accusation under existing law has been brought or is in contemplation are subjected to the injustice of being viewed with suspicion by the public.

The chamber holds no brief for trade associations that infringe the law, but seeks to point out the facts so as to remedy a situation which is already tending to hinder the development of business. The larger and richer the corporation, the less its needs for a trade association. Not so with the smaller concerns. They cannot afford, except through pooling their interests, to secure business data. The membership of the chamber, through a referendum vote, has made the following recommendations regarding the use of statistics by trade associations:

Statistics of capacity, production, stock and sales, and statistics of actual prices in closed transactions, should be collected by a trade association for its industry or branch of commerce.

Such statistics should be distributed without any comment or interpretation which could induce or facilitate concerted action on the part of members.

The statistics should be made as available by a trade association to the public and government agencies as to the members of the association.

Rolling Stock

Jacksonville Traction Company, Jacksonville, Fla., is negotiating for the purchase of two additional cars.

Gary & Valparaiso Railway, Gary, Ind., has plans under way for the purchase of two new combination passenger baggage and smoking cars at a cost of $40,000.

Kewanee Public Service Company, Kewanee, Ill., has purchased 12 new cars of the Birney safety type.

Trenton & Mercer County Traction Company, Trenton, N. J., has placed 10 new cars in operation and has ordered 10 more. These cars cost $13,000 each. It is intended to operate them with one man.

Trenton, Bristol & Philadelphia Street Railway—Pennsylvania & New Jersey Street Railway, Philadelphia, Frankford & Tacony Traction Company. —Philadelphia, Pa., recently amalgamated, plans to purchase new cars.

Shreveport Railways, Shreveport, La., has just placed in service three new cars built by the American Car Company, St. Louis. These are double-truck, single-end, front-entrance, center-exit, one-man, two-man type. The length over all is 40 ft. 9 in. The total weight is approximately 30,000 lb. When arranged for one-man operation the car will seat 55 passengers, but when operated by two men the seating capacity is only 47.

Track and Line

Miami Beach Electric Company, Miami Beach, Fla., has started work on new tracks which are to be constructed on Washington Avenue, Biscayne Avenue, Ocean Drive and First Street.

Iowa Railway & Light Company, Cedar Rapids, Iowa, has completed a loop in Des Moines which will give a number of towns it serves duplicate service. The loop as completed extends from Boone west to Grand Junction, south to Perry, east to Madrid and north to Boone.

Cleveland Railway, Cleveland, Ohio, has filed plans for the erection of a one-story brick and steel substation at 1004 Central Avenue, to cost $45,000.

Chicago Surface Lines, Chicago, Ill., opened up two extensions recently aggregating about 1 mile. The West Seventy-first Street line was extended from South Western Avenue to California Avenue, making an additional route to Marquette Park. The Western Avenue line was extended from Seventy-first to Seventy-fifth Street with the expectation that it will subsequently extend several miles south into territory now developing.

Johnstown Traction Company, Johnstown, Pa., has completed its 1924 program of track renewals and street improvements at a cost of $239,520. This is the fifth year during which extensive work of this kind has been done by the company. Since the beginning of 1920 more than $850,000 has been spent for street improvements by the railway. The program will be continued next year, but definite plans have not yet been formulated for this work.

Georgia Railway & Power Company, Atlanta, Ga., is putting the finishing touches on a number of paving and track rebuilding projects before the close of the current year. One of the major projects recently on Fair Street necessitated rebuilding the entire roadway area, including the laying of heavier tracks and repaving of the street. A new type of work in which steel cross-ties were used was completed recently on Highland Avenue. Double tracks were installed on Pryor Street and Georgia Avenue and the rebuilding work on Kelly Street was completed. The laying of double track and the construction of a left-hand branch-off nt Whitehall and Cooper Streets and the installation of two new crossings nt Georgia Avenue and Washington Street are other jobs which have been completed, also the improvement program begun some weeks ago on Broad Street.

New Incorporation

St. Louis-Kansas City Short Line Railroad, St. Louis, Mo., has been incorporated. The articles provide for an authorized capitalization of $2,400,000, of which $240,000 has been subscribed. The incorporators are Lee Dunlap and Frank E. Lott, Kansas City, Mo., and Ernest H. Lawhon, Erba D. Smith and William H. White all of St. Joseph, Mo. Mr. Dunlap has stated a standard gage electric railroad is planned, but the company is authorized to use steam, electricity or other motive power. The line would run from St. Louis through Creve Cœur, St. Charles, Warrenton, Jonesboro, New Florence, Columbia and New Franklin, crossing the Missouri River at Arrow Rock and proceed thence through Marshall, Higginsville and Independence to Kansas City. The projected road, 238 miles long, would take 35 miles off the rail mileage between the two terminal cities.

Trade Notes

Economy Electric Devices Company, Chicago, Ill., is calling nttention in a special letter to the aluminum coil which it exhibited at the Atlantic City convention. That coil was subjected to the most severe tests possible. A bare aluminum coil, oxidized by the company's usual process, was mounted on a transformer growler. Under one end of this coil was an alcohol lamp. The other end of the coil was kept saturated with water. A vise in the middle of the coil subjected it to pressure far in excess of any pressure a coil would have to withstand in service. The coil was clear of shorts even with one end soaking wet, the other end sizzling hot, and under pressure sufficient actually to deform the wire. Intentional shorts made on the coil would promptly clear themselves by the passage of the current. In the Economy aluminum field coils aluminum oxide is used as the insulator. A trial of the device is urged.

Rail Welding & Bonding Company, Cleveland, Ohio, announces the partial rearrangement of selling territories and the appointment of the following additional sales representatives: For the eastern Pennsylvania territory, Railway Track Work Company, 3132 E. Thompson Street, Philadelphia; for western Pennsylvania and northern West Virginia, Electrical Engineering & Manufacturing Company, 907 Penn Avenue, Pittsburgh, with branch offices in 330 Union Building, Cleveland, and 604 Mercantile Library Building, Cincinnati, Ohio; for the northern section of Illinois and for Wisconsin, Iowa and Minnesotta, R. Roy Holden, 310 South Michigan Avenue, Chicago; for Louisiana, Mississippi, Alabama, Florida, Georgia, eastern Tennessee, Texas and Oklahoma City, P. W. Wood, 1003 Carondelet Building, New Orleans, La.; for California, A. W. Arlin, 519 Delta Building, Los Angeles, and for the states of Washington and Oregon, Burton R. Stare Company, 619 Fourth Avenue, Seattle, Washington.

