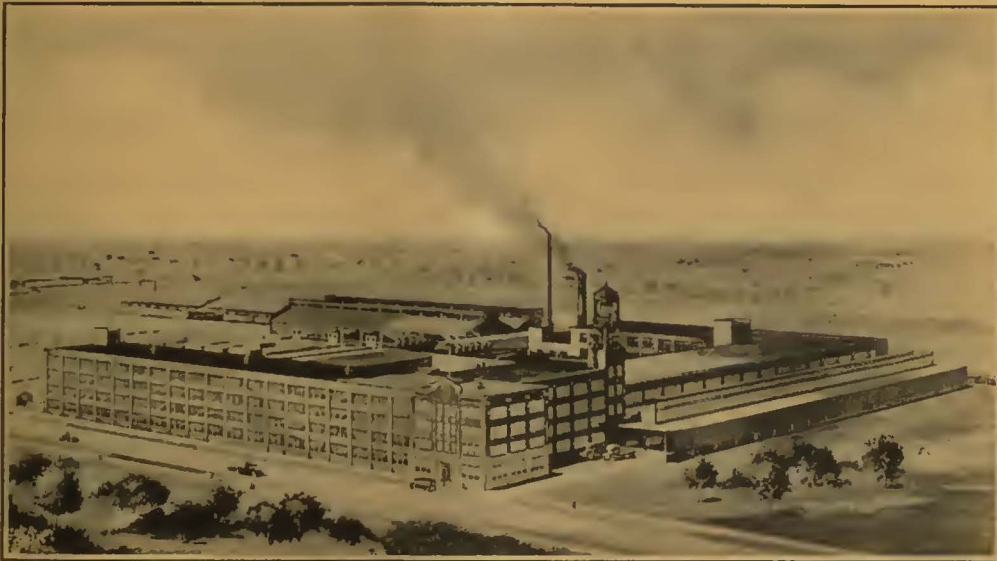


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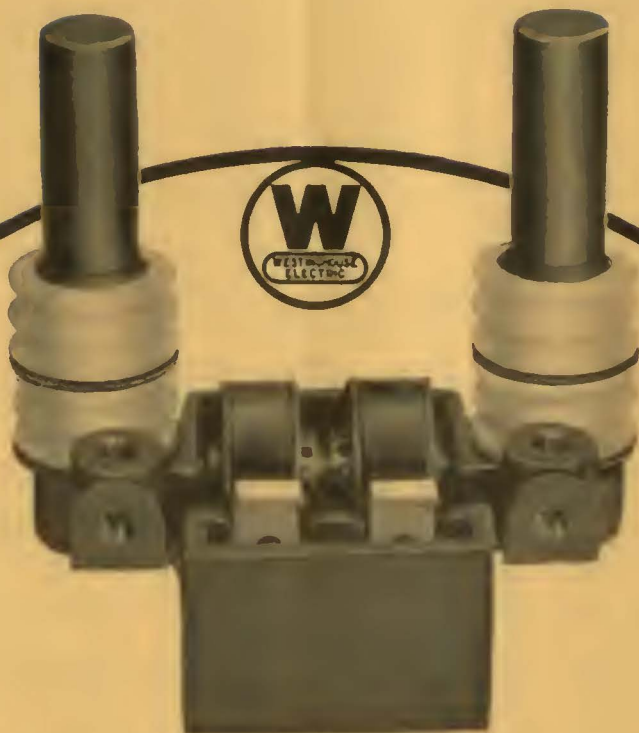
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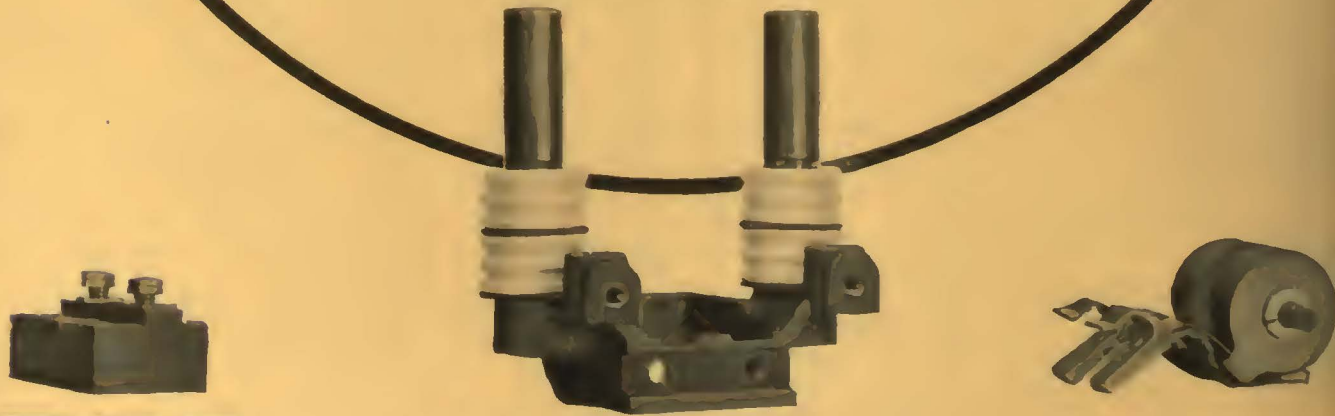


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ACCORDING to popular theory the ostrich sticks his head in the sand when he is frightened, and thinks that because he cannot see he cannot be seen. It would be just as effective, or ineffective, if he simply closed his eyes, although that really would accomplish nothing except to satisfy his silly ostrich mind.

Some people are like the ostrich. They close their eyes to what they don't want to see and then seem to think that it does not exist.

The JOURNAL does not believe in imitating the ostrich. In the electric railway industry things sometimes occur which are rather disheartening. But it does no good to ignore them. On the contrary, there may be a valuable lesson in them for the future.

In our opinion if a thing is true it's of interest to the industry. Acting on this theory we publish all kinds of news, good or bad, cheerful or discouraging. This, we believe, our readers have a right to expect. Happily the items of bad news nowadays are well-nigh lost in the mass of good news.

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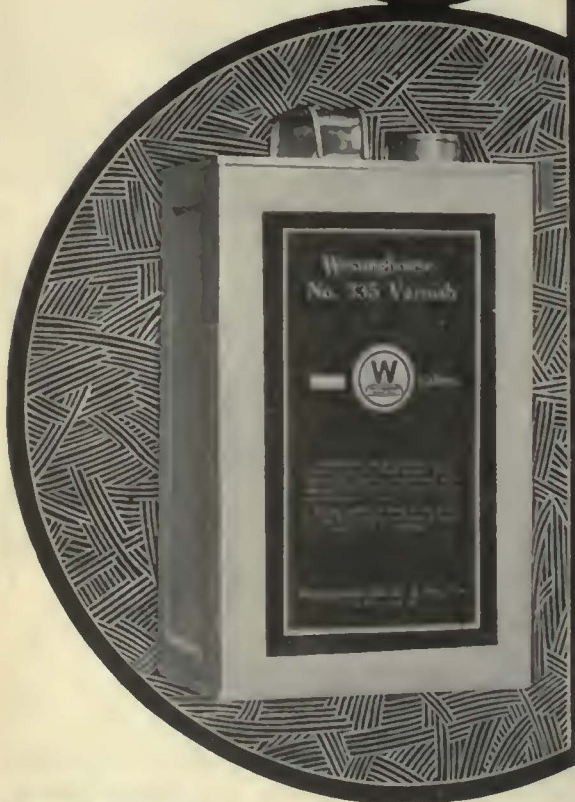
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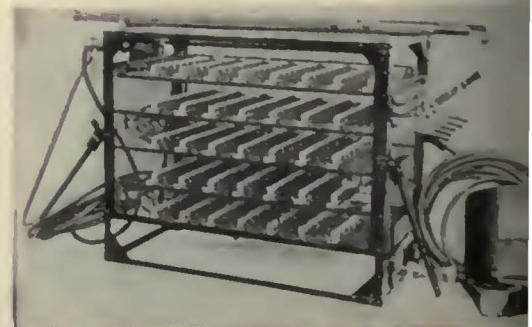
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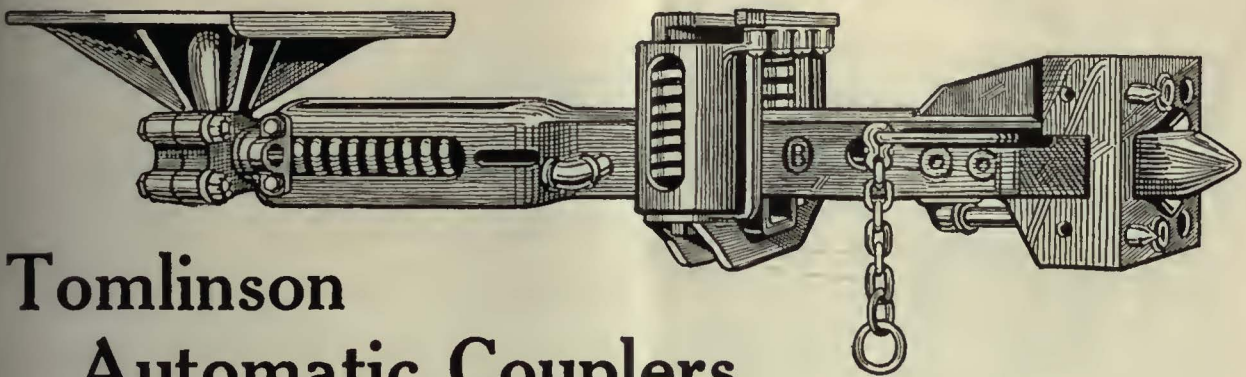
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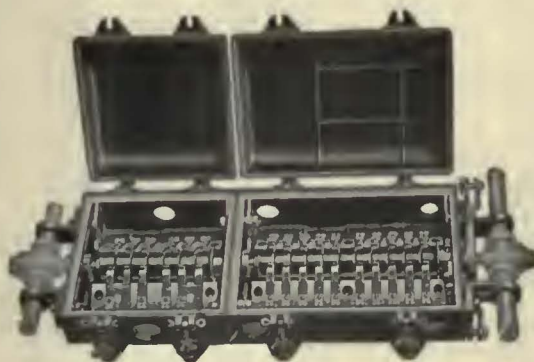
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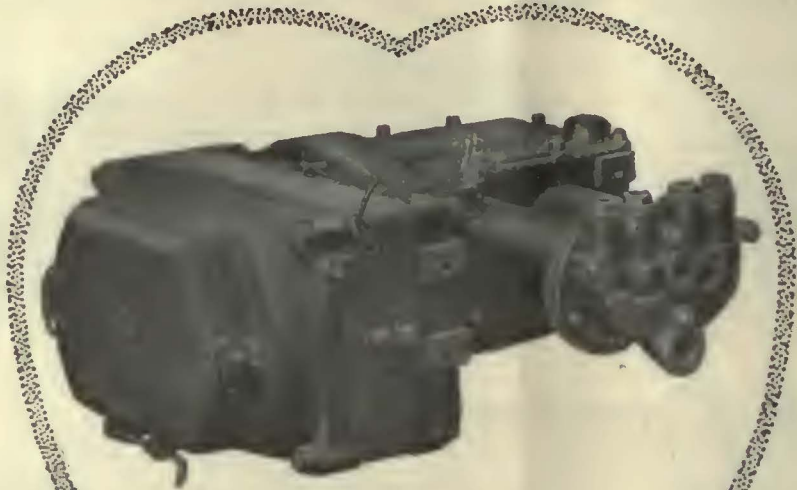
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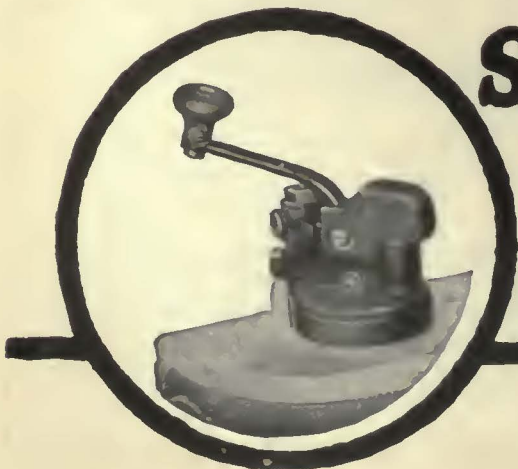
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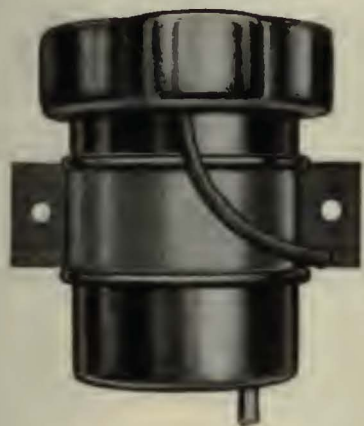
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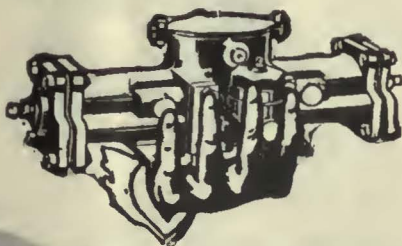
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Decatur has a street car line of 17.7 miles. The 11.9 miles of bus routes which were added gives the city *complete service* covering 29.6 miles.

Both the buses and the street cars run to the business center of the city at Lincoln Square. The buses are not used simply as feeders, but where the bus and street car meet, transfer privileges are made easy and convenient.

C. A. Wait, writing in "Current Topics" published in the interest of the employees of the Illinois Power & Light Corporation, says:

"Whether or not the bus service is making a profit remains to be figured out, but it has increased the patronage on the street cars and produced its own direct revenue. That much is certain. To the citizens of Decatur, the addition of the buses with transfer privileges to the street cars seems to be the solution of the transportation problem in the small city".

Mack buses are playing their part in Decatur to co-ordinate bus and railway, just as they are co-ordinating bus and railway for many railway properties. They are distinguished

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A specially designed low bus chassis.