Sullivan Machinery Company, Chicago, Ill., has removed its Cleveland office to Room 701, Rockefeller Building, from Room 824 in the same building. The district manager is Ralph T. Stone.

New Advertising Literature

General Electric Company, Schenectady, N. Y., is distributing a publication on lightning arrester grounds which is an elaboration of a paper by H. M. Towne, presented before the Southeastern Division of the N.E.L.A. at Tampa, Fla., on Nov. 20, 1923.

Horne & Ebling Corporation, 50 Church Street, New York, and factory in Jersey City, has listed in a four-page circular devices which it handles under the main heads: Motor and Controller Parts, Car Hardware, Line and Track Equipment, Specialties and Heat Treatment of Steel. Among the products of the company are brakes, malleable and brass castings, watertight crossing bells, junction boxes, case hardened pins, track sanders, car sash fixtures and trolley bases. The company is prepared to design and manufacture special railway devices.

Atlas Lumnite Cement Company, New York, N. Y., has published a 30-page pamphlet in which Lumnite cement is described and its uses illustrated. Instances are reported where Lumnite has proved an advantage in concreting between and along tracks of various electric railways.

Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., has released folder 4586, a single-phase road locomotive for preference freight service. This folder describes the new single-phase locomotive known as the Type L-5, which has recently been placed in service by the Pennsylvania Railroad, and a supplement to the folder describes the L-5-A, d.c. locomotive, which has also just been completed.

Bankers and Engineers

Facts on Electric Car Heaters broadcast from Station CCH

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

Low Wire Temperature *means long life—*

By the use of the *open* coil principle in the electric heating unit, the resistance wire itself operates at a low temperature. In Consolidated Electric Car Heaters there are no red-hot wires. Ample air circulation around the *open coil* keeps the wire cool, and promptly puts the heat in circulation throughout the car. Wrapped snugly around the porcelain insulating tube, the resistance element is proof against vibration damage. As an additional factor of safety, a strong asbestos cord binds the coil securely to the porcelain insulator. Under no circumstances can the coil come in contact with the metal case, and "ground." **26 different types of Consolidated Electric Car Heaters have been inspected and approved by the Underwriters Laboratories maintained by the National Board of Fire Underwriters.**

These points indicate the secret of Consolidated success in the car-heater field. Because of their long life, and freedom from excessive maintenance requirements, Consolidated Electric Car Heaters are most widely known throughout the industry.

Station C C H now signing off until next week when it will broadcast another message.

CONSOLIDATED HEATERS

CONSOLIDATED CAR-HEATING COMPANY

New York ALBANY, N. Y. Chicago

LUMNITE CEMENT

Gets ahead of Cold Weather with SAFETY AND ECONOMY

THE quick work possible with Atlas Lumnite Cement solves the old problem of forestalling winter during concrete construction. When you are in a hustle to clean up the big job before cold weather sets in, Lumnite is the only material to use, because with it you can obtain twenty-eight-day concrete in twenty-four hours without using artificial accelerators.

Atlas Lumnite Cement is a hydraulic cement which develops greater strength at twenty-four hours than that developed by other building cements at twenty-eight days. This high early strength of Lumnite is made possible through its principal ingredient, bauxite, obtained from high-grade aluminum ore.

Lumnite has the particular advantage, in that it can be used in much colder weather than can other cements. It is less subject to frost for two reasons:

First, the rapid hydration or early hardening of Lumnite Cement brings the concrete, in a few hours, to a point in its curing beyond the danger of frost attack.

Second, this rapid hardening, a chemical action, produces very considerable heat in Lumnite Cement concrete. This forms an additional safeguard against the attack of frost.

Lumnite Cement is adapted to the various uses of concrete, and is not "quick-setting." It can be mixed and manipulated in the same manner as Portland Cement and allows the normal time required for mixing and placing in forms.

Lumnite, through its quick hardening, eliminates waste of both material and time. It is the most effective and economical material where cold weather or other emergencies make quick action necessary.

THE ATLAS LUMNITE CEMENT CO.

25 *Broadway*, NEW YORK CITY

2000 First Avenue, Birmingham, Ala. 134 South LaSalle Street, Chicago

LUMNITE was used for this trolley roadbed in Hudson, N. Y. Concrete was placed on the morning of October 25, 1924, and 32-ton trolley cars were put in operation on the new road the morning of October 26th—only 26 hours after completion with LUMNITE.

D.E.R.R.J.

SEND THIS COUPON TODAY

Please send your booklet on Lumnite, also detailed information on Lumnite's use for_____

*Name*_____

*Address*_____

Ebony Asbestos Wood

Installation by the Bureau of Power and Light, Los Angeles, Calif.

THE greatest possible electrical and mechanical safety goes with the attractive appearance of this Ebony Asbestos Wood combined Switch and Bench board, of the Bureau of Power and Light, Los Angeles, California. Ebony Asbestos Wood surpasses all other switchboard materials in dielectric strength and resistance to shock. It is easy to cut and drill.

JOHNS-MANVILLE, Inc., 292 Madison Ave., N.Y.C.
Branches in 62 Large Cities
For Canada: Canadian Johns-Manville Co., Ltd., Toronto

Through — Electrical Materials for Utilities Jobber Contractor and Dealer

JOHNS-MANVILLE

Amafuta

The duty of the Kaffir valet is to make his master shine in society.

—so he covers the boss all over with amafuta (fat).

—which gives the old boy one of those rich mahogany glosses that only those who use Morganite brushes know.

—that gloss you see on the commutator once you get rid of misapplied brushes.

Morganite Brush Co., Inc.

Main Office and Factory:
519 West 38th St., New York

DISTRICT ENGINEERS AND AGENTS

Pittsburgh, Electrical Engineering & Mfg. Co., 909 Penn Ave.
Cincinnati, Electrical Engineering & Mfg. Co., 607 Mercantile Library Building.
Cleveland, Electrical Engineering & Mfg Co., 422 Union Building
Philadelphia, Electric Power Equipment Corp., 412 North 18th St.
Baltimore, O. T. Hall, Sales Engineer, 1926 Edmondson Ave.
Revere, Mass., J. F. Drummey, 75 Pleasant Street.
Los Angeles, Special Service Sales Co., 502 Delta Building
San Francisco, Special Service Sales Co., 202 Russ Building.
Toronto, Can., Railway & Power Engineering Corp., Ltd., 101 Eastern Ave.
Montreal, Can., Railway & Power Engineering Corp., Ltd., 326 Craig St., West.
Winnipeg, Can., Railway & Power Engineering Corp., Ltd., P. O. Box 38.

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, 5 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.

POSITION VACANT

SHOP foreman wanted for electric railway in New England. Give experience, reference, age and salary expected in first letter. P-752, Elec. Ry. Journal, 10th Ave. at 36th St., New York.

POSITIONS WANTED

AUDITOR, broad and thorough experience in financing and accounting; all branches railway, electric and gas utilities, open for engagement. Possess initiative and capable of assuming full control of all accounting matters. PW-758, Electric Railway Journal, Old Colony Bldg., Chicago, Ill.

EXECUTIVE, nine years manager of local street railway system in industrial town seeks larger opportunity. Thirteen years' prior experience in engineering, transportation and executive departments of large trunk line railroad. Has given special study to analyzing transportation problems and operating costs. PW-761, Electric Railway Journal, Real Estate Trust Bldg., Philadelphia, Pa.

SUPERINTENDENT—City or interurban; twelve years' successful experience in maintenance, operation and public relations. PW-757, Electric Railway Journal, 10th Ave. at 36th St., New York.

TRAFFIC and transportation superintendent—Experienced interurban and city railway and bus operation, desire to connect with organization inaugurating bus service. PW-759, Electric Railway Journal, Leader-News Bldg., Cleveland, Ohio.

WANTED

Order for Oak, Car Stock, Cross Ties, Switch Ties, Timber. Have four mills in operation. A good stand of timber, grades guaranteed. Prices right. Let's get acquainted.

ENARC LUMBER MFG. CO.
411 Aonw Bldg., Little Rock, Ark.

WE WANT TO BUY
30—West. 306-C.V.-4
MOTORS
Have you any to offer?
ELECTRIC EQUIPMENT CO.
Commonwealth Bldg., Philadelphia, Pa.

"Searchlight"
is
Quick Action
Advertising

0233

In Small Lots As Well As Large

THERE is a class of rail buyers, occasionally in need of only small tonnages, who are paying a premium on their purchases elsewhere because they believe that we do not seek their patronage.

We maintain a large organization to give efficient service on small orders. Our tremendous volume gives us unequaled buying power and saves our clients money regardless of the tonnage required.

Immense stocks at strategic distributing points provide complete assortments near you. This adds a saving in freight to our already unbeatable prices.

Next time you need rails, let us know your requirements.

We guarantee the same prompt, efficient service to all.

HYMAN-MICHAELS COMPANY
"The House of Dependable Service"
122 South Michigan Avenue, Chicago

Dealers in New and Relaying Rails, Locomotives and Railway Equipment

District Offices: New York, Woolworth Bldg.; St. Louis, Railway Exchange Bldg.; Pittsburgh, First Nat'l Bank Bldg.; San Francisco, 234 Steuart St.
Yards: St. Louis, East Chicago, Ind., McKee's Rocks, Pa., San Francisco.
Cable Address: "Hymanmikel"
World's Largest Distributors of Rails

FOR SALE
Two Single Truck Snow Sweepers
Complete
Ready for operation
Splendid condition
Transit Equipment Co.
Cars — Motors
501 Fifth Avenue, New York

RAILS
New 1 TON or 1000 **Relaying**

FROGS
SWITCHES
SPLICE BARS
BOLTS
NUTS
TIE PLATES
RAIL
BRACES

All Rails and Track Materials shipped subject to inspection and approval at destination.

L.B. Foster Co.
PITTSBURGH-PA
NEW YORK

FOR SALE
Taylor Trucks
4—Complete, 34-in. steel wheels with 8-G.E. 200-C motors, all in first class condition.
Receivers, Morris County Traction Company
Morristown, N. J.

425 TONS—No. 1
80 LB. RELAYING RAILS
EXCEPTIONALLY FINE SHAPE
Immediate Shipment—Low Price
ZELNICKER IN ST. LOUIS

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.

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

Armature Shop Tools
Elec. Service Supplies Co.

Automatic Return Switch Stands
Ramapo Ajax Corp.

Automatic Safety Switch Stands
Ramapo Ajax Corp.

Axles
Bemis Car Truck Co.
Bethlehem Steel Co.
Brill Co., The J. G.
Carnegie Steel Co.
Johnson & Co., J. R.
Laclede Steel Co.
St. Louis Car Co.
Standard Steel Wks.
Westinghouse E. & M. Co.

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

Batteries, Dry
National Carbon Co.

Bearings and Bearing Metals
Bemis Car Truck Co.
Brill Co., J. G., The
General Electric Co.
More-Jones Brass & Metal Co.
St. Louis Car Co.
Westinghouse E. & M. Co.

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

Bells and Gongs
Brill Co., The J. G.
Consolidated Car Heat. Co.
Elec. Service Supplies Co.
St. Louis Car Co.

Bearings, Roller
Norma-Hoffman Bearings Corp.

Boilers
Babcock & Wilcox Co.

Bonding Apparatus
Amer. Steel & Wire Co.
Elec. Service Supplies Co.
Ohio Brass Co.
Railway Track-work Co.

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

Book Publishers
McGraw-Hill Book Co.

Boxes, Switch
Johns-Pratt Co.

Brackets and Cross Arms (See also Poles, Ties, Posts, Etc.)
Elec. Ry. Equipment Co.
Elec. Service Supplies Co.
Hubbard & Co.
Ohio Brass Co.

Brake Adjusters
Brill Co., The J. G.
National Ry. Appliance Co.
Westinghouse Tr. Br. Co.

Brake Shoes
Amer. Br. Shoe & Fdy. Co.
Barbour-Stockwell Co.
Bemis Car Truck Co.
Brill Co., The J. G.
St. Louis Car Co.

Brakes, Brake Systems and Brake Parts
Allis-Chalmers Mfg. Co.
Bemis Car Truck Co.
Brill Co., The J. G.
General Electric Co.
Horne & Ebling Corp.
Johns Manville, Inc.
National Brake Co.
St. Louis Car Co.
Westinghouse Tr. Br. Co.

Brushes, Carbon
General Electric Co.
Jeandron, W. J.
Le Carbone Co.
Morganite Brush Co.
National Carbon Co.
U. S. Graphite Co.
Westinghouse E. & M. Co.

Brushes Graphite
Morganite Brush Co.
National Carbon Co.
U. S. Graphite Co.

Brushes Wire Pneumatic
Ingersoll-Rand Co.