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- Cab Heaters
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New York, Saturday, November 29, 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 22

Separate Accounts Desirable for Combined Utilities

A TENDENCY has been in evidence in some quarters for railway men to rejoice in the fact that their particular companies were financially associated with and under the same general management as electric light and power companies. The reason for taking satisfaction in this arrangement was the idea that the electric light company would probably make a big profit and could make good whatever losses the railway might incur. A safeguard of this kind may have merit in the eyes of those engaged in marketing the railway securities. It is generally admitted, however, that such a combination, where the profitable department carries the unprofitable one, is unsound as an economic proposition. Aside from that fact, there are also practical difficulties which are sometimes overlooked.

It is very difficult to imbue the employees of a railway associated with a lighting company with the idea that they must unceasingly try for efficient operation. Their attitude seems to be that the electric company will foot the bill and they need not worry. In numerous cases combined railway and electric companies are more careless and slipshod in their methods than are the railways which must depend exclusively on their own resources.

Where a combination of utilities exists under one management, best results come with separate books for the individual services. Not only is this advisable for executive purposes, but the individual figures are available for use in advising both the employees and the public of the earnings status of each utility.

Depreciation Is Real and Must Be Recognized

THE brief on the subject of depreciation submitted some time ago in behalf of the steam railroads in their case before the Interstate Commerce Commission shows a studied effort to prepare an argument to avoid setting up depreciation funds. This was made on purely legal grounds without giving sufficient weight to engineering facts. The argument is that the average American trunk line is so large and so diversified that any depreciation that may have accrued is balanced by new construction. In other words, they claim the net result is that there is no depreciation. This does not square with the position taken by the American Electric Railway Association that a reserve for depreciation should be set up.

As a matter of fact, depreciation is something that does exist. A locomotive that has seen service for 30 years cannot be as good as ever, regardless of the quality of repair work done on it. Maybe it will function well enough to haul trains, but it is not the machine

that it was when purchased. No amount of repair, be it ever so good, will suffice to put it in that condition.

Then there is the question of adequacy. This is so closely bound up with depreciation that it is difficult to separate the two. There comes a time when it no longer pays to patch up the old machine, because there is available on the market something that will do the work so much better that it is folly to spend the money necessary to keep the old machine in working order. The old machine may be "in 100 per cent condition" today, as the steam road brief argues, but actually it is a 100 per cent machine as of 30 years ago.

It naturally is impossible to determine with mathematical accuracy the date on which a certain piece of apparatus will reach the point where it will fail to do the work and must be replaced. Any allowance to cover such reduction in value as will accrue from the action of time, wear and the elements must be made very roughly approximate. Certainly it is possible to show examples of equipment that, through careful repair, have been able to give service over a long period of years. On the other hand, other equipment will wear out very quickly, or will be involved in accidents which will shorten its life materially. To get at the proper accruals for depreciation is quite similar to the calculation of life insurance rates. The amount to be set aside for the individual element is taken from the average of a large number of such units. Enough information is available to enable an accountant to determine the proper accruals for depreciation of the average car, locomotive or piece of track.

On a large property the amount of new construction may offset the amount of depreciation, but unless the cost of the new work is charged to operation rather than to capital it does not cancel the depreciation.

What the "Automobile Guest" Does to the Electric Railway

THE New Orleans *Times Picayune*, in a recent issue, disagrees with an electric railway statement that automobile drivers are too generous when they invite neighbors to accompany them to and from town and thereby deprive the railway of customers. This newspaper declares that the host in this case would not extend such an invitation unless he expected to gain by it—the usual motive being companionship for the ride—and that it would be an economic waste for such an automobile owner to use a car suitable to carry five or more persons for the transportation of but one. Hence, both driver and guest benefit.

No one will deny that the automobile owner is within his rights when he invites his neighbor to ride with

him. Unfortunately it is also a fact that an electric railway in a community cannot continue to give good service unless it receives sufficient patronage. Possibly the existence of such a line in their community is a matter of indifference to the automobile owner and guests in question. But the continuance of trolley service for the remainder of the community is of real concern to them. Without it they would find the business of their town, including their own, stagnated. Their servants and the tradesmen and workmen who serve them would not be able to reach their places of employment. The great bulk of the buyers would not be able to get back and forth to the stores. So it is true that even the man who provides his own transportation has good reason to avoid a practice which, if multiplied enough times in a community, will impair continuance of the public transportation system.

Another point raised in the editorial mentioned is the economic waste of operating a large automobile for the transportation of one person only. This point is well taken, but if the automobile owner accepts this view, there is hope he will soon realize that it is almost as much an economic waste to operate his automobile for the conveyance of two or three persons, and that in most circumstances he and his friends will save money (and often time) by riding in the trolley rather than in a private car. This has not always been the case in the past, but with more stringent parking regulations it will become more true in the future. The private automobile has its important place in the daily life of the American family, but usually its place is not that of a vehicle to take the owner to and from his daily work.

Pruning Off the Dead Branches Has Strengthened the Tree

BETWEEN 1917 and the end of 1923 service was suspended on more than 400 miles of electric railway track in Massachusetts, mostly in the eastern part of the state. Since the beginning of 1924 there have been additional, but less extensive, abandonments. No public transportation of any kind is furnished over some of the abandoned routes, but in most cases buses are now running where cars formerly were operated. The opinion is held among electric railway men in this territory, however, that the replacement of rail lines by bus lines has gone about as far as it is likely to go.

Suspension of service on these many miles of track was the natural outcome of an unduly optimistic program of railway building a generation ago. This fever ran even higher in Massachusetts than it did elsewhere. Instead of being content with the construction of one rail line between important points, promoters built two and three. As a result the service and traffic were divided. Other lines were built through such sparsely settled territories that they were never profitable. The advent of the passenger automobile which retarded the natural growth of railway traffic, and the era of high costs prevailing since the war, made the operation of these routes a heavy burden.

Now, however, most of the unprofitable lines which duplicated the service supplied on other routes, or which ran through "no man's land," have been lopped off. This pruning process has undoubtedly strengthened the railway systems, and the lines that remain are now on a sound basis. In the main, they are earning

a fair return and it appears unlikely that any considerable additional mileage will be abandoned or replaced with buses in this state.

That is not to say, however, that bus transportation in this territory has reached the limit of its development. Buses are being used more and more on feeder and cross-route lines and to furnish express service. An example of the latter is the Boston and Lowell route operated by the Eastern Massachusetts Street Railway. The Boston & Worcester Street Railway is considering the establishment of a similar service between those cities. The Boston Elevated Railway is already operating a number of feeder bus lines and is considering others. In New Bedford the Union Street Railway operates buses through districts not served by its cars. Further developments of this kind may be expected, even though the railways continue to operate cars, on most of the present track.

The New Standard of Comparison Sets Requirements Higher for Public Vehicles

AT A RECENT sectional association convention a master mechanic described in detail how the operating and mechanical departments on his road co-operated so that the attention of maintenance men would be directed to rattling sash or squeaking bodies on the buses operated by the railway. He elaborated on the importance of eliminating such squeaks and rattles from the standpoint of pleasing the patrons of the line.

Now this master mechanic was undoubtedly right. He knew from experience what an annoyance a squeak or rattle in a private automobile produces. It was the sales value of quiet operation that stimulated the development of the passenger automobile from an extremely noisy vehicle to its present almost noiseless operation. This development took place in the face of severe inherent difficulties. The sales value of quietness, however, furnished the necessary stimulus to carry out the improvement in the face of the difficulties. The master mechanic appreciated the sales value of quietness in his buses because of their direct outgrowth from the automobile, because he and his passengers apply the standards of automobile comfort in judging the comfort of his buses.

But how many railway men are fully aware that railway passengers are also judging the comfort of a railway ride by automobile standards? No wonder we hear much these days of "the rubber urge" and "the desire to ride on rubber." That desire is largely a desire to ride quietly. Although operation on steel rails imbedded in concrete presents many complications from the standpoint of quiet operation, surely an application of the painstaking care described by this master mechanic in connection with the maintenance of buses would also produce improved conditions on railway cars. Tight sash and the elimination of body and truck squeaks and rattles would make the average electric railway car a more pleasant and desirable vehicle in which to ride.

It is entirely a matter of viewpoint. It is easy to appreciate the importance of quiet operation of a bus. The same sales value also attaches to the same factor in railway cars. Surely more careful attention to these squeaks and rattles would work a substantial improvement, pending further development of body and truck construction with a view toward quiet operation.



Buses and Cars Are Now Operated in Co-ordinated Service in Decatur, Ill.

Buses Amplify Transportation in Decatur, Ill.

Unified Car-Bus System Gives Transportation Service to Illinois City of 45,000—Fifteen Modern Buses Supplement Street Cars with Free Transfer Privileges—Transfer House in Center of Business District Is Starting Point for All Cars and Buses

SINCE the inauguration of bus operation in Decatur on Aug. 1, 1924, by the Illinois Power & Light Corporation, this city of 45,000 population has had a unified and co-ordinated transportation system. All parts of the city are served at a single fare and free transfers are issued between cars and buses. For a short distance from the center of the city cars and buses operate over the same street, but the routes soon diverge. A number of the bus routes serve sections of the city not conveniently provided with railway facilities, while others supplement the service in districts already reached by the street cars.

The history of the transportation situation in Decatur is not unlike that of a number of other cities where the public has underestimated the value to it of the street railway and has allowed competition to run riot. Since 1920 independent bus operation has developed with great rapidity on a 5-cent fare, while the railway fare was 6 cents or 9 tickets for 50 cents. The city administration has endeavored to make political capital of the difference in fare. The buses prospered, and while they did not operate entirely on the same streets as the railway, the effect of the added transportation service was felt by the company.

After these conditions had continued for three years the railway undertook an extensive investigation of the entire transportation problem in Decatur. A consulting engineer was called in and he submitted a report to the management and to the City Council. Among the suggestions embodied in his report was one to the effect that the railway should operate buses as auxiliaries and feeders.

Following out this suggestion the railway procured from the Illinois Commerce Commission a certificate of

convenience and necessity for operating buses. This was done with the definite understanding that the competitive lines would be purchased before operation was started. Negotiations between the railway and the independent bus operators resulted in the latter obtaining fair prices, considering the depreciated value of the equipment and an additional amount for good will. The railway management believes that legal action to end the competition would have been unpopular with the people of the city, as would have been the inauguration of competitive bus service.

The new equipment purchased consisted of 10 Model Z 29-passenger Yellow Coach Company's buses and 5 Mack 25-passenger buses. These vehicles represent an expenditure of \$120,000. They are painted according to the company's standard color scheme of yellow and orange. The seal of the railway appears on the letter-board. In the interior no hand straps have been provided, although it is customary at times to carry standees. Fare collection is accomplished by means of a Woods farebox.

A number of the former independent operators have been taken into the employ of the railway. These men were carefully trained in the operation of the new equipment and with a few exceptions have proved satisfactory. The remaining bus drivers were secured from outside except two men who transferred from the car service. The uniform worn by the bus drivers is made of Oxford gray whipcord with breeches and leather leggings.

All bus and car routes start from the transfer house in the central square. This terminal serves as a hub for the co-ordinated transportation system and is a convenient place for transfer between bus and car. Six



A Modern Garage with 16,000 Sq.Ft. of Floor Space Has Been Built to House the Buses

bus routes have loading zones along the curb opposite the transfer house. Loading points are designated by signs and the police department keeps this area free from parked automobiles.

Bus lines intersect the street car lines only in the center of the city and transfers are issued between the two only at the transfer house, as the bus routing is such that transfers at other points are not needed. All bus routes are comparatively short, the longest being that to Nelson Park, a distance of 2.72 miles. The present arrangement of bus and car routes is shown in the accompanying map. The total route mileage of the buses is 11.44. The base schedule calls for 10 buses and the running time is 10 m.p.h., as compared with a schedule speed of 8 m.p.h. under independent operation. All routes with the exception of the Nelson Park line operate over paved streets. This line is operated over a gravel road from the city limits to the park, but as the road is in fair condition, the buses experience no difficulty. Nelson Park is an attraction on Saturday evenings and Sundays. The base schedule, which is normally handled by one bus covering the route every 30 minutes, is augmented by five additional vehicles during the peak periods on Saturday afternoons and Sundays. Often a bus is called upon to carry as many as 65 passengers to or from the park. While such heavy traffic might be handled more economically by street cars, the overloading is of short duration, and the normal traffic during the week is handled easily by one 29-passenger bus.

Routes, number of vehicles and running time are shown in the accompanying table.

The street car system consists of a total of 15.75 miles of route covered by 25 cars the majority of which are single-truck safety cars. Headways vary from 10 to 20 minutes. Most of the lines are single track with turnouts.

During the first month the buses operated by the railway carried an average of 9,000 passengers per day.

| No. | Name | Round Trip Miles | Base Vehicles | Round Trip Time, Minutes | Schedule Headway, Minutes |
|-----|--------------|------------------|---------------|--------------------------|---------------------------|
| 1 | Franklin | 2.23 | 1 | 15 | 15 |
| 2 | East Main | 2.42 | 2 | 20 | 10 |
| 3 | Nelson Park | 5.44 | 1 | 30 | 30 |
| 4 | North Jasper | 3.73 | 2 | 24 | 12 |
| 5 | North Monroe | 4.62 | 2 | 30 | 15 |
| 6 | West Decatur | 3.44 | 2 | 20 | 10 |

a notable increase over the average number carried by the former independent operators. In the opinion of the management this increase was due to the more comfortable and attractive vehicles operated and to the co-ordinated service. At the same time the street cars also showed an increase in the number of passengers carried.

To give the new service a favorable start full-page advertisements announcing the plan were published in the local newspapers. Later advertisements were used to announce the actual beginning of bus operation and to familiarize the people with the routes and the rates of fare. While the present fare of 6 cents cash or 9 tickets for 50 cents is a slight increase over the



The Storage Space Outside the Garage Is Equal in Area to that Inside



Loading Spaces Have Been Provided by the City at Various Points Along the Curb of the Central Square

cent fare formerly charged, no complaints have been received.

A new garage costing \$60,000 was built for the buses on property adjacent to the railway carhouse. This building is 200 ft. long and 80 ft. wide and is so situated that entrance can be had through a door at the south end, while egress from the building is by nine double swinging doors on the east side. The garage has been located upon a triangular piece of property in such a way that it has been possible to pave the remainder of the land, thus affording a large amount of outside storage space. In order to make a convenient approach to the property, 300 ft. of street was paved and at the same time one-half of the width of the street on the east side of the property was paved to afford an exit. Property owners along this street paid for the paving for the other half.