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

Bushings, Case Hardened and Manganese
Bemis Car Truck Co.
Brill Co., The J. G.
Long Co., E. G.
St. Louis Car Co.

Cables. (See Wires and Cables)

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

Carbon Brushes (See Brushes, Carbon)

Cars, Dump
Brill Co., J. G., The
Differential Steel Car Co.
St. Louis Car Co.

Car Lighting Fixtures
Elec. Service Supplies Co.

Car Panel Safety Switches
Consolidated Car Heat. Co.
Westinghouse E. & M. Co.

Cars, Passenger, Freight, Express, etc.
Amer. Car Co.
Brill Co., The J. G.
Kuhlman Car Co., G. C.
McGuire-Cummings Mfg. Co
National Ry. Appliance Co.
St. Louis Car Co.
Wason Mfg. Co.

Cars, Gas, Rail
Brill Co., J. G., The
St. Louis Car Co.

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

Cars, Self-Propelled
Brill Co., J. G., The
General Electric Co.

Car Steps Safety
Irving Iron Wks.

Car Wheels, Rolled Steel
Bethlehem Steel Co.

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

Castings, Gray Iron and Steel
Bemis Car Truck Co.
Fort Pitt Steel Castings Co.
St. Louis Car Co.
Standard Steel Wks.

Castings, Malleable and Brass
Amer. Br. Shoe & Fdy. Co.
Bemis Car Truck Co.
Fort Pitt Steel Castings Co.
Horne & Ebling Corp.
St. Louis Car Co.

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

Catenary Construction
Archbold-Brady Co.

Ceilings, Plywood, Panels
Haskelite Mfg. Co.

Cement Products
Atlas Lumnite Co.

Chains, Parlor Car
Heywood-Wakefield Co.

Change Carriers
Cleveland Fare Box Co.

Circuit-Breakers
Anderson, A. & J. M. Mfg. Co.
General Electric Co.
Westinghouse E. & M. Co.

Clamps and Connectors for Wires and Cables
Elec. Ry. Equipment Co.
Elec. Ry. Improvement Co.
Elec. Service Supplies Co.
General Electric Co.
Hubbard & Co.
Ohio Brass Co.
Westinghouse E. & M. Co.

Cleaners and Scrapers Track (See also Snow-Plows, Sweepers and Brooms)
Brill Co., The J. G.
St. Louis Car Co.

Clusters and Sockets
General Electric Co.

Coal and Ash Handling (See Conveying and Hoisting Machinery)

Coil Banding and Winding Machines
Elec. Service Supplies Co.

Coils Armature and Field
General Electric Co.
Westinghouse E. & M. Co.

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

Coin Counting Machines
Cleveland Fare Box Co.
Intern'l Register Co.
Johnson Fare Box Co.

Coin Sorting Machines
Cleveland Fare Box Co.

Coin Wrappers
Cleveland Fare Box Co.

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

Commutator Truing Devices
General Electric Co.

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

Compounds (Insulating & Splicing)
Johns-Manville, Inc.

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

Concrete Flooring Surface
Irving Iron Wks.

Concrete Reinforcing Bars
Laclede Steel Co.

Condenser Papers
Irvington Varnish & Ins. Co

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

Connectors, Solderless
Frankel Connector Co.
Westinghouse E. & M. Co.

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

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

Controller Regulators
Elec. Service Supplies Co.

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

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

Copper Wire
Anaconda Copper Mining Co.

Cord, Bell, Trolley, Register
Brill Co., The J. G.
Elec. Service Supplies Co.
Internat'l Register Co., The
Roebling's Sons Co., John A.
St. Louis Car Co.
Samson Cordage Works

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

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

Cross Arms (See Brackets)

Crossing Foundations
International Steel Tie Co.

Crossing, Frog & Switch
Ramapo Ajax Corp.

Crossing, Manganese
Bethlehem Steel Co.
Ramapo Ajax Corp.

Crossings
Ramapo Ajax Corp.

Crossings, Track (See Track, Special Work)

Crossings, Trolley
Ohio Brass Co.

Curtains & Curtain Fixtures
Brill Co., The J. G.
Curtain Supply Co.
Elec. Service Supplies Co.
Morton Mfg. Co.
St. Louis Car Co.

Dealer's Machinery
Elec. Equipment Co.
Hyman-Michaels Co.
Transit Equipment Co.

Derailing Devices (See also Track Work)

Derailing Switches
Ramapo Ajax Corp.

Destination Signs
Elec. Service Supplies Co.

Detective Service
Wish-Service, P. Edward

Door Operating Devices
Brill Co., The J. G.
Consolidated Car Heat. Co.
General Electric Co.
Nat'l Pneumatic Co., Inc.
St. Louis Car Co.

Doors & Door Fixtures
Brill Co., The J. G.
Consolidated Car Heat. Co.
General Electric Co.
Morton Mfg. Co.

Doors, Folding Vestibule
Nat'l Pneumatic Co., Inc.
Safety Car Devices Co.

Drills, Track
Amer. Steel & Wire Co.
Elec. Service Supplies Co.
Ingersoll Rand Co.
Ohio Brass Co.

Dryers, Sand
Elec. Service Supplies Co

Ears
Ohio Brass Co.

Ebony Asbestos Wood
Johns-Manville, Inc.

Electrical Wires and Cables
Amer. Electrical Works
Amer. Steel & Wire Co.
Roebling's Sons & Co., J. A.

Electric Grinders
Railway Track-work Co.
Western Electric Co.

Electrodes, Carbon
Railway Track-work Co.

Electrodes, Steel
Railway Track-work Co.

Engines Gas, Oil or Steam
Ingersoll Rand Co.

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

Engineering Equipment Engineering Co.

Engines, Gas, Oil or Steam
Allis-Chalmers Mfg. Co.
Westinghouse E. & M. Co.

Fare Boxes
Cleveland Fare Box Co.
Johnson Fare Box Co.
Nat'l Ry. Appliance Co.

Fare Registers
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.
Elec. Service Supplies Co.
St. Louis Car Co.

Fibre and Fibre Tubing
Johns-Manville, Inc.
Westinghouse E. & M. Co.

Field Coils (See Coils)

Fire Extinguishers
Johns-Manville, Inc.

Floodlights
Elec. Service Supplies Co.

Flooring Composition
Johns-Manville, Inc.

Flooring, Fireproof
Irving Iron Wks.

Flooring, Non-Slipping
Irving Iron Wks.

Flooring, Open Steel
Irving Iron Wks

Flooring, Steel Subway
Irving Iron Wks.

Flooring Ventilating
Irving Iron Wks.

Forgings
Brill Co., J. G., The
Standard Steel Wks.

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

Frogs, Track (See Track Work)

Frogs, Trolley
Ohio Brass Co.

Fuses and Fuse Boxes
Consolidated Car Heat.
General Electric Co.
Westinghouse E. & M.

Fuses, Cartridge, Non-Refillable & High Voltag
Johns-Pratt Co.

Fuses, Refillable
General Electric Co.
Johns-Manville, Inc.
Johns-Pratt Co.

Galvanizers, Hot Dip
Jos. P. Cattie & Bros

Gaskets
Johns-Manville, Inc
Westinghouse Tr. Br.

Gas Producers
Westinghouse E. & M.

Gas-Electric Cars
General Elec. Co.
Westinghouse E. & M.

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

Gear Blanks
Bethlehem Steel Co
Brill Co., J. G., The
Standard Steel Wks

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

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

Generating Sets, Gas-Electric
General Electric Co.

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

Girder Rails
Bethlehem Steel Co.
Lorain Steel Co.

Gong (See Bells and Gongs

Grating Steel Subway
Irving Iron Wks

Greases (See Lubricants)

Grinders and Grind Supplies
Indianpolis Switch & Fro Co.
Railway Track-work Co

Grinders, Portable
Railway Track-work Co.

Grinders, Portable Electric
Railway Track-work Co

Grinding Bricks and Wheels
Railway Track-work Co

Guard Rail Clamps
Ramapo Ajax Corp.

Guard Rails, Tee Rail & Manganese
Ramapo Ajax Corp.

Guards, Trolley
Elec. Service Supplies Co
Ohio Brass Co.

Hammers, Pneumatic
Ingersoll Rand Co.

Harps, Trolley
Elec. Service Supplies Co
More-Jones Brass Metal Co
Nuttall Co., R. D.
Star Brass Works
Thornton Trolley Wheel C

Headlights
Elec. Service Supplies Co
General Eelctric Co.
Ohio Brass Co.
St. Louis Car Co.

Headlining
Haskelite Mfg. Co
Panelyte Co.

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

Heaters, Car, Hot Air and Water
Elec. Service Supplies Co.
Smith Heater Co., Peter

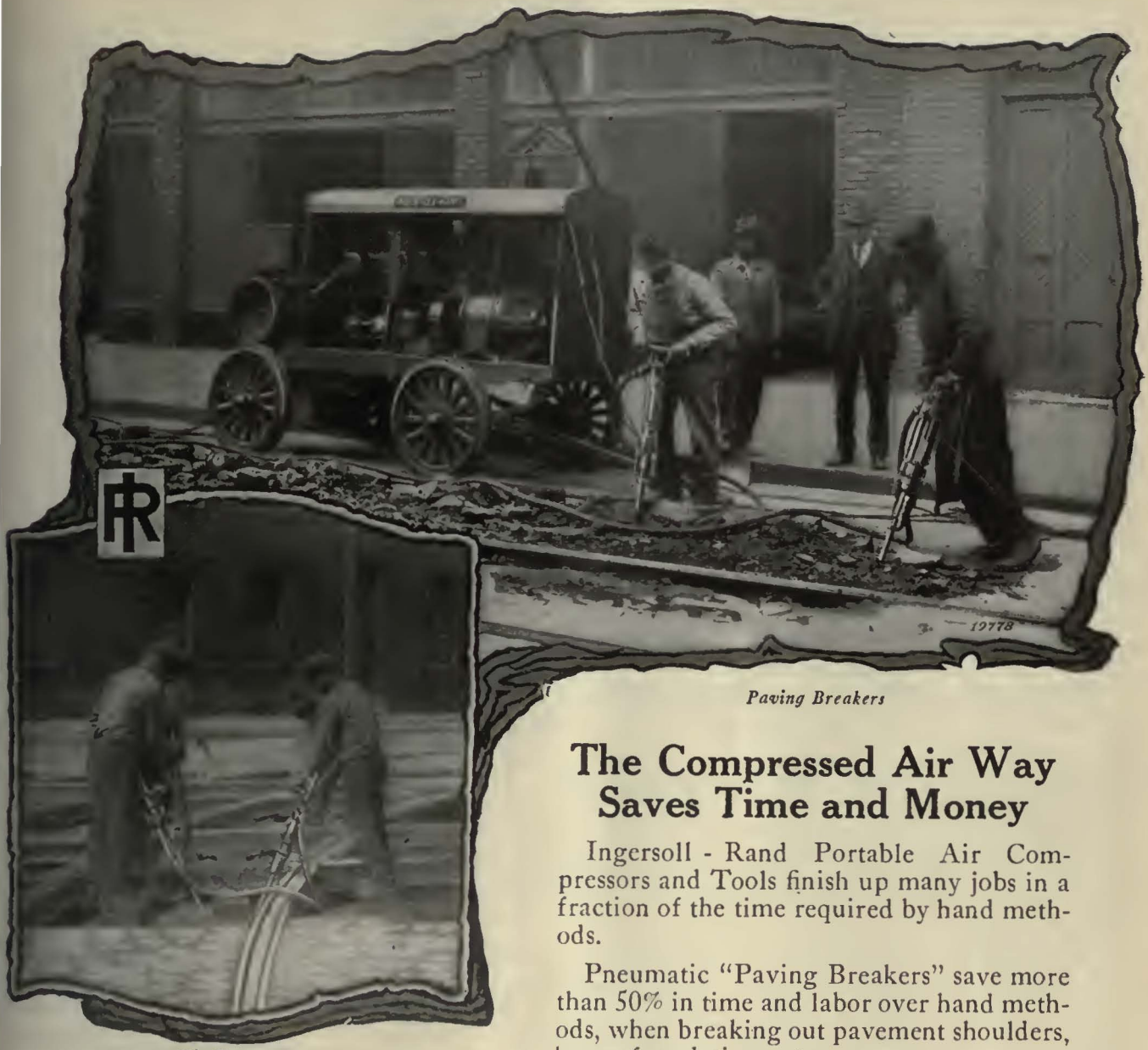
Helmets—Welding
Railway Track-work Co.

Hoists, Portable
Ingersoll Rand Co.

Hydraulic Machinery
Allis-Chalmers Mfg. Co.