Red brick with white limestone trimmings was used for the building. A single span arch roof is carried on steel trusses spaced at 20-ft. centers. The curve of the roof has been carried out in the construction of the end wall, giving the building a pleasing appearance. The east wall consists of the nine double doors already mentioned. On the west, 60 per cent of the wall space is taken by windows with small panes set in steel frames.

The interior of the garage is open for almost its entire length. The last bay at the north end is occupied by an office, stockroom, locker room and toilet. Fuel for the buses is stored in two 1,000-gal. tanks buried outside the building. The washrack is immediately inside of the entrance door at the south end. This rack

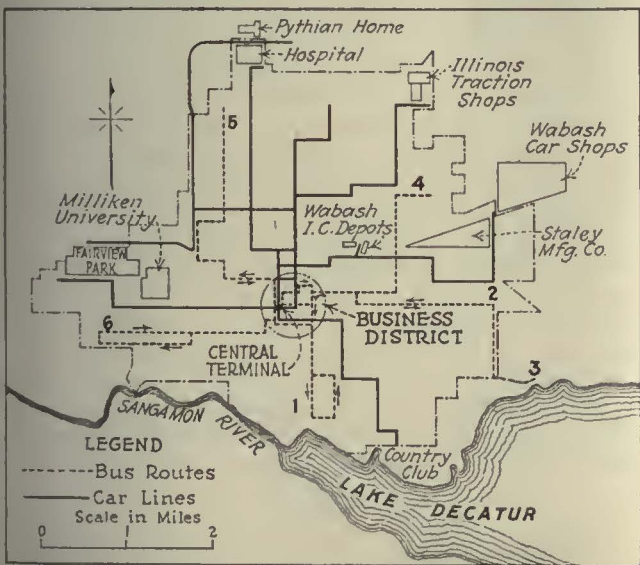
5 in. of water. Inasmuch as the garage will be used mostly at night, ample illumination has been provided by means of three 100-watt shaded lamps on each roof truss. A similar shaded lamp is mounted above each doorway outside the building.

The plan is to have the buses fueled outside, washed immediately after entering the building and then stored in a double row, starting at the north end and facing



Interior of the Garage at Decatur, Showing the Inspection Pits

toward the side with the doors. With this arrangement it is possible to accommodate conveniently 30 buses and an equal number can be parked outside. When the buses pull out in the morning no backing or turning will be necessary inside the garage, but the vehicles can move straight ahead through the double doors. In an emergency all doors can be opened and the buses pushed out by hand, this being possible because there is a slight grade to the land surrounding the building. The doorways and roof trusses have a clearance of 14 ft. 6 in., which is sufficient to permit the passage of a double-deck bus.



Routes of the Co-ordinated Bus and Car Service in Decatur
1—Franklin; 2—East Main; 3—Nelson Park; 4—North Jasper; 5—North Monroe; 6—West Decatur.

drains into a trough 14 in. wide and 12 in. deep, covered with steel grating and connected with the sewer. Swivel pipe connections and hose and washing utensils are mounted on two of the overhead trusses.

Two inspection pits 3 ft. 4 in. wide x 4 ft. 3 in. deep and 18 ft. long are located near the north end of the building. These are covered with removable gratings made up in sections 1 ft. long. Near these pits are located the work benches, test racks and battery charging outfits. No machine tools are in the garage because the railway machine shop is adjacent. The garage is heated by hot air forced over steam pipes and delivered through ducts at a pressure of about

Detroit Car Cards

THE following are copies of car cards or bulletins used by the Department of Street Railways in Detroit during the past few weeks:

Cross Car Tracks Cautiously! Leaves Falling on the Track Cause Slippery Rails and Prevent Quick Stops.

Street Space.—"There is sufficient space in the average street to take care of two lines of traffic comfortably or three lines in emergency. When cars are parked against the curb on both sides, the available space will be sufficient for only one line of traffic. It is inevitable that congestion and delays must follow."—Dominick Henry, Deputy Chief Inspector in charge of New York traffic.

Lost Articles.—During the month of September, 1,611 articles were left on the cars of this system. All articles found on D.S.R. cars are sent to the Lost Article Department, which is located at Room 328, 165 Congress Street. If you lose or think you might have left an article on a street car, inquire at the above address, or call Cadillac 2551. This information is given for your convenience and to forestall the ever-increasing number of calls, both personal and telephone, to the various carhouses in regard to lost articles.

Awaiting Common Council Action! D.S.R. is preparing to furnish new motor bus service as soon as a purchase contract is approved. Service will operate to unserved outlying districts direct from the business centers. Six-cylinder pneumatic tires, fully inclosed upper deck. We want the best vehicles—made in Detroit if possible—but the best at any cost.

Changing a Deficit Into a Profit*

In Four Years the Charleston Consolidated Railway & Lighting Company Has Reduced Its Operating Expenses per Car-Mile 35 per Cent, While Its Gross Earnings Decreased Approximately 30 per Cent

HOW to operate the street railway in Charleston, S. C., and make both ends meet has been a problem ever since the World War. In 1920 the population served by the Charleston Consolidated Railway & Lighting Company was approximately 84,000. The next year it had dropped to 78,000. In 1922 it was 72,000, in 1923 it was 66,000, and at the present time it is estimated to be only 58,000. In the face of these conditions it was inevitable that the earnings of the railway should decrease. The reduction in revenue per

been made in the supervisory force and the personnel of the mechanical department. Details of these changes are given in an accompanying table.

The results have been to reduce purely transportation costs per month approximately 20 cents per car-mile down to about 11 cents per car-mile. During the same period the maintenance of equipment has been reduced from 5 cents per car-mile to about 3 cents. In the first six months of 1923 \$26,402 was paid in claims. In the same period of 1924 the amount was \$6,810. The combined results of these savings has been to convert a deficit of \$4,796.70 for June, 1923, into a profit of \$4,209.41 for June, 1924.

Oklahoma City Enlarges Passenger Station

This Station, Built in 1911, Had Become Outgrown and Has Just Been Enlarged—It Now Has Six Through Tracks—A New Freight Station Has Also Been Built

THE Oklahoma Railway recently completed the rearranging and separation of its passenger and freight terminal facilities in Oklahoma City. The old passenger terminal station, which was constructed in 1911, had become inadequate for the volume of traffic passing through it. This was particularly true during the morning and evening rush hours and with the advent of the small one-man safety cars.

In the original layout, the freight station was located just west of and adjoining the passenger station and was served by two short tracks entering from Hudson Street. These two tracks were laid out with short radius curves and would not take all standard equipment. No provision was made for teaming, as the trackage allowed the loading of package freight cars only from the dock. Baggage and express shipments were handled in a small building on the west side of the passenger terminal inclosure.

The original passenger terminal contained two through tracks from Main Street to Grand Avenue, two passing tracks out of these through tracks, and four stub sidings for car storage.

The city and interurban cars were routed to enter the terminal from both directions, and the two outside tracks were reserved for interurban traffic. This condition caused more or less trouble because, when two

ORGANIZATION OF RAILWAY DEPARTMENT

| | July, 1923 | January, 1924 | July, 1924 |
|----------------------------------|------------|---------------|------------|
| Railway | | | |
| Superintendent..... | 1 | 1 | 1 |
| Clerks..... | 2 | 2 | 1 |
| Claim Department | | | |
| Adjuster..... | 1 | 1 | 1 |
| Investigator..... | 1 | 1 | 1 |
| Clerk..... | 1 | 1 | 1 |
| Transportation Department | | | |
| Supervisor..... | 1 | 1 | 1 |
| Dispatcher..... | 1 | 1 | 1 |
| Receivers..... | 2 | 2 | 2 |
| Inspectors..... | 6 | 3 | 4 |
| Trainmen..... | 140 | 108 | 90 |
| Mechanical Department | | | |
| Master mechanic..... | 1 | 1 | 1 |
| General foreman..... | 1 | 1 | 1 |
| Electrical foreman..... | 1 | 1 | 1 |
| Electrical workmen..... | 5 | 2 | 1 |
| Machine shop foreman..... | 1 | 1 | 1 |
| Machine shop workmen..... | 1 | 1 | 1 |
| Air-brake foreman..... | 1 | 1 | 1 |
| Air-brake workmen..... | 5 | 2 | 1 |
| Paint shop foreman..... | 1 | 1 | 1 |
| Paint shop workmen..... | 2 | 2 | 1 |
| Carpenter foreman..... | 1 | 1 | 1 |
| Carpenter workmen..... | 8 | 4 | 2 |
| Carhouse foreman..... | 1 | 1 | 1 |
| Carhouse workmen..... | 23 | 19 | 18 |
| Night foreman..... | 1 | 1 | 1 |
| Night workmen..... | 11 | 8 | 6 |
| Total..... | 220 | 166 | 141 |

car-mile from 43.17 cents in 1920 to 29.95 in 1924, a decrease of approximately 30 per cent, is, in fact, slightly less than the per cent decrease in population of the city.

To meet this situation the railway has had to curtail its expenses heavily. This has been done by the inauguration of one-man operation, reducing the num-

| Classifications | June, 1920 | June, 1921 | June, 1922 | June, 1923 | January, 1924 | June, 1924 |
|--|-------------|-------------|-------------|-------------|---------------|-------------|
| Gross earnings..... | \$76,849.46 | \$66,234.13 | \$53,429.62 | \$45,126.65 | \$36,426.47 | \$35,745.68 |
| Operating expenses including taxes..... | \$72,692.42 | \$60,330.40 | \$53,420.99 | \$49,923.35 | \$35,361.67 | \$31,536.27 |
| Net income from operations..... | \$4,157.04 | \$5,903.73 | \$8.63 | \$4,796.70* | \$1,064.80 | \$4,209.41 |
| Gross earnings per car-mile, cents..... | 43.17 | 39.38 | 35.52 | 31.16 | 29.58 | 29.95 |
| Operating expenses per car-mile, cents..... | 40.84 | 35.87 | 35.51 | 34.47 | 28.72 | 26.42 |
| Income from operation per car-mile, cents..... | 2.33 | 3.51 | .01 | 3.31* | .86 | 3.53 |
| Per cent operating expenses to gross..... | 94.59 | 91.09 | 99.98 | 110.63 | 97.08 | 88.22 |

* Deficit.

ber of men employed in the shops, and by reducing the number of car-miles operated. An important saving has also been made in the amount paid for damage claims.

In 1923 the percentage of one-man cars operated to total cars was 51.3, while in 1924 the percentage of one-man cars was 91.3 of the whole. This has made it possible to reduce the number of trainmen from 140 to 90. At the same time radical revisions have

interurban cars were in and loading, only the two through tracks were available for the city cars.

In the new layout there are six through tracks in the passenger terminal, as shown in the plan. The city cars use the four easterly tracks and the interurban cars the fifth and sixth tracks. All traffic through the new terminal is one way, all cars entering from Grand Avenue. There is also a stub siding, leading off from the sixth track, for the storage of interurban trailers. There is dock room and team space on the west side of the sixth track to provide for the minimum of handling between truck and car.

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



At Left, New Passenger Terminal Under Construction. At Right, Team Side of New Freight House

All the new special trackwork on Grand Avenue, made necessary by these changes, is laid with wood ties and ballast, while all tracks, including special work within the terminal inclosure, are on steel ties, Carnegie H section, with a reinforced-concrete beam under each rail. Paving brick was placed outside the rail for a border, and one row of brick was placed inside the rail to provide for the flangeway. The old train shed was divided into two sections, and these two sections were placed alongside each other, thus providing overhead protection for the entire six tracks.

A 4-in. slab of concrete was poured alongside the tracks for platform space.

Concrete pits were installed at the south end of the terminal and just inside the north property line on Grand Avenue. These pits are to be kept filled with water and are illuminated at night with a series of red lights to keep trespassers out.

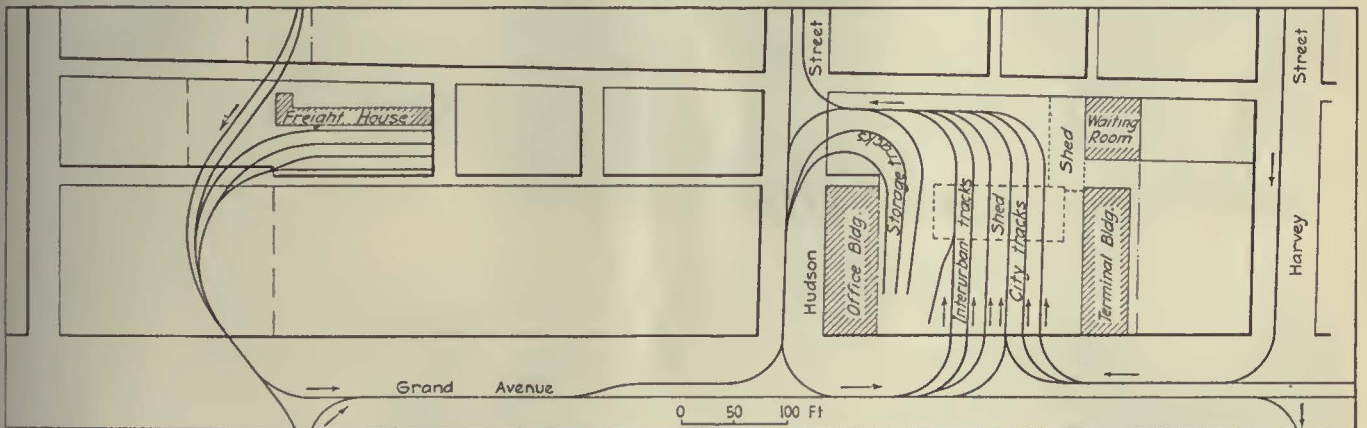
The tracks shown in the plan as entering the terminal from Hudson Street on the west side formerly served the old freight terminal. These tracks, later, are to be lengthened and used for storage tracks.

Several electric track switches have been installed. One is at the turnout to the interurban tracks on Grand Avenue, one at the wye just off Hudson Street at the west side of the terminal yard, and one at the wye at Main and Hudson Streets. Some additional track had also to be built to route the cars one way through the terminal. No change has been made in the method of handling passengers into and out of the terminal inclosure.

A NEW FREIGHT HOUSE BUILT

The new freight house is located one block west of the passenger station and is served by one through track from Main Street to Grand Avenue and one passing track.

The freight dock is 20 ft. x 130 ft. and has 80 ft. under roof. The driveways to the dock and team tracks are ballasted with crushed rock, the rock being covered with limestone screenings and the screenings with crude oil to give a good surface and to keep down the dust. Freight offices and a warehouse were constructed at the west end of the freight dock. The alleys on both



Plan Showing New Station Layout, Oklahoma City



Arrangement of Pits and Red Lights to Prevent Unauthorized Entrance to Passenger Terminal from Street

sides of the freight station are paved with brick, which makes the dock accessible in all kinds of weather.

All labor on the passenger and freight stations was done with company forces. With the exception of the special work layout at the north end of the passenger terminal, which was purchased new, the special work required was taken from material on hand and assembled for the various locations.

Replacing Cable on the Mount Lowe Incline

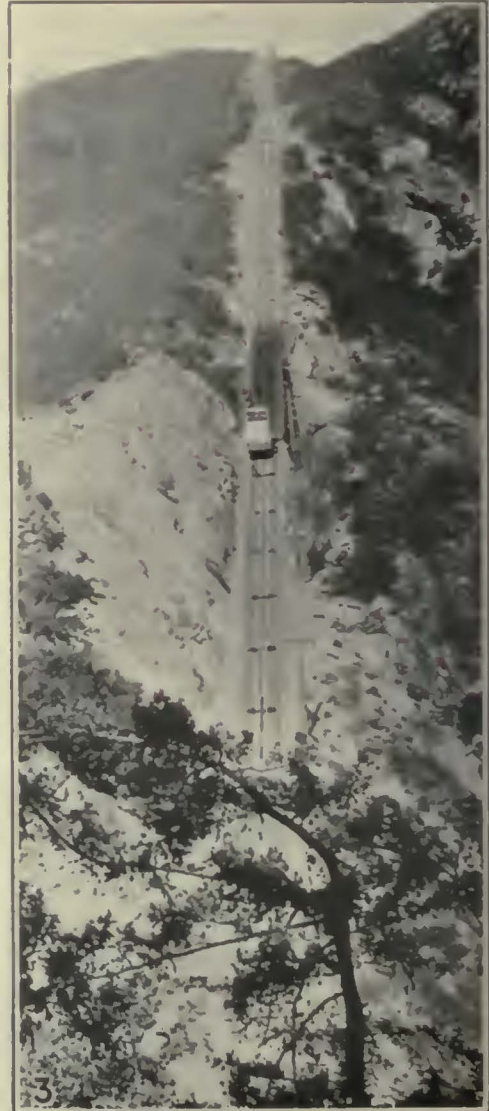
THE replacement of the pulling cable on the Mount Lowe Incline, a 62-deg. grade between Rubio and Echo Mountain on the Pacific Electric Railway scenic route in southern California, was accomplished some time ago by the mechanical department of the company. On account of the grade and unique physical conditions existing the replacement of this cable was a difficult engineering feat. This route was constructed in 1893 and has been operated since that time by the Pacific Electric Railway. Two passenger cars are operated on this incline to convey sightseers to Alpine Tavern, a mile up the mountain.

The pulling cable on the incline is 3,000 ft. in length and weighs more than 6 tons. It is replaced at intervals ranging from two to three years, its condition being determined by hand inspection and examination over its entire length every week. Extensive preparations, considerable equipment and a trained crew of 12 mechanics are required to make the change. A 35-hp. motor is used to drive a revolving cable reel capable of receiving the entire 6 tons of discarded cable. The motor and reel, together with the reel containing the new cable, are mounted on a flat car anchored at the foot of the incline, as shown in an accompanying illustration.

The cable is in the form of a loop, the section ahead of the car being known as

the "pulling cable" because it carries the load. The section behind the car is known as the compensating cable because its only function is to take up the slack. When preliminaries have been completed the pulling cable is cut with an acetylene torch at a point about 60 ft. behind the lower car. The new cable is then spliced into the old pulling cable. The cars are chained into position on the incline before the pulling clamps are removed. The end of the compensating cable is made fast to the power-driven reel, which is started simultaneously with the cable winding machinery at the top of the mountain. While the new cable is being pulled into position the old cable is being reeled up. Care must be taken that the speed of the reel coincides with the speed of the winding machinery. The entire length of the incline must be under observation while the change is being made to make sure that the new cable does not jam or leave the guiding pulley.

The job was done under the direction of J. W. Haughton, assistant mechanical superintendent, who has supervised this work since 1909. Several members of the crew have taken part in this work for the past 20 years. In spite of the familiarity of the men with the work it requires about 20 hours before the line is again ready for service.



Features of Cable Replacement on the Mount Lowe Incline, Pacific Electric Railway

No. 1. Mechanics make a weekly inspection of the cable, using a special sled.
 No. 2. A motor-driven reel to wind up

the old cable and another reel containing the new cable are mounted on a flat car at the foot of the incline.

No. 3. A new cable was recently installed on the Mount Lowe Incline, which rises 1,300 ft. at a 62-deg. grade.

Modern Planning System in Detroit Shops

Department of Street Railways Has Developed System for Checking Progress of Work on Cars in Various Departments of Highland Park Shops — Cumulative Curves Give Daily Information on Production

By G. L. Ohmart

General Foreman Highland Park Shops,
Department of Street Railways, Detroit, Mich.

CENTRALIZED planning and production control are necessary for a well-regulated and efficient business. The planning systems in use in the large manufacturing plants have demonstrated their worth over and over again. While the methods employed in planning for a manufacturing plant can be only partially applied to a maintenance shop, the principles involved are the same in both cases.

Up to the present time the functions of the planning department in the Highland Park shops of the Detroit Department of Street Railways are confined to the handling of cars from the time they come to the shops until they are taken away, and to keeping such records and charts as have been found useful in carrying out the work. No attempt as yet has been made to do the detailed planning of the work of each shop department, although this is under consideration.

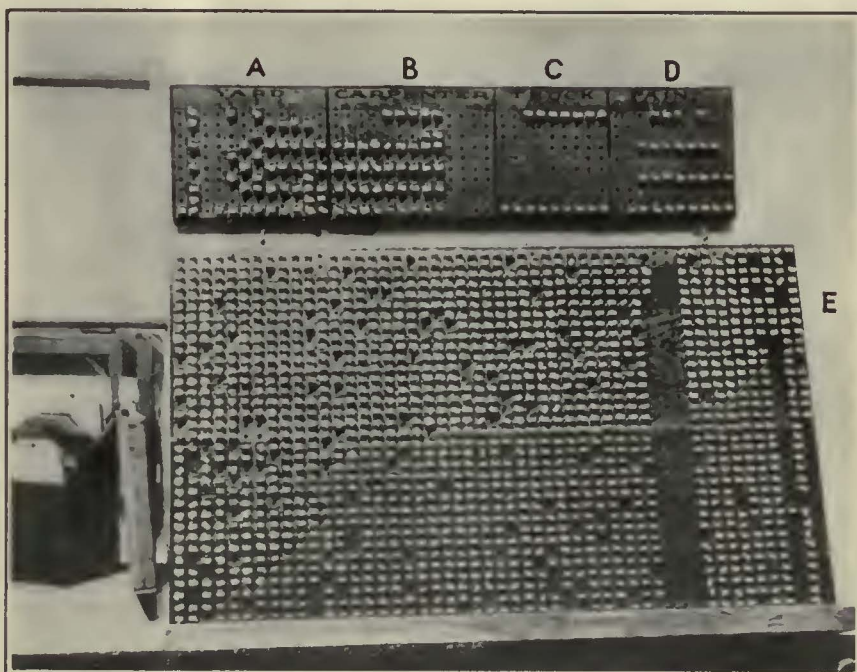
When a car is sent to the shops for any class of work, a form, shown in an accompanying illustration, is filled out by the carhouse foreman with car number, name of the carhouse, and a general notation of the reason for the car being sent in. This card (Form 246) is then turned over to the yard master of the operating department, who fills out the detachable part of the card with the car number, time the car leaves the carhouse, and the badge numbers of the crew which will take the car to the shop. The card is taken to the shops with the car and turned over to the planning clerk, who enters on the detachable part of the card the time the car is received, and signs the card. This stub is then detached and taken back to the yard master. It not only serves as a record of the movement of the car, but also as a receipt of the delivery of the car to the shops and a check on the time the crew arrived.

The planning clerk, who is in touch with all the shop foremen, enters on Form 246 the account numbers for each class of work and a description of the various classes of work to be done, such as wiring changes, overhauling trucks, painting, etc. This card is then fastened to the car to remain until all the work is finished and the car is ready to leave the shop.

PLANNING PROGRESS OF THE CAR

When a car is delivered to the shop, it is left in the yard by the train crew. The planning clerk has direct charge of the movement (shifting) of all cars at the

shops and also of the men (shifters) who do this work. Assuming that work on the car is to be started in the carpenter shop, Form 247, shown in another illustration, is used to instruct the shifters. This form is made up on green paper in pads 4 in. x 6 in. size. It will be noted that spaces are provided for car number, date, and



Car Numbers on Plugs Show Where the Cars Are in the Shops

Location of all cars in the shop is indicated on the upper plug board. This is divided into four sections to indicate the various departments. The holes in each section correspond with the car loca-

tions on each track in that department of the shop. The lower and larger board indicates cars in service at carhouses, and contains plugs arranged in numerical order for quick reference.

two series of locations; "from," which indicates present location of the car, and "to," indicating where it is to be moved.

Assume that the car is on Track 9 in the yard, and is to be moved to Track 2 in the carpenter shop. Under "From" the planning clerk checks an "X" opposite "yard" and writes in "Track 9." Under column headed "To" he checks "X" opposite "Carp," writes in "Track 2" and gives the time. This form is turned over to one of the shifting crew and furnishes complete information regarding the movement of the car. He delivers the car to the proper track in the carpenter shop and turns over Form 247 to the carpenter foreman. This is notification to the foreman that the car is in his department, at a certain location, ready for work.

When any particular job is completed on a car, the foreman in charge of this work enters in the column headed "Repairs made by" the badge number of the man or men who did the work, and also signs his own initials,

Forms for Highland Park Shops Give Complete Record of Work

The image shows three forms from the City of Detroit Department of Street Railways. The top form is the 'SHOP CAR RECORD' (Form 248), which is a grid for tracking car movements between departments (Yard, Carp, Truck, Paint) with columns for 'IN' and 'OUT' dates and times. The middle form is the 'CITY OF DETROIT-DEPT OF STREET RAILWAYS CAR SHIFTING REPORT' (Form 371), which has columns for 'CARS RECEIVED' and 'CARS RETURNED', including car number, line, and time. The bottom form is the 'MOVE CAR ORDER' (Form 247), which lists 'FROM' and 'TO' departments and includes checkboxes for 'YARD', 'TRUCK', 'PAINT', 'CARP.', and 'TRACK' with associated time slots.

At top (Form 248)—Form used by the planning clerk in connection with his work. This serves as a permanent record of the location of all cars in the shop.

Below (Form 371)—A complete record of all car movements to and from the shop is kept on these daily sheets, which are signed by car crews.

(Form 247)—The planning clerk issues instructions on this form for shifting cars between departments in the shop.

indicating that the work has been completed properly. When all the work to be done by that department is completed on the car the foreman notifies the planning clerk by telephone that it is ready to leave his department, gives its present location and the next department to which it is to be moved. The planning clerk again uses Form 247 to notify one of the shifting crews that this particular car is on Track 2 in the carpenter shop and is to be moved to Track 4 in the truck shop. The shifter moves the car and turns over the form to the truck shop foreman. This procedure is repeated for each movement of the car.

When all the work of the various shop departments is completed, the car goes back to the yard ready to be taken to the carhouse. Form 246 is now removed and filed for future reference, as it gives a complete record of work done, workmen's numbers, job numbers, account numbers to which labor and material were charged, the date, and the foremen's signatures, indicating that the work was carried out properly.

The location of all cars in the shops is indicated on a board in the planning clerk's office by means of plugs having the car numbers stamped on them. The board has a series of holes for each track in the yard

This is Form 246, a 'SHOP CAR' tag for car number 3088. It lists several jobs performed by different foremen: a carpenter for 'Overhauling for operation with new trailer car', a wireman for 'Wiring changes', an air department for 'Install air compressor', a truck department for 'overhaul trucks', a motor department, and a paint department for 'Repaint'. The tag also includes dates, times, and signatures for each job.

(Form 246)—This form indicates the work to be done in each department, the badge numbers of the men, the account chargeable and the signature of the foreman who approved the completed job. The stub at the bottom is sent back to the carhouse as a receipt when the car is delivered to the shop.

and the various shop departments. An accompanying illustration shows the arrangement. It can be seen from this that the upper board is divided into four sections. Section A represents the yard, B the carpenter shop, C the truck shop, and D the paint shop. The large board E, below, holds the plugs for all the cars which are in service at the various carhouses. The plugs in the large board are arranged in numerical order so that it is easy to pick out any particular car number wanted.

Simultaneously with the movement of the car, the plug with that car number on it is moved to the proper place to indicate the location of the car. This part of the system is very useful, both to the planning department and to the executives, who can tell at a glance exactly where a car is located, as well as the number of cars in the different shop departments.

In the case of a car which has been in an accident and on which all costs of repairing due to the accident are kept separate from regular maintenance, a separate job number is issued. Form 245, which is a tag exactly like 246 except that it is red instead of yellow, is used either separately or in conjunction with the latter to give the job number and account numbers on the work done due to the accident. When both regular maintenance work and work due to accident are necessary on a car, both cards are clipped together and placed in the car for the information of the shop men concerned.

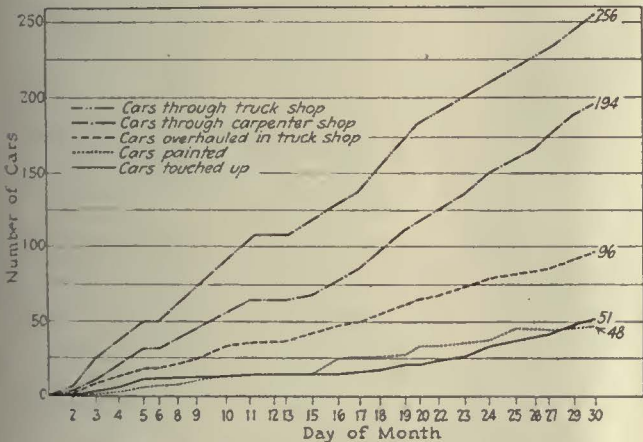
Two other forms are used by the planning department to keep records. Form 371, also shown in an illustration

tion, is a sign-in and out sheet. All entries on this sheet are made by the crews of the transportation department who take cars to and from the shops, a new sheet being used each day. The operator enters in the proper columns the car number, the line on which the car is operated regularly, and the time it arrives at or leaves the shop, as the case may be.