Industrial Flooring
Johns-Manville, Inc

Instruments Measuring, Testing and Recording
Elec. Service Supplies Co
General Electric Co.
Johns-Pratt Co.
Westinghouse E. & M. Co



Paving Breakers

Tie Tampers

The Compressed Air Way Saves Time and Money

Ingersoll - Rand Portable Air Compressors and Tools finish up many jobs in a fraction of the time required by hand methods.

Pneumatic "Paving Breakers" save more than 50% in time and labor over hand methods, when breaking out pavement shoulders, heavy foundations, etc.

Pneumatic Tie Tampers enable four men to tamp more track and do it better than twelve to sixteen men using hand methods.

Other air tools are also used to save money on various jobs, making the portable compressor outfit a most important factor in reducing track costs. Ask for complete information on the savings made with portable air-power units.

Ingersoll-Rand Track Tools include—

Paving Breakers,
Tie Tampers,
Grinders,
Riveters,
Chippers,
Spike Drivers

INGERSOLL-RAND COMPANY, 11 Broadway, New York

Offices in Principal Cities the World Over

For Canada refer Canadian Ingersoll-Rand Co., Limited, 260 St. James Street, Montreal, Quebec

Ingersoll-Rand

Insulating Cloth, Paper and Tape
General Electric Co.
Irvington Varnish & Ins. Co.
Johns-Manville, Inc.
Mitchell-Rand Mfg. Co.
Okonite Co.
Stand. Underground Cable Co.
Westinghouse E. & M. Co.

Insulating, Silk & Varnish
Irvington Varnish & Ins. Co.

Insulation (See also Paints)
Electric Ry. Equipment Co.
Elec. Service Suplies Co.
General Electric Co.
Irvington Varnish & Ins. Co.
Johns-Manville, Inc.
Mitchell-Rand Mfg. Co.
Okonite Co.
Westinghouse E. & M. Co.

Insulation Slots
Irvington Varnish & Ins. Co.

Insulators (See also Line Materials)
Elec. Ry. Equipment Co.
Elec. Service Supplies Co.
General Electric Co.
Irvington Varnish & Ins Co.
Ohio Brass Co.
Western Electric Co.
Westinghouse E. & M. Co.

Insulator Pins
Elec. Service Supplies Co.
Hubbard & Co.

Insulators, High Voltage
Lapp Insulator Co., Inc.

Insurance, Life
Prudential Insurance Co.

Jacks (See also Cranes, Hoists and Lifts)
Elec. Service Supplies Co.

Joints, Rail
(See Rail Joints)

Journal Boxes
Bemis Car Truck Co.
Brill Co., J. G.
Fort Pitt Steel Castings Co.
St. Louis Car Co.

Junction Boxes
Std. Underground Cable Co.

Lamps, Guards and Fixtures
Elec. Service Supplies Co.
General Electric Co.
Westinghouse E. & M. Co.

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

Lamps, Signal and Marker
Nichols-Lintern Co.
Ohio Brass Co.

Lanterns, Classification
Nichols-Lintern Co.

Lightning Protection
Elec. Service Sup. Co.
General Electric Co.
Ohio Brass Co.
Shaw, Henry M.
Westinghouse E. & M. Co.

Line Material (See also Brackets, Insulators, Wires, etc.)
Archbold-Brady Co.
Electric Ry. Equipment Co.
Elec. Service Sup. Co.
General Electric Co.
Hubbard & Co.
Johns-Manville, Inc.
More-Jones Brass & Metal Co.
Ohio Brass Co.
Westinghouse E. & M. Co.

Locomotives, Electric
General Electric Co.
McGuire-Cummings Mfg. Co
St. Louis Car Co.
Westinghouse E. & M. Co.

Locomotive Oil Engine, Electric Driver
Ingersoll Rand Co.

Lubricating Engineers
Galena Signal Oil Co.
Universal Lubricating Co.

Lubricants, Oil and Grease
Galena Signal Co.
Universal Lubricating Co.

Manganese Parts
Bemis Car Truck Co.

Manganese Steel Castings
Wm. Wharton, Jr. & Co.

Manganese Steel Guards Rails
Ramapo Ajax Corp.

Manganese Steel, Special Track Work
Bethlehem Steel Co.

Manganese Steel Switches Frogs & Crossings
Bethlehem Steel Co.
Ramapo Ajax Corp.

Meters (See Instruments)

Molding, Metal
Allis-Chalmers Mfg. Co.

Motor Buses (See Buses, Motor)

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

Motors and Generators, Sets
Allis-Chalmers Mfg. Co.
General Electric Co.

Motormen's Seats
Brill Co., J. G.
Elec. Service Sup. Co.
Heywood-Wakefield Co.
St. Louis Car Co.
Wood Co., Chas. N.

Nuts and Bolts
Barbour-Stockwell Co.
Bemis Car Truck Co.
Bethlehem Steel Co.
Hubbard & Co.

Oils (See Lubricants),

Omnibuses (See Buses, Motor)

Oxygen
International Oxygen Co.

Oxy-Acetylene (See Cutting Apparatus, Oxy-Acetylene)

Packing
Elec. Service Supplies Co.
Johns-Manville, Inc.
Westinghouse E. & M. Co.

Paints and Varnishes (Insulating)
Irvington Varnish & Ins. Co.
Mitchell-Rand Mfg. Co.

Paints and Varnishes for Woodwork
National Ry. Appliance Co

Pavement Breakers
Ingersoll Rand Co.

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

Pickup, Trolley Wire
Elec. Service Supplies Co.
Ohio Brass Co.

Pinion Pullers
Elec. Service Supplies Co
General Electric Co.
Wood Co., Chas. N.

Pinions (See Gears)

Pins, Case Hardened, Wood and Iron
Bemis Car Truck Co.
Elec. Service Sup. Co.
Ohio Brass Co.
Westinghouse Tr. Brake Co.

Pipe Fittings
Standard Steel Wks.
Westinghouse Tr. Brake Co.

Planers (See Machine Tools)

Plates for Tee Rail Switches
Ramapo Ajax Corp.

Pliers, Rubber Insulated
Elec. Service Sup. Co.

Pneumatic Tools
Ingersoll Rand Co.

Pole Line Hardware
Bethlehem Steel Co.
Ohio Brass Co.

Poles, Metal Street
Elec. Ry. Equipment Co.
Hubbard & Co.

Pole Reinforcing
Hubbard & Co.

Poles & Ties Treated
Bell Lumber Co.

Poles, Ties, Posts, Piling & Lumber
Bell Lumber Co.

Poles, Trolley
Bell Lumber Co.
Elec. Service Supplies Co.
Nuttall Co., R. D.

Poles, Tubular Steel
Elec. Ry. Equipment Co.
Elec. Service Sup. Co.

Porcelain Special High Voltage
Lapp Insulator Co., Inc.

Potheads
Okonite Co.

Power Saving Devices
National Ry. Appliance Co
Railway Improvement Co.

Pressure Regulators
General Electric Co.
Ohio Brass Co.
Westinghouse E. & M. Co.

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

Pumps Vacuum
Ingersoll Rand Co.

Punches, Ticket
Intern'l Register Co., The
Wood Co., Chas. N.

Rail Braces & Fastenings
Ramapo Ajax Corp

Rail Grinders (See Grinders)

Rail Joints
Carnegie Steel Co.

Rail Joints—Welded
Lorain Steel Co.

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

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

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

Railway Safety Switches
Consolidated Car Heat. Co.
Westinghouse E. & M. Co.

Rail Welding
Railway Track-work Co.

Rattan
Brill Co., The J. G.
Elec. Service Supplies Co.
Heywood-Wakefield Co.
McGuire-Cummings Mfg. Co.
St. Louis Car Co.

Registers and Fittings
Brill Co., The J. G.
Elec. Service Supplies Co.
Intern'l Register Co., The
Rooke Automatic Register Co.
St. Louis Car Co.

Reinforcement, Concrete
Amer. Steel & Wire Co.

Repair Shop Appliances (See also Coil Handling and Winding Machines)
Elec. Service Supplies Co.

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

Replacers, Car
Elec. Service Sup. Co.

Resistances
Consolidated Car Heat. Co.

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

Retrievers, Trolley (See Catchers and Retrievers, Trolley)

Rheostats
General Electric Co.
Westinghouse E. & M. Co.

Roofing Asbestos
Johns-Manville, Inc.

Roofing Car
Pantasote Co., Inc.

Roofs
Haskelite Mfg. Co.

Sanders, Track
Brill Co., The J. G.
Elec. Service Sup. Co.
Horne & Ebling Corp.
Nichols-Lintern Co.
Ohio Brass Co.
St. Louis Car Co.

Sash Fixtures, Car
Brill Co., The J. G.
St. Louis Car Co.

Scrapers, Track (See Cleaners and Scrapers, Track)

Screw Drivers, Rubber Insulated
Elec. Service Sup. Co.

Seats, Bus
Brill Co., J. G., The
Heywood-Wakefield Co.
St. Louis Car Co.

Seats, Car (See also Rattan)
Brill Co. The J. G.
Heywood-Wakefield Co.
St. Louis Car Co.

Seating Materials
Brill Co., J. G.
Heywood-Wakefield Co.
Pantasote Co., Inc.
St. Louis Car Co.

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

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

Shovels
Brill Co., The J. G.
Hubbard & Co.

Side Bearings (See Bearings, Center and Side)

Signals, Car Starting
Consolidated Car Heat Co.
Elec. Service Sup. Co.
Nat'l Pneumatic Co., Inc.

Signals, Indicating
Nichols-Lintern Co.

Signal Systems, Highway Crossing
Nachod Signal Co., Inc.
Wood Co., Chas N.

Signal Systems, Block
Elec. Service Sup. Co.
Nachod Signal Co., Inc.

Slack Adjusters (See Brake Adjusters)

Sleet Wheels and Cutters
Anderson Mfg. Co., A. & J. M.
Elec. Ry. Equipment Co.
Elec. Ry. Improvement Co.
Elec. Service Supplies Co.
More-Jones Brass & Metal Co.
Nuttall Co., R. D.

Smokestacks, Car
Nichols-Lintern Co.

Sockets & Receptacles
National Metal Molding Co.

Snow Sweepers, Rattan
Heywood-Wakefield Co

Snow-Plows, Sweepers and Brooms
Brill Co., The J. G.
Consolidated Car Fender Co
McGuire-Cummings Mfg. Co.
St. Louis Car Co.

Sockets and Receptacles
Johns-Manville, Inc.

Soldering and Brazing Apparatus (See Welding Processes and Apparatus)
Irvington Varnish & Ins. Co.

Solderless, Connector
Frankel Connector Co.

Special Adhesive Papers
Irvington Varnish & Ins. Co.

Special Trackwork
Bethlehem Steel Co.
Lorain Steel Co.

Spikes
Amer. Steel & Wire Co.

Splicing Compounds
Westinghouse E. & M. Co.

Splicing Sleeves (See Clamps and Connectors)

Springs, Car and Truck
Amer. Steel & Wire Co.
Bemis Car Truck Co.
Brill Co., The J. G.
Fort Pitt Spring & Mfg. Co.
St. Louis Car Co.
Standard Steel Wks.

Sprinklers, Track and Road
Brill Co., The J. G.
McGuire-Cummings Mfg. Co.
St. Louis Car Co.

Stair Steps, Safety
Irving Iron Wks.

Steel and Steel Products
Carnegie Steel Co.

Steps, Car
Brill Co., J. G., The
Morton Mfg. Co.

Stokers, Mechanical
Babcock & Wilcox Co.
Westinghouse E. & M. Co.

Stop Signals
Nichols-Lintern Co.

Storage Batteries (See Batteries, Storage)

Strain, Insulators
Anderson, A. & J. M. Mfg. Co.
Ohio Brass Co.

Strand
Roebling's Sons Co., J. A.

Steps, Car, Sanitary
Railway Improvement Co.

Subway Boxes
Johns-Pratt Co.

Superheaters
Babcock & Wilcox Co.

Sweepers, Snow (See Snow Plows, Sweepers and Brooms)

Switch Boxes
Johns-Manville, Inc.

Switches, Safety
Johns-Pratt Co.

Switches, Selector
Nichols-Lintern Co.

Switches, Tee Rail
Ramapo Ajax Corp.

Switches, Track (See Track Special Work)

Switches and Switchboards
Elec. Service Supplies Co.
General Electric Co.
Westinghouse E. & M. Co.

Tamper Tie
Ingersoll-Rand Co.
Railway Track-work Co.

Tapes and Cloths (See Insulating Cloth, Paper and Tape)

Tee Rail Special Track Work
Bethlehem Steel Co.
Ramapo Ajax Corp.

Telephones and Parts
Elec. Service Supplies Co.

Terminals, Cable
Std. Underground Cable Co

Testing Instruments (See Instruments, Electrical Measuring, Testing, etc.)