Form 248 is used by the planning clerk chiefly for his own information in carrying out the details of his work. When a car is received at the shop, the car number is entered in the proper column and the date under "Yard." Then as the car goes through the various shop departments, the date is checked under the proper column when it enters that department. When the car is finished, the date is entered when the car is reported out to the carhouse. There are also columns for shop order and account numbers.

PRODUCTION CURVES PLOTTED MONTHLY

In connection with the planning, a number of progress or production curves are kept daily for periods of a month each. A typical curve sheet is illustrated. These curves are plotted cumulatively so that at the end of any period, beginning with the first of the month, the total is given to date. The abscissas represent the actual number of working days in the month, whole



Charts Show Daily Production of Each Department

Cumulative curves are used to record production and show the monthly totals up to any given date. These sheets are made up 9 in. x 12 in., and the various items of production are shown in different colored lines.

days and half days being given proper value. The ordinates give the number of cars. By one subtraction, the production for any other period of time can be obtained. A straight line drawn through zero and the point at the end of any period gives the average daily production. In case there is a definite production to work to for a month, a straight line through zero and the total value for the month represents the actual average amount required per day, and the deviation of the actual production curve from the straight line represents at any time the exact amount that production is ahead of, or behind, the requirements.

At the present time curves are being made up for the following items: Total cars received, total cars out of shops, cars through the carpenter shop, cars through truck shop, cars through paint shop, accident cars through the shops, car wheels welded, car wheels bored, car wheels pressed on, car wheels pressed off, motor gears changed, car wheels turned, car wheels ground, stoves replaced and stoves rebuilt.

Similar curves can be worked out to meet the particu-

lar needs of any shop, and may be used to keep daily progress on any kind of shop work. The value of such curves to the shop executives can hardly be overestimated. They furnish him in a moment's time with a simple picture which tells him just what each shop department is doing and enables him to co-ordinate readily the shop work with the requirements.

The Readers' Forum

Sixteen Hundred Butt Welds in Philadelphia

THE LORAIN STEEL COMPANY
JOHNSTOWN, PA., Nov. 21, 1924.

To the Editors:

In the article on "Rapid Track Reconstruction with Butt-Welded Joints," which appeared in the Nov. 15 issue of the ELECTRIC RAILWAY JOURNAL, the statement is made that butt-welded joints were tried in Boston and in Philadelphia, about 500 joints being made in each place. While this is correct as far as Boston is concerned, more than three times this number were made in Philadelphia. To be exact, 1,607 butt welds have been installed in the latter city.

H. F. A. KLEINSCHMIDT,
Superintendent Track Welding Department.

Canadian Highway Tax Not Discriminatory

HYDRO-ELECTRIC POWER COMMISSION
OF ONTARIO

Hydro-Electric Railways Operating Department

TORONTO, ONT., OCT. 31, 1924.

To the Editors:

After commenting on the conditions of electric railway operation in Canada in ELECTRIC RAILWAY JOURNAL for Oct. 25, page 749, you refer to a statement of the *Canadian Financial Post* in the last part of which it is stated that the bus license fee is not an equitable tax inasmuch as it is not on the same basis for all bus lines. The statement also contends that the buses in direct competition with hydro radials are being taxed so high and in such an arbitrary manner as to prevent them giving adequate service. For your information I would say that the tax is imposed by the Department of Provincial Highways and is, according to its statement, the same on all provincial highways, no discrimination being shown in any way against the bus lines operating in opposition to the Hydro-Electric Railways—in fact, it really is to the contrary. The act became effective and was enforced commencing June 1, 1924. We have three lines in competition with buses. On our Scarborough division the tax became effective on June 1; on the Metropolitan division it did not become effective until Sept. 1, while on the Mimico division, where we are affected most, it is not in effect as yet but it is expected that it will become effective on Nov. 15.

This certainly does not show discrimination in favor of the Hydro, and I am satisfied that by calling your attention to this misstatement you will correct the impression that was unwittingly created.

This is the type of propaganda which is being used against the Hydro at all times by those opposed to public ownership.

W. R. ROBERTSON,
General Superintendent.

American Association News

Committee Appointments for 1924-1925, American and Engineering Associations

COMMITTEE appointments for the American Electric Railway Association are virtually complete. Appointments to Engineering Association committees are also completed with a few exceptions. The committee membership of the Accountants, Claims and Transportation and Traffic Associations are not yet available. The personnel of the American and Engineering Association committees follows:

American Association

FINANCE

R. P. Stevens, president Republic Railway & Light Company, New York, N. Y., chairman.

B. A. Hegeman, Jr., New York, N. Y.
L. S. Storrs, New Haven, Conn.

POLICY

F. R. Coates, president the Toledo, Ottawa Beach & Northern Railway, Toledo, Ohio. Mailing address, H. L. Doherty & Company, New York, N. Y., chairman.

J. G. Barry, Schenectady, N. Y.
Britton I. Budd, Chicago, Ill.
C. D. Emmons, Baltimore, Md.
Harry Reid, Indianapolis, Ind.
W. H. Sawyer, East St. Louis, Ill.
Paul Shoup, San Francisco, Cal.
H. D. Shute, East Pittsburgh, Pa.
R. P. Stevens, New York, N. Y.
L. S. Storrs, New Haven, Conn.
Robert I. Todd, Indianapolis, Ind.

NATIONAL RELATIONS

Harry Reid, president Interstate Public Service Company, Inc., Indianapolis, Ind., chairman.

E. J. Bechtel, New York, N. Y.
H. G. Bradlee, Boston, Mass.
Ralph R. Bradley, Chicago, Ill.
Arthur W. Brady, Anderson, Ind.
C. D. Cass, Waterloo, Ia.
Samuel Curwen, Philadelphia, Pa.
F. C. Hamilton, New York, N. Y.
J. H. Hanna, Washington, D. C.
G. H. Harries, Chicago, Ill.
Charles L. Henry, Indianapolis, Ind.
Frank Karr, Los Angeles, Cal.
H. A. Mitchell, Oakland, Cal.
Frank Silliman, Jr., New York, N. Y.
D. W. Snyder, Jr., Springfield, Ill.
A. F. Van Deirse, Marion, Ohio.

SUBJECTS AND MEETINGS

W. H. Sawyer, president East St. Louis & Suburban Railway, East St. Louis, Ill., chairman.
H. D. Briggs, Newark, N. J.
Harry L. Brown, New York, N. Y.
F. D. Burpee, Ottawa, Ontario, Canada.
T. C. Cherry, Syracuse, N. Y.

C. H. Clark, Cleveland, Ohio.
Harlow C. Clark, Newark, N. J.
W. L. Davis, Allentown, Pa.
F. W. Doolittle, New York, N. Y.
C. R. Ellicott, New York, N. Y.
J. H. Hanna, Washington, D. C.
G. H. Harries, Chicago, Ill.
C. W. Kellogg, Boston, Mass.
A. S. Richey, Worcester, Mass.
R. B. Stearns, Boston, Mass.
E. F. Wickwire, Mansfield, Ohio.

PUBLICITY

James P. Barnes, president Louisville Railway, Louisville, Ky., chairman.

Barron Collier, New York, N. Y., vice-chairman.

W. R. Alberger, Oakland, Cal.
Frank L. Blanchard, New York, N. Y.
J. S. Bleeker, Philadelphia, Pa.
Robert Dougan, Washington, D. C.
P. H. Gadsden, Philadelphia, Pa.
L. E. Gould, Chicago, Ill.
J. P. Griffin, Dallas, Tex.
W. H. Hodge, Chicago, Ill.
H. M. Lytle, Chicago, Ill.
J. C. McQuiston, East Pittsburgh, Pa.
J. P. Pulliam, Milwaukee, Wis.
M. P. Rice, Schenectady, N. Y.
L. S. Storrs, New Haven, Conn.
W. P. Strandborg, Portland, Ore.
F. L. Thompson, New York, N. Y.
Robert G. Tucker, Indianapolis, Ind.
E. F. Wickwire, Mansfield, Ohio.

PUBLICATIONS

C. D. Emmons, president the United Railways & Electric Company of Baltimore, Baltimore, Md., chairman.

G. B. Anderson, Los Angeles, Cal.
F. G. Buffe, Kansas City, Mo.
Thomas W. Casey, New York, N. Y.
Harlow C. Clark, Newark, N. J.
B. J. Denman, Davenport, Ia.
Edwin G. Faber, New York, N. Y.
Myles B. Lambert, East Pittsburgh, Pa.
M. McCants, San Francisco, Cal.
C. C. Peirce, Boston, Mass.
E. Stenger, Denver, Col.
Robert I. Todd, Indianapolis, Ind.

ADVISORY COMMITTEE ON ELECTRIC RAILWAY FINANCING

Alfred L. Loomis, vice-president Bonbright & Company, New York, N. Y., chairman.

R. P. Stevens, New York, N. Y.
A. G. Hoyt, New York, N. Y.
H. L. Stuart, Chicago, Ill.
M. W. Gaines, New York, N. Y.

CHARLES A. COFFIN PRIZE

J. N. Shannahan, president Newport News & Hampton Railway, Gas &

Electric Company, Hampton, Va., chairman.

F. R. Coates, Toledo, Ohio.
J. H. McGraw, New York, N. Y.

Committee to co-operate with the above, J. G. Barry and A. H. Jackson, Schenectady, N. Y.

COMPANY AND ASSOCIATE MEMBERSHIP

L. H. Palmer, vice-president and general manager United Railways & Electric Company of Baltimore, Baltimore, Md., chairman.

W. K. Archbold, Syracuse, N. Y.

J. D. Augustus, Louisville, Ky.

H. L. Brown, New York, N. Y.

W. M. Brown, Seattle, Wash.

F. D. Burpee, Ottawa, Ontario, Canada.

T. W. Casey, New York, N. Y.

C. D. Cass, Waterloo, Ia.

B. J. Denman, Davenport, Ia.

J. A. Dewhurst, Philadelphia, Pa.

J. H. Drew, Mansfield, Ohio.

C. D. Flanigen, Athens, Ga.

H. L. Geisse, Wausau, Wis.

F. O. Grayson, St. Louis, Mo.

C. A. Greenidge, New York, N. Y.

J. W. Hancock, Roanoke, Va.

C. F. Handshy, Springfield, Ill.

C. H. Harvey, Knoxville, Tenn.

W. J. Harvie, Auburn, N. Y.

H. B. Hearn, Shreveport, La.

C. W. Kellogg, Boston, Mass.

H. J. Kenfield, Chicago, Ill.

George R. Lyman, New York, N. Y.

J. H. McClure, Aurora, Ill.

E. H. Maggard, Petaluma, Cal.

W. G. Meloon, Portsmouth, N. H.

C. E. Morgan, Brooklyn, N. Y.

W. G. Murren, Vancouver, B. C.,

Canada.

F. B. Musser, Harrisburg, Pa.

A. J. Purinton, Atlantic City, N. J.

A. E. Reynolds, Springfield, Mo.

K. A. Simmon, East Pittsburgh, Pa.

Claus Spreckels, San Diego, Cal.

W. P. Strandborg, Portland, Ore.

D. P. Strickler, Colorado Springs,

Col.

E. J. Thompson, Pittsburgh, Pa.

W. B. Tuttle, San Antonio, Tex.

W. M. Wampler, New York, N. Y.

Herbert Warren, Duluth, Minn.

H. E. Weyman, Levis, Quebec, Can-

ada.

E. S. Wilde, New Bedford, Mass.

F. H. Wilson, Cleveland, Ohio.

COMMITTEE ON CO-OPERATION WITH MANUFACTURERS

E. F. Wickwire, vice-president Ohio Brass Company, Mansfield, Ohio, chairman.

G. A. Barnes, New York, N. Y.

William C. Bell, Richmond, Va.

W. D. Blatz, Bridgeport, Conn.

W. H. Boyce, Pittsburgh, Pa.

E. C. Faber, New York, N. Y.

W. H. Gibson, Brooklyn, N. Y.

E. E. Kretschmer, Chicago, Ill.

H. H. Lloyd, Indianapolis, Ind.

E. B. Meissner, St. Louis, Mo.

David Cameron, New York, N. Y.
 J. R. MacFarland, Philadelphia, Pa.
 J. C. McQuiston, East Pittsburgh, Pa.
 G. R. Rowland, New York, N. Y.
 J. F. Sloan, New York, N. Y.
 C. N. Uhl, Akron, Ohio.
 C. L. Van Auken, Chicago, Ill.
 P. L. Thomson, New York, N. Y.

CO-OPERATION WITH STATE AND SECTIONAL ASSOCIATIONS

P. H. Gadsden, vice-president the United Gas Improvement Company, Philadelphia, Pa., chairman.
 P. A. Bertrand, Aberdeen, Wash.
 John S. Bleecker, Philadelphia, Pa.
 F. G. Buffe, Kansas City, Mo.
 F. D. Burpee, Ottawa, Canada.
 F. C. Chambers, Des Moines, Ia.
 G. H. Clifford, Fort Worth, Tex.
 J. F. Collins, Jackson, Mich.
 F. B. Culley, Augusta, Ga.
 E. W. Fowler, Chicago, Ill.
 J. W. Hancock, Roanoke, Va.
 A. M. Patten, Topeka, Kan.
 J. S. Pevear, Birmingham, Ala.
 William Phipps, Meridian, Miss.
 J. P. Pulliam, Milwaukee, Wis.
 J. C. Schade, Green Bay, Wis.
 O. J. Shaw, Lincoln, Neb.
 T. H. Tutwiler, Memphis, Tenn.
 E. A. West, Denver, Col.
 C. V. Wood, Springfield, Mass.

COMMUNITY SECTION, COMPANY SECTION AND INDIVIDUAL MEMBERSHIP

C. E. Morgan, vice-president and general manager Brooklyn City Railroad, Brooklyn, N. Y., chairman.
 G. B. Anderson, Los Angeles, Cal.
 C. H. Beck, New York, N. Y.
 C. P. Billings, Pittsburgh, Pa.
 F. G. Buffe, Kansas City, Mo.
 H. O. Butler, St. Louis, Mo.
 T. C. Cherry, Syracuse, N. Y.
 C. H. Clark, Cleveland, Ohio.
 W. H. Heulings, Jr., Philadelphia, Pa.
 S. B. Irelan, St. Joseph, Mo.
 A. E. Potter, Providence, R. I.
 Martin Schreiber, Camden, N. J.
 S. B. Way, Milwaukee, Wis.

EDUCATION

Edward Dana, general manager Boston Elevated Railway, Boston, Mass., chairman.
 H. O. Allison, New Brighton, Pa.
 George B. Anderson, Los Angeles, Cal.
 George A. Barnes, New York, N. Y.
 V. W. Berry, Fort Worth, Tex.
 Horatio Bigelow, Charleston, S. C.
 G. B. Cade, Asbury Park, N. J.
 W. J. Edmunds, Pittsburgh, Pa.
 J. A. Greenland, Fort Wayne, Ind.
 C. J. Griffith, Little Rock, Ark.
 W. W. Holden, San Antonio, Tex.
 J. S. Hyatt, Highwood, Ill.
 M. B. Lambert, East Pittsburgh, Pa.
 Richard J. Lockwood, St. Louis, Mo.
 M. McCants, San Francisco, Cal.
 H. H. Norris, New York, N. Y.
 A. B. Paterson, New Orleans, La.
 Samuel Riddle, Louisville, Ky.
 A. J. Rowland, Milwaukee, Wis.
 R. Schaddelee, Grand Rapids, Mich.
 J. V. Sullivan, Chicago, Ill.
 E. M. Walker, Schenectady, N. Y.

INSURANCE

P. E. Wilson, secretary Cleveland Railway, Cleveland, Ohio, chairman.

W. R. Alberger, Oakland, Cal.
 O. H. Bernd, Des Moines, Ia.
 Granville H. Bourne, New York, N. Y.
 C. E. Brown, Napa, Cal.
 E. J. Burdick, Detroit, Mich.
 Norman McD. Crawford, Columbus, Ohio.
 N. H. Daniels, Boston, Mass.
 F. M. Hamilton, Chicago, Ill.
 A. D. Knox, New Haven, Conn.
 John H. Moran, Boston, Mass.
 C. E. Morgan, Brooklyn, N. Y.
 L. D. Pellissier, Holyoke, Mass.
 F. J. Petura, New York, N. Y.

LOCATION OF MIDYEAR MEETING AND CONVENTION

W. H. Sawyer, president East St. Louis & Suburban Railway, East St. Louis, Ill., chairman.
 M. R. Boylan, Newark, N. J.
 H. L. Brown, New York, N. Y.
 C. C. Castle, New York, N. Y.
 S. J. Cotsworth, Philadelphia, Pa.
 E. C. Faber, New York, N. Y.
 Thomas Finigan, Chicago, Ill.
 Thomas Fitzgerald, Pittsburgh, Pa.
 H. B. Flowers, New Orleans, La.
 Edward M. Graham, Bangor, Me.
 A. A. Hale, New York, N. Y.
 J. C. McQuiston, East Pittsburgh, Pa.
 C. E. Morgan, Brooklyn, N. Y.
 Paul Shoup, San Francisco, Cal.
 Claus Spreckels, San Diego, Cal.
 E. P. Waller, Schenectady, N. Y.
 T. W. Wilson, Wilmington, Del.

REVISION OF CONSTITUTION AND BY-LAWS

L. S. Storrs, president The Connecticut Company, New Haven, Conn., chairman.
 H. C. Clark, Newark, N. J.
 C. R. Ellicott, New York, N. Y.
 C. D. Emmons, Baltimore, Md.
 J. G. Barry, Schenectady, N. Y.

SPECIAL TAXES

W. H. Maltbie, special counsel United Railways & Electric Company of Baltimore, Baltimore, Md., chairman.
 F. C. Chambers, Des Moines, Iowa.
 F. W. Coen, Sandusky, Ohio.
 A. T. Davison, New York, N. Y.
 Thomas Fitzgerald, Pittsburgh, Pa.
 R. M. Feustel, Fort Wayne, Ind.
 A. Flor, New York, N. Y.
 Edwin Gruhl, New York, N. Y.
 Harry H. Hanson, Newtonville, Mass.
 Raymond Hunt, Wilmington, N. C.
 A. G. Neal, Washington, D. C.
 A. M. Robertson, Duluth, Minn.
 H. B. Sawyer, Boston, Mass.
 A. C. Watt, New York, N. Y.
 T. W. Wilson, Wilmington, Del.

VALUATION

F. W. Doolittle, vice-president North American Company, New York, N. Y., chairman.
 E. J. Bechtel, New York, N. Y.
 Francis Blossom, New York, N. Y.
 H. M. Brinckeroff, New York, N. Y.
 H. A. Clarke, New York, N. Y.
 Thomas Conway, Jr., Philadelphia, Pa.
 J. A. Emery, New York, N. Y.
 W. Findlay Downs, Philadelphia, Pa.
 T. E. Francis, St. Louis, Mo.
 C. W. Gillespie, Staten Island, New York, N. Y.
 F. C. Hamilton, New York, N. Y.
 W. H. Maltbie, Baltimore, Md.
 L. R. Nash, Boston, Mass.

A. S. Richey, Worcester, Mass.
 Frank Silliman, New York, N. Y.
 Ernest Stenger, Denver, Col.
 W. B. Tuttle, San Antonio, Tex.
 E. D. Uhlendorf, Chicago, Ill.
 James Walker, Chicago, Ill.

UNITED STATES CHAMBER OF COMMERCE REPRESENTATIVES

J. H. Hanna, vice-president Capital Traction Company, Washington, D. C., national councillor.
 C. E. Morgan, vice-president and general manager Brooklyn City Railroad, Brooklyn, N. Y., substitute national councillor.

JOINT COMMITTEE OF THE NATIONAL UTILITY ASSOCIATIONS

Randal Morgan, chairman of the executive and finance committee United Gas Improvement Company, Philadelphia, Pa., chairman.
 F. R. Coates, Toledo, Ohio.
 C. D. Emmons, Baltimore, Md.
 P. H. Gadsden, Philadelphia, Pa.
 J. H. Pardee, New York, N. Y.
 J. N. Shannahan, Hampton, Va.
 R. P. Stevens, New York, N. Y.
 L. S. Storrs, New Haven, Conn.
 James W. Welsh, New York, N. Y.

CO-OPERATION WITH THE NATIONAL SAFETY COUNCIL

J. P. Barnes, president Louisville Railway, Louisville, Ky., chairman.
 The following American committees and representatives on national organization's committees were continued from last year without change in personnel:
 American Committee on Electrolysis.
 American Committee on Inductive Co-ordination.
 Conference on Street and Highway Safety.
 Mail Pay Committee.
 National Defense.
 National Industrial Conference Board.
 Sub-Committee of the Committee on National Relation on Depreciation.

Engineering Association

AUTOMATIC SUBSTATIONS

Adrian Hughes, Jr., superintendent of power United Railways & Electric Company of Baltimore, Baltimore, Md., chairman.
 L. D. Bale, Cleveland, Ohio.
 W. E. Bryan, St. Louis, Mo.
 C. A. Butcher, East Pittsburgh, Pa.
 C. H. Jones, Chicago, Ill.
 F. W. Peters, Schenectady, N. Y.
 Ralph H. Rice, Chicago, Ill.
 L. R. Wagner, Detroit, Mich.
 E. H. Scofield, Minneapolis, Minn., sponsor.

BUILDINGS AND STRUCTURES

W. F. Graves, chief engineer Terre Haute, Indianapolis & Eastern Traction Company, Indianapolis, Ind., chairman.
 E. D. Eckroad, Akron, Ohio.
 George H. Hodges, New York, N. Y.
 J. D. Kent, New York, N. Y.
 J. R. McKay, Fort Wayne, Ind.
 F. H. Miller, Louisville, Ky., sponsor.
 E. S. Myers, New Orleans, La.

H. R. Stamm, New Haven, Conn.
S. J. Steiner, Aurora, Ill.
Judson Zimmer, Gloversville, N. Y.

CAR AND CARHOUSE WIRING

H. H. Adams, superintendent shops and equipment Chicago Surface Lines, Chicago, Ill., chairman.

R. S. Beers, Schenectady, N. Y.
A. T. Clark, Baltimore, Md.
H. C. Eddy, Newark, N. J.
C. G. Keen, Philadelphia, Pa.
John Lindall, Boston, Mass., vice-chairman.

J. D. McKee, Champaign, Ill.
G. H. McKelway, Brooklyn, N. Y.
G. M. Woods, East Pittsburgh, Pa.

ENGINEERING ACCOUNTING

(Joint Committee)

R. B. Rifenberick, valuation engineer United Railways & Electric Company of Baltimore, Baltimore, Md., chairman.

E. J. Dickson, Providence, R. I.
N. E. Drexler, Hampton, Va.
E. D. Dreyfus, Pittsburgh, Pa.
C. R. Harte, New Haven, Conn., sponsor.

F. R. Phillips, Pittsburgh, Pa.
A. S. Richey, Worcester, Mass.
H. E. Riggs, Ann Arbor, Mich.

ENGINEERING MANUAL

R. C. Cram, engineer surface roadway Brooklyn-Manhattan Transit Corporation, Brooklyn, N. Y., chairman.

Daniel Durie, Connellsville, Pa.
C. R. Harte, New Haven, Conn.

EQUIPMENT

P. V. C. Sec, superintendent car equipment Northern Ohio Traction & Light Company, Akron, Ohio, chairman.

W. S. Adams, Philadelphia, Pa.
W. W. Brown, Brooklyn, N. Y.
R. S. Bull, Pittsburgh, Pa.
A. T. Clark, Baltimore, Md., vice-chairman.
Daniel Durie, Connellsville, Pa., sponsor.

Lawford H. Fry, Burnham, Pa.
J. L. Gould, New York, N. Y.
J. M. Hipple, East Pittsburgh, Pa.
A. C. Jordan, Elmira, N. Y.
J. H. Lucas, Milwaukee, Wis.
W. H. McAloney, Atlanta, Ga.
J. C. McCune, New York, N. Y.
A. D. McWhorter, Memphis, Tenn.
J. F. Miller, Pittsburgh, Pa.
M. O'Brien, St. Louis, Mo.
E. D. Priest, Schenectady, N. Y.
E. S. Sawtelle, Cincinnati, Ohio.
R. B. Smyth, Boston, Mass.
C. W. Squier, New York, N. Y., secretary.

W. G. Stuck, Lexington, Ky.
H. S. Sweet, Utica, N. Y.
H. S. Williams, Detroit, Mich.
J. M. Yount, San Francisco, Cal.

HEAVY ELECTRIC TRACTION

John C. Davidson, engineer electric traction Norfolk & Western Railway, Bluefield, W. Va., chairman.

A. H. Armstrong, Schenectady, N. Y.
J. M. Bosenbury, Springfield, Ill.
C. E. Brown, Napa, Cal.
H. F. Brown, New Haven, Conn., secretary.

Morris Buck, New York, N. Y.

H. W. Cope, East Pittsburgh, Pa.
A. B. Daus, Chicago, Ill.
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G. A. Peabody, Cleveland, Ohio.
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C. A. Alden, Steelton, Pa.
S. C. Baker, East St. Louis, Ill.
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E. M. T. Ryder, New York, N. Y.
A. T. Spencer, Toronto, Ontario, Canada.

J. B. Tinnon, New York, N. Y.
W. W. Wysor, Baltimore, Md.

U. S. DEPARTMENT OF COMMERCE COM-
MITTEE TO CO-OPERATE ON SUB-
JECT OF STANDARDIZATION

R. H. Dalgleish, chief engineer Cap-
ital Traction Company, Washington,
D. C., chairman.
C. S. Kimball, Washington, D. C.
W. W. Wysor, Baltimore, Md.

SPECIAL COMMITTEE ON AIR RESERVOIR
SPECIFICATIONS TO CO-OPERATE WITH
THE AMERICAN SOCIETY OF
MECHANICAL ENGINEERS

R. H. Dalgleish, chief engineer Cap-
ital Traction Company, Washington,
D. C., chairman.
L. J. Davis, Brooklyn, N. Y.
C. A. Ives, Erie, Pa.
J. A. Leeper, Wilmerding, Pa.
J. S. McWhirter, New York, N. Y.

WOOD PRESERVATION

A. P. Way, electrical engineer
American Electric Power Company,
Philadelphia, Pa., chairman.
R. C. Cram, Brooklyn, N. Y.,
sponsor.
M. J. Curtin, Boston, Mass.
J. L. Fritsch, Pittsburgh, Pa.
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E. F. Hartman, New York, N. Y.
W. L. Harwood, Springfield, Mass.
E. L. Morier, New York, N. Y.
L. P. Scanlan, Newark, N. J.
C. A. Smith, Atlanta, Ga.
R. P. Woods, Kansas City, Mo.

Subjects and Meetings

A MEETING of the subjects and
meetings committee was held in
New York on Nov. 20, with the fol-
lowing members present: Chairman
W. H. Sawyer, President Shannahan,
T. C. Cherry, C. R. Ellicott, J. H.
Hanna, Harry L. Brown, J. W. Colton,
H. C. Clark, and Secretary J. W. Welsh.

The nature of the morning, afternoon
and evening sessions for the Midyear
Meeting at Washington were outlined
and speakers considered. It was the
general consensus that a forum dis-
cussion would be highly desirable and
a portion of both morning and after-
noon sessions will be set aside for this
purpose. Certain subjects will be
suggested for these discussions—sub-
jects on which it is likely that a dif-
ference of opinion will exist—so that
the delegates will be inspired to express
their views and thus tend to bring out
some worth-while points of view for
the benefit of the members.

The next meeting will be on Dec. 19
in New York.

Special Trackwork Committee

THE A.E.S.C. sectional committee on
specifications for special trackwork
met at New York on Nov. 24. Those
present were V. Angerer, chairman;
R. C. Cram, H. H. George, C. A. Alden,
E. B. Entwisle, G. L. Fowler, C. L.
Hawkins, R. E. Hess, E. P. Rounder,
E. M. T. Ryder, J. B. Strong, and G. C.
Hecker.

Specifications for special track were
discussed and the form of report to be
made was considered.

News of Other Associations

Public Relations Discussed at West Virginia Convention

Water Power and Regulation Were Other Topics at a Two-Day Meeting
of the West Virginia Public Utilities Association,
Held in Charleston on Nov. 14-15.

WATER-POWER problems and
the difficulties of the street
railway and telephone companies were
discussed at the seventh annual con-
vention of the West Virginia Public
Utilities Association, which was held
at Charleston Nov. 14 and 15. It was
attended by 120 utility executives.
The convention lasted two days, the
first day's session ending with a ban-
quet, while on the afternoon of the
second day the delegates attended the
annual football clash between West
Virginia and Washington and Lee.

Officers elected were: President, Men-
tor Hetzer, vice-president and general
manager Moundsville Water Company;
first vice-president, W. R. Power, man-
ager Consolidated Heat, Light & Power
Company, Huntington; second vice-
president, J. E. Harsh, vice-president
Virginia Power Company, Charleston;
third vice-president, J. D. Whittemore,
general manager Monongahela-West
Penn Public Service Corporation, Fair-
mont; secretary, A. Bliss McCrum,
Charleston; treasurer, A. M. Hill,
Charleston.

D. I. McCahill, general counsel West
Penn System, said it was an accepted
fact that public service could best be
rendered by a company, and that the
investments of public service com-
panies should be protected against
wasteful competition. No monopoly
was necessary, but "fly-by-night" op-
position was taboo. He said that it was
also recognized that unfair regulation
of these companies would be more un-
fair to the public, which would suffer
because of the lack of investment in
the company and hence the curtailment
of the service.

"Unless companies are allowed to
prosper sufficiently to attract capital
the public will suffer," he said. "That
is why a liberal policy has always been
the desire of public service corpora-
tions and reasonable rates have been
assured the public. This policy sta-
bilizes business and enables the utilities
to give the utmost service.

"But every utility must have a pub-
licity bureau to let its works be known.
The troubles of utilities are nearly
always because of misunderstandings
with the public, because they do not
know how to express themselves. The
legislatures are made up of patrons of
the public utilities. If the public utili-
ties have not taken their patrons into
their confidence or won their good will,
they can never expect legislatures that
will understand their works. The pub-
lic utilities must tell the whole truth
to the public and the newspapers are
the only mediums."

In extending cordial welcome to the
delegates Mayor Wertz said, among
other things: "When I was a lawyer
I was nothing loath to begin suits
against the cold-blooded corporations.
In those years you couldn't reason with
public utility officials. It was simply
a case of smacking down the papers
in court. Today when such a suit
threatens it is only necessary to call
up the utility company at fault and
every effort is made to redress the
misfortune. It is because you have
human officials and the human idea in
business, and let me assure you that
the public appreciates that spirit."

John B. Garden of Wheeling, man-
ager Wheeling Electric Company, said
Wheeling was the fourth city in the
United States to have electric cars in
operation. He traced the early advent
of power into Wheeling, which was
the first stand of the electric utilities,
and said that it was by no means a
rosy road to success.

A talk on "Electric Railways of
Today" was delivered by R. P. Stev-
ens, president Republic Railway &
Light Company of New York, who
said that the street railways of America
have an investment in this country of
\$5,000,000,000 and carry 15,000,000,000
passengers annually. He said that
such an investment and service would
never be surpassed and that any talk
of bus service superseding the railways
was already known to be of the idle
myth variety.

"Our problems are of today and not
of yesterday," he said. He explained
the "come-back" of the railways fol-
lowing the World War. Prior to that
time too many companies were ready
to sit silent and let the demagog
threaten. The public got thinking
that where there was so much smoke
there must be fire and judged the
amount of fire by the uncontradicted
accusations. It became difficult for
the companies to do business, and in
their frantic zeal to stay in the game
they cut fares to secure new extensions
and leases, and then the government's
statisticians found that the companies
were really trying to operate while
losing money. Then came the reaction.

For a time while this reaction to a
sane level was in progress, there de-
veloped a second cloud in the form of
bus transportation, he said. But every
city in the United States of more than
50,000 population that had tried bus
service exclusively has asked the street
railways to come back. However, the
companies are finding more and more
success by using buses as auxiliaries.

Mr. Stevens said the municipal own-

ership failures that could be cited were legion. The people knew of all these and the one-time clamor had subsided. Independent control of the railways or supervision by a public utility commission safeguarded the public, and where roads were under such supervision they usually were popular, he said. He advocated a step further, pointing out that if government control wasn't desired, neither was ownership of utilities by a few men. He advocated customer ownership and pointed out that the public wants to buy such stock. He said that 25 offerings of 21 companies, aggregating \$75,000,000, had been gobbled up by investors who knew that their money was safe.

A. Bliss McCrum, executive secretary of the association, briefly reviewed the work of the body since its formation on Sept. 16, 1915. He explained that the association was a clearing house

for ideas of the same business of the whole world. New ideas, from whatever source, were passed on to the members, and in turn any suggestions from the members would be appreciated.

James Weir, field secretary of the West Virginia Publishers and Employing Printers' Association, said that the public utilities must advertise to tell of their service. He told about some companies whose excellent service is absolutely unappreciated, because the public has not been kept informed. This is because the companies are short-sighted enough to think that advertising is an expense instead of an investment. However, if companies advertise and then do not follow up with good service, that advertising is futile. But, the speaker said, the growth of service among public utilities has been such that the public has ceased criticising, even though the reason might not always be understood.

Efficient Bus Lighting*

By L. C. PORTER AND A. C. ROY

Commercial Engineering Department, General Electric Company, Harrison, N. J.

A GENERAL survey of bus lighting conditions as they existed in 1923 indicated that the average bus contained: (1) Six inefficient inclosed dome fixtures, generally badly in need of cleaning and usually with one inoperative, due to a burnt-out or missing lamp; (2) 2 or 4-cp. lamps of inferior quality in the dome fixtures; (3) medium color finish on walls and ceiling; (4) wire of sizes too small to carry the lighting load without excessive drop in voltage, and (5) battery of inadequate capacity.

After analyzing the data that had been collected, tests were made in a motor bus body and results showed that sufficient light must be provided to insure the safety of the passengers upon entering or leaving the bus. Elderly people, ladies and those carrying babies require much more light than the younger or more active persons. To prevent eyestrain in case the passengers chose to read, more illumination must be provided in buses than is found in trolley cars because of the more intense vibration and subjection to jolts with the subsequent shifting of print. To secure the maximum value from the ad cards plenty of light is required. As an aid in creating the "riding habit" the interior should present a cheerful and inviting atmosphere. In order to care for all of these points an intensity of about 7 foot-candles upon the reading plane is necessary. Under ideal conditions 1 watt per square foot of floor space will give approximately 4.7 foot-candles of illumination. To secure 7 foot-candles of illumination in a 21-ft. body it is necessary to provide 1.5 watts per square foot or a total of 178.5 watts.

Of the lamps available the 21-cp. gas-filled Mazda lamp is to be preferred. The 6-8-volt 21-cp. lamp consumes 17.84 watts, while the 12-16-volt lamp consumes 16.82 watts. The number of lamps required is 10.

*Abstract of paper presented before the New York section of the Illuminating Engineering Society, Nov. 13, 1924.

As the incandescent filaments of lamps have a high brilliancy, it is necessary, in producing comfortable illumination, that the eye be shielded from this source. Reflectors serve to obscure the filament or diffuse the light, so that it is not directly visible from usual visual angles. As a means of protecting the lamp bulb from breakage, a reflector is also of great assistance.

Light-directing fixtures for motor coach lighting may be classed as (1) Reflector units or those made of glass and open at the bottom, and (2) Dome units in which the lamp is totally inclosed.

Since the question of proper maintenance is a vital factor in good lighting practice, it is desirable to consider these questions: Is it of a shape that will tend to collect dirt? Does it have a metal reflector that will tarnish with age? Are there deep crevices which will be difficult to clean? Are the surfaces roughened and hence dust catchers requiring scrubbing to be made clean? Are there many parts to remove in order to clean the glassware properly and replace the lamps? Do these parts fit easily or are they held in place by small screws, clips, or other devices requiring considerable "juggling"? Are the fixtures constructed so as to withstand the severe vibration to which they will be subjected?

Number and Arrangement of Ceiling Outlets. The number and arrangement of ceiling outlets is governed primarily by the hanging height, i.e., the distance from the floor to the ceiling. The headroom in the average bus is seldom over 6 ft. 3 in. If reflector fixtures are installed the distance from the floor to the lower edge of the fixture will be less than 6 ft. Tall passengers will undoubtedly strike their heads on them. With fixtures that are placed up in the roof and flush with the ceiling there is still a very undesirable condition that cannot be overcome with fixtures in the central position. Standing passengers cut off the light that normally should reach the seats and the entire lighting

plan is defeated. If, however, there were a headroom of 7 ft. as is found in trolley cars the central fixture would be more suitable. Lamps placed in two rows with each row from 12 to 15 in. from the side of the bus is by far the most desirable arrangement. Here, the reflectors will be out of the way of the standing passengers or those entering or leaving the bus, and the light will not be hindered from reaching the reading plane about the seats.

To insure an even distribution of light the fixtures should be placed from 3 to 3½ ft. apart. The last fixture should be placed about 1½ ft. from the rear wall and the others spaced accordingly. In general, the following number of ceiling outlets should be provided in the bodies listed:

| Length of Body | Number Ceiling Outlets | Minimum Candle-power of Lamps |
|------------------|------------------------|-------------------------------|
| 16 ft. to 18 ft. | 6 | 21 |
| 18 ft. to 20 ft. | 8 | 21 |
| 20 ft. to 22 ft. | 10 | 21 |

No matter how carefully designed a lighting system may be as to type and size of lamps, type and make of reflector, spacing, height, etc., if the surroundings are not adapted to reflecting such light as strikes them, an inefficient system may result. The question of proper painting of walls and ceilings is therefore of great importance.

The results of tests of the effect of color of walls and ceilings made in motor bus are listed in the following table:

INCREASE IN FOOT-CANDLE INTENSITIES PER CENT

| | Dark Ceiling | White Ceiling | White Ceiling Light |
|--------------------------|--------------|---------------|---------------------|
| | Dark Walls | Dark Walls | White Walls |
| Eight bare lamps..... | Std. 0.0 | 71.0 | |
| Eight dome units..... | 58.0 | 61.0 | 71.0 |
| Eight reflector units... | 84.0 | 110.0 | 132.0 |

Lamps of 21-cp. were employed in each of these tests. For the same expenditure of energy the per cent increase in foot-candle intensities is clearly shown. Assuming eight bare lamps as a basis of comparison in a bus having dark oak walls and ceiling an increase of 84 per cent in intensity may be obtained simply by placing reflectors over the lamps. By painting the ceiling glossy white and the walls light oak and using reflectors over the same eight lamps the intensity may be increased 132 per cent.

Step Lighting — Step lighting on motor buses has never been really adequate but the need for such lighting is clearly evident from the safety aspect. Passengers frequently get off a bus facing the rear. It is hard enough to regain one's balance in broad daylight if the bus should give a start, but at night with no light to see by it is still more difficult. As a consequence passengers hang onto the grip or hand rail longer when getting off. This is particularly noticeable in inclement weather. When getting on a dark step of a bus there is a natural pause.

These things were observed and studied in detail, and actual stop-watch checks were made of the time required

to take on and discharge passengers on various runs in the city of Newark. These tests showed that the time taken to get on a bus which had no step light was 11.4 per cent greater than where a good step light was used. Also it was found that 14.8 per cent longer time was required to get off from an unlighted step. With respect to poorly lighted buses, it would appear that in the course of an evening's run, considerable time could be saved by the bus operator if he had his bus equipped with a good step light. Certainly for the sake of safety and convenience to his passengers he should provide this.

While much has been said regarding the standardization of higher voltages it would appear, after considerable study of the matter, that the 12-volt system embodies most of the points necessary for successful operation as far as the lighting is concerned. It is doubted if buses will ever be constructed to seat more than 70 or 75 people. A double-deck bus of this capacity would require the following number and sizes of lamps:

| LOWER DECK | | |
|--|--------------|---------|
| | Candle-power | Amperes |
| Nine ceiling | 21 | 10.44 |
| Two headlights | 21 | 2.32 |
| Two platform | 21 | 2.32 |
| One dash | 2 | 0.19 |
| One rear | 2 | 0.19 |
| Three destination | 2 | 0.57 |
| UPPER DECK | | |
| Ten ceiling | 21 | 11.60 |
| One platform | 21 | 1.16 |
| Two danger signals | 21 | 2.32 |
| One periscope | 21 | 1.16 |
| Total lighting load | | 32.27 |
| Buzzers, stop light, etc., intermittent load | | 1.00 |
| | | 33.27 |

Reduced to watts this is $33.27 \times 14.5 = 482.4$ watts. The 600-watt generator, which is in standard production at the present time, would amply take care of 483 watts, lighting and buzzer load and have 117 watts excess power. This amount of power will light seven additional 21-cp. lamps. Starting loads have been neglected, for the total number of ampere-hours required is very small.

The subject of voltage drop is very serious. On a 110-volt circuit 1 or 2 volts drop means only 1 or 2 per cent drop, but where only 6 volts are used, as in buses, 1 volt amounts to 16 2/3 per cent. The effect of decreased voltages upon the candle-power output of both the 6 and 12-volt, 21-cp. Mazda lamps is as follows:

| Voltage at Lamp Socket | Candle-Power Output of Lamp |
|------------------------|-----------------------------|
| 6-8 Volt Lamps | |
| 7.00 | 23.0 |
| 6.50 | 21.0 |
| 6.25 | 19.3 |
| 6.00 | 15.5 |
| 5.75 | 13.8 |
| 5.50 | 11.5 |
| 5.25 | 9.2 |
| 5.00 | 7.8 |
| 12-16 Volt Lamps | |
| 15.0 | 23.0 |
| 14.5 | 21.0 |
| 14.0 | 19.3 |
| 13.5 | 16.8 |
| 13.0 | 14.7 |
| 12.5 | 12.6 |
| 12.0 | 10.5 |

The average jitney was wired with No. 16 stranded wire. A recommended list of wire sizes follows:

| Size American Wire Gage | Area Circular-Mils | Current* Capacity in Amperes Rubber Insulation |
|-------------------------|--------------------|--|
| 14 | 4.110 | 0-5 |
| 12 | 6.530 | 6-8 |
| 10 | 10.400 | 9-15 |
| 8 | 16.500 | 16-24 |
| 6 | 26.300 | 25-30 |

*The ampere-capacity range given in the table above is suggested in order to reduce the voltage drop throughout the lighting circuit to a minimum.

WIRING FOR 21-FT. BUS BODY HAVING 8 to 10 21-C.P. CEILING LAMPS

| Points of Connection | Size of Stranded Wire | |
|-----------------------------|-----------------------|----------|
| | 6 Volts | 12 Volts |
| Battery to ground | 6 | 8 |
| Battery to ammeter | 6 | 8 |
| Ammeter to switch busbar | 6 | 8 |
| Switch throughout circuit | 10 | 12 |
| Connections to lamp sockets | 14 | 14 |
| Common return to ground | 6 | 8 |

Lamp Sockets—With the application of miniature lamps to automobile service, it was found that the screw bases originally in use worked loose in the sockets due to vibration. The bayonet base was introduced to overcome this objection and provide the positive positioning of the light source required in headlights and spotlights. The lamps are based with the pins at right angles to the plane of the filament. The single-contact bayonet socket has now been standardized by practically all manufacturers because of economy in wiring, lower voltage drop, simplified socket construction; and other mechanical and electrical advantages.

The total ampere drain on the storage battery exclusive of starting is shown in the following table.

| | Candle-power | Total Amperes | |
|---|--------------|---------------|----------|
| | | 6 Volts | 12 Volts |
| Continuous Lighting Load | | | |
| Two headlight lamps | 21 | 5.62 | 2.32 |
| One rear lamp | 2 | 0.47 | 0.19 |
| One dash lamp | 2 | 0.47 | 0.19 |
| One gen. indicating lamp | 2 | 0.47 | 0.19 |
| One fare box lamp | 2 | 0.47 | 0.19 |
| One stop light lamp | 21 | 2.81 | 1.16 |
| Ten ceiling lamps | 21 | 28.10 | 11.60 |
| Total continuous lighting load | | 38.41 | 15.84 |
| Other Intermittent Operating Devices | | | |
| One stop light telltale | 2 | 0.47 | 0.19 |
| One stop light | 21 | 2.81 | 1.16 |
| Buzzers | .. | .. | .. |
| Total intermittent load in amperes | | 3.28 | 1.35 |

Assuming that on continuous discharge the intermittent load as given would amount to 2 amp. at 6 volts or 1 amp. at 12 volts the total load on the generator would be 40.41 amp. for the 6-volt system or 16.84 amp. for the 12-volt system. The starting load would amount to considerably less than 1 amp.-hr. and so it has been neglected in these computations.

It is recommended that a battery of such size as will carry the entire lighting load for from 6 to 8 hours with the generator idle be selected. This is particularly desirable where the bus is operating on short runs with long layovers. Choosing the mean of 7 hours and multiplying this by the number of amperes required the ampere-hour capacity of the required battery is 280 amp.-hr. and 119 amp.-hr. respectively for the 6 and 12-volt systems.

In summarizing, the following is recommended as the best practice in motor bus lighting.

1. That 21-cp. Mazda C lamps be used in the ceiling fixtures.

2. That 21-cp. Mazda C lamps be used in the step light.

3. The single contact bayonet base case of the type recommended be accepted as standard.

4. Two types of lamps be standardized, viz.: 2 and 21-cp.

5. Reflector fixtures be employed for the ceiling lights.

6. The ceiling be painted gloss white.

7. Six ceiling lamps of 21 cp. be used in bodies 16 to 18 ft. long; eight ceiling lamps of 21 cp. be used in bodies 18 to 20 ft. long; 10 ceiling lamps of 21 cp. be used in bodies 20 to 22 ft. long.

8. Ceiling outlets be arranged on two circuits and be placed on the ceiling 12 to 15 in. from the side walls.

9. Wire of the recommended sizes be employed throughout.

10. All wire joints to be soldered.

11. Battery and ground connections be made as outlined.

12. Switches of ample size be installed.

13. All lighting circuits fused.

14. A suitable switch and fuse panel be adopted.

15. A battery of sufficient capacity to carry the lamp load for from 6 to 8 hours exclusive of generator be provided.

16. The generator be of ample capacity to keep battery charged.

17. Voltage regulation be provided.

18. The 12-volt system be standardized.

New England Club Meeting

THE December meeting of the New England Street Railway Club will be held at the Copley Plaza Hotel, Boston, Mass., on Dec. 4. The afternoon meeting, which will be called to order at 4 o'clock, will be devoted to a paper on "Maintenance Costs of Car Equipment," by Henry S. Day of the Westinghouse Electric & Manufacturing Company.

Two papers will be read at the evening meeting: "Maintenance of Street Railway Personnel," by S. F. Fannon, director division of public service, Sherman Service, Inc., Boston; and "Street Railway Economics," by T. N. Carver, professor of economics Harvard University.

Motor Freight Tariffs in C. E. R. A. Territory

AT THE last meeting of the Central Electric Traffic Association the committee on freight tariffs and rates agreed to secure information from the various states with regard to I. C. C. Cause No. 14,828. The committee reports:

In Indiana the Public Service Commission has no jurisdiction over trucks and for that reason no tariffs can be filed in connection with trucking companies where they are made participating carriers. The only way this can be handled is to consider any points reached by them as a station on the line of the railroad which issues the tariff and operates in connection with the truck line.

In Michigan it is entirely legal for any lino to start this service provided a permit is first obtained from the Michigan Public Utilities Commission, and there is nothing in the law tending to restrict joint service between electric lines and truck lines.

In Ohio the truck companies are under the jurisdiction of the Public Utilities Commission and joint tariffs may be filed covering service in both directions in connection with them.

City Fares in Northern and Central Europe*

The Use of Flat and Zone Fares Is Fairly Equal—In Addition There Is General Use of Special Rates for Workmen and Wholesale Riders, Either with Individual Ride or Season Tickets

BY AUGUST WINTER
Vienna Municipal Railway

OWING to the catastrophic fall in German exchange during the year 1923, this paper can present only a fraction of the conclusions which would otherwise have been possible with regard to the influence of different fare systems. Furthermore, the results which are presented require subdivision because of the unequal influence of the World War on the economic status of members in Germany, the neutral states (viz., Norway, Sweden, Denmark, Holland and Switzerland) and in the Austro-Hungarian succession states. The subdivision as to population follows:

CLASSIFICATION OF STREET RAILWAYS REPLYING TO FARE QUESTIONS

| Number of Cities of: Population | Germany | Neutral States | Succession States | Total |
|------------------------------------|---------|----------------|-------------------|-------|
| Over 1,000,000 | 2 | 1 | 1 | 4 |
| 700,000-800,000 | 1 | 1 | 1 | 3 |
| 600,000-700,000 | 2 | 1 | 1 | 4 |
| 500,000-600,000 | 2 | 1 | 1 | 4 |
| 400,000-500,000 | 3 | 2 | 2 | 7 |
| 300,000-400,000 | 3 | 1 | 1 | 5 |
| 200,000-300,000 | 2 | 2 | 2 | 6 |
| 100,000-200,000 | 6 | 5 | 3 | 14 |
| Under 100,000 | 3 | 5 | 4 | 12 |
| Total | 24 | 15 | 8 | 47 |

Of the reporting properties 30, or 64 per cent, are municipally owned; 11 properties, or 23 per cent, are owned entirely by private capital; and in the case of the remaining six properties, or 13 per cent, the city is the controlling shareholder to the extent of at least 50 per cent.

Three-fourths of the reporting street railways handle all the mass transport of their cities except for a little steam traffic. Competition is of account only in 12 cities, and outside of Berlin and Hamburg rarely amounts to more than 25 per cent of the total traffic. In Germany's largest two cities the subdivision of traffic is as follows:

| | Berlin | Hamburg |
|--|--------|---------|
| Street railways | 51.68 | 40.1 |
| Steam railroads (electrified at Hamburg) | 32.6 | 43.2 |
| Elevated | 12.47 | 15.7 |
| Buses | 3.25 | 0.31 |
| Boats | ..... | 0.65 |

Vienna is unique in that its nearly 2,000,000 inhabitants have no rapid transit, so that the street railways carry about 95 per cent of the traffic. While a rapid transit system was laid out just before the war, the nearest approach to rapid transit is the coming electrification of the old steam Stadtbahn, which has been leased by the government to the city of Vienna. This railway is 38.8 km. (24 miles) long. Its layout is unfavorable for

*Abstract of a paper before the Internationaler Strassenbahn und Kleinbahn Verein, Homburg von der Höhe, September, 1924.

rapid transit, but it did carry about 40,000,000 passengers (8 per cent of the total traffic) a year up to the time of its shutdown on Dec. 8, 1918.

FLAT AND ZONE-FARE SYSTEMS

A tabulation of fare systems shows that of the 47 undertakings, 22 had unit fares and 25 some form of distance fare. In Germany the proportion was as 10:14; in the neutral states as 11:4; in the succession states as 1:7.

The totals show that the unit and zone-fare systems are fairly equal in number. The effectiveness of one or the other most depend upon local conditions and on the degree to which the public has become accustomed to either. In general, the unit fare preponderates in northern Europe and the zone fare in central Europe, as in Switzerland and the succession states. Berlin is on a flat-fare basis, while Hamburg favors distance fares. [EDITORS' NOTE—The original Berlin franchises called for a 10-pfennig fare in the city proper and 15-pfennig fares on the western suburban routes.]

PROPORTION THAT FARE BEARS TO WAGES

The most desirable measure of the relative highness of fares in different communities appears to be the ratio of the fare to the weekly earnings of an average workman. If F is taken to represent the average fare and W the weekly wage the following table appears for the value $\frac{F}{W}$:

| Cities | $\frac{F}{W}$ in Ten-thousandths |
|-------------------|----------------------------------|
| Scandinavian | 20 to 25 |
| Dutch | 24 to 29 |
| Swiss | 15 to 23 |
| Succession states | 30 to 38 |

German cities have been omitted from the foregoing table because the economic situation was too unsettled at the time this paper was prepared. In any event, the proportion for them is believed to be greater in most cases than in those included.

Another relation is the annual expenditure for fare compared to the local weekly wage. Let n represent the number of rides per annum. Then the annual expenditure will be " $F \times n$ ". The relationship to the weekly wage W is given by the equation $x = \frac{Fn}{W}$. As

the value of $\frac{F}{W}$ for any given group of cities has already been determined as a constant K , we can write our equation as $x = Kn$

We know, of course, that the number of rides (" n ") per inhabitant per

annum tends to increase with increase of population and area. Taking

Vienna as an example, we have:
 $F = 1370$ Kroner.
 $W = 630,000$ Kroner.
 $n = 285$.

Then

$$x = \frac{Fn}{W} = 0.62$$

Eliminating the German cities, it is found that the value of x in the smaller cities is 0.16 to 0.20; and in the larger cities, 0.5 to 0.6. In certain German cities, x attains as high a value as 0.8. This value brings the annual expenditure per inhabitant in comparison to the weekly wage up to the limits usually found only in world cities such as London. For example, Lord Ashfield in the June, 1921, *Nineteenth Century and After*, figured that a typical London family of five persons spend £16 a year, or four weekly wage payments, for transport. This amount corresponds to the value $x = 0.8$, since 0.8 multiplied by 5 (persons) = 4 (weekly wages). In Vienna, the value of 0.62 multiplied by 5 (persons) = 3.1 (weekly wages); but in some months of 1922 and 1923 the limit of 4 was attained.

Most of the undertakings reported that different rates of fare were charged according to time of day. About one-fifth of the properties (chiefly in the neutral states) sell individual reduced-rate rides for workmen; but all of the others except five cities have a substitute for this in the form of weekly cards or similar whole sale purchase concessions. The workmen's rates are usually valid up to times varying between 7:30 a.m. and 8:45 a.m. The reduction ranges from 30 to 50 per cent.

Limited-ride weekly cards are more common in German cities but season tickets, punch cards, tear-off coupon or ticket books are used in individual cases. One undertaking sells a workman's card which is valid during the morning hours to 8 o'clock; between 1 noon and 2 p.m.; and between 5 and 7 p.m. Another railway runs special workmen's cars from 3 a.m. onward with a reduction of 25 per cent. Only one property has departed from the peak hour, reduced-rate custom by granting a lower rate between 9 and 12 a.m. when traffic needs most encouragement.

Higher fares for night hours begin in some cases, as early as 7 p.m., but the usual hours are 9 to 10 p.m. with a few choosing an hour or two later. The night fare is generally one or one-half to two times the ordinary fares. In the case of after-midnight or owl service, there are seven properties which charge double to triple the ordinary rates. A detail tabulation follows:

PER CENT FARE DIFFERENTIALS ACCORDING TO HOURS AND HOLIDAYS

| | Number of Railways | Reduction or Increase |
|----------------------|--------------------|-----------------------|
| Early morning | 10 | 30 to 50 |
| Late forenoon | 1 | 37 |
| Late evening | 19 | 14 to 100 |
| Owl | 7 | 20 to 230 |
| Round trip | 3 | 25 to 50 |
| Sundays and holidays | 2 | 21 to 25 |
| | 5 | 46 to 100 |

Individual round-trip tickets (sold at 28 per cent reduction) are used in but one city. On two other properties, the holder of a transfer costing nothing to 50 per cent more is at liberty to return or to take a second ride at any time during the day.

It will be noted that seven systems have a different fare on Sundays and holidays, two making a reduction and five an increase in the rates. In some cases, the rate on holiday afternoons is double that of the morning, but not higher than the standard weekday fares.

On 31 properties transfers are free; on eight they cost 20 to 50 per cent more and on five they are not granted at all. The rules vary greatly as to the permissible number of car changes. A check at Vienna of season ticket or pass users revealed a transfer ratio of 80 per cent as follows:

20 per cent used no transfers.
46.7 per cent transferred once.
24.5 per cent transferred twice.
7.3 per cent transferred thrice.

1.5 per cent transferred four times.
In other cities, the transfer ratio is generally 25 to 30 per cent, with some cities below this range and others as high as 50 per cent. [EDITORS' NOTE—The transfer indentifications