Thermostats
Consolidated Car Heat. Co.
Gold Car Heat. & Ltg. Co.
Railway Utility Co.
Smith Heater Co., Peter

Ticket Choppers & Destroyers
Elec. Service Supplies Co

Tickets & Transfers
Globe Ticket Co.

Ties, All-Metal
Metal Safety R. R. Tie Co

Ties, Mechanical
Dayton Mechanical Tie Co.

Ties and Tie Rods, Steel
Barbour-Stockwell Co.
Carnegie Steel Co.
International Steel Tie Co.

Ties, Wood Cross (See Poles, Ties, Posts, etc.)

Tool Steel
Bethlehem Steel Co.

Tools, Track & Miscellaneous
Amer. Steel & Wire Co.
Elec. Service Supplies Co.
Hubbard & Co
Railway Track-work Co.

Torches, Acetylene (See Cutting Apparatus)

Towers and Transmission Structures
Archbold-Brady Co.
Westinghouse E. & M. Co.

Track Grinders
Railway Track-work Co.

Trackless Trolley Cars
Brill Co., J. G., The
St. Louis Car Co.

Track, Special Work
Barbour-Stockwell Co.
Bethlehem Steel Co.
Ramapo Ajax Corp.

Transfer (See Tickets)

Transfer Tables
American Bridge Co.

Transformers
Allis-Chalmers Mfg. Co.
General Electric Co.
Westinghouse E. & M. Co.

Treads, Safety, Stair, Car Step
Morton Mfg. Co.

Trolley Bases
Elec. Service Supplies Co
General Electric Co.
More-Jones Brass & Metal Co.
Nuttall Co., R. D.
Ohio Brass Co.

Trolley Bases, Retrieving
Elec. Service Supplies Co.
Nuttall Co., R. D.
Ohio Brass Co .

Trolley Buses
Brill Co., The J. G.
General Electric Co.
Westinghouse E. & M. Co

Trolley Material, Overhead
Anderson, A. & J. M. Mfg. Co.
Elec. Service Supplies Co.
More-Jones Brass & Metal Co.
Ohio Brass Co.

Trolley Wheel Bushings
More-Jones Brass & Metal Co.

Trolley Wheels & Harps
More-Jones Brass & Metal Co.
Thornton Trolley Wheel Co.

Trolley Wheels (See Wheels, Trolley)

Trolley Wire
Amer. Electrical Works
Amer. Steel & Wire Co.
Anaconda Copper Min. Co.
Roebling's Sons Co., J. A.

Trucks, Car
Bemis Car Truck Co.
Brill Co., The J. G.
McGuire-Cummings Mfg Co.
St. Louis Car Co.
Taylor Elec. Truck Co.

Tubing, Yellow & Black Flexible Varnish
Irvington Varnish & Ins. Co.

Turbines, Steam
Allis-Chalmers Mfg., Co.
General Electric Co.
Westinghouse E. & M. Co.

Turbines, Water
Allis-Chalmers Mfg. Co.

Turnstiles
Elec. Service Supplies Co.
Perey Mfg. Co., Inc.

Valves
Ohio Brass Co
Westinghouse Tr. Br. Co.

Varnished Papers & Silks
Acme Wire Co.
Irvington Varnish & Ins. Co.

Ventilators, Car
Brill Co., The J. G
Nat'l Ry. Appliance Co.
Nichols-Lintern Co.
Railway Utility Co.
St. Louis Car Co.

Welded Rail Joints
Alumino-Thermic Corp.
Ohio Brass Co.
Railway Track-work Co.

Welders, Portable Electric
Ohio Brass Co.
Railway Track-work Co.

Welding & Cutting Tools
International Oxygen Co.

Welding Processes and Apparatus
Alumino-Thermic Corp.
General Electric Co.
International Oxygen Co.
Ohio Brass Co.
Railway Track-work Co
Westinghouse E. & M Co

Welding Steel
Railway Track-work Co.

Wheel Guards (See Fenders and Wheel Guards)

Wheel Presses (See Machine Tools)

Wheels, Car, Cast Iron
Bemis Car Truck Co.
Carnegie Steel Co.
Griffin Wheel Co

Wheels Car Steel & Steel Tire
Standard Steel Wks

Wheels, Wrought Steel
Carnegie Steel Co.

Wheels, Trolley
Elec. Ry. Equipment Co
Elec. Service Supplies Co.
General Electric Co
More-Jones Brass & Metal Co.
Nuttall Co., R. D
Star Brass Works

Whistles, Air
General Electric Co.
Ohio Brass Co.
Westinghouse E. & M. Co

Wire Rope
Roebling's Sons Co., J. A

Wires and Cables
Amer. Electrical Works
Amer. Steel & Wire Co.
Anaconda Copper Min. Co.
General Electric Co.
Okonite Co.
Roebling's Sons Co., J. A
Std. Underground Cable Co.
Westinghouse E. & M Co

ALPHABETICAL INDEX TO ADVERTISEMENTS

AURORA, ELGIN AND FOX RIVER ELECTRIC COMPANY
AURORA, ILLINOIS

September 4, 1924.

MR. A.P. JENKS.
Railway Department,
General Electric Co.,
Illinois Merchants Bank Bldg.,
Chicago, Illinois.

Dear Mr. Jenks:-

Noticing your adv. on the back cover of the Electric Railway Journal, August 30th issue, where your company very graciously used photographs of our cars, I thought perhaps it would be interesting for you to know that we have now had our city cars, which are equipped with the GE-264 motors, in operation one year, each car averaging approximately 4200 miles per month. Our interurbans with the GE-265 motors have only been in operation approximately nine months, averaging 5000 miles per month. Now that our summer business is nearly over, we are taking down all motors, making a complete and thorough inspection, cleaning all parts. I am certain it will be interesting to your company to know that we have not as yet had one failure in any of the GE-264 motors and only one failure in the GE-265 motors, this being occasioned by the motorman's mis-use when stuck in a snow drift with one pair of trucks off track last February.

To me this is a wonderful record, where equipment on forty-seven cars has stood up as this equipment has and not suffered one failure of any description. If this information is of any value to you, you may use these figures to whatever extent you may desire.

With kindest personal regards,

I beg to remain,

Yours very truly,

GENERAL MANAGER.

More Modernization Results

G-E modern equipment on this middle-west road is living up to the high standard it has set on many other progressive properties.

General Electric Company
Schenectady, N. Y.

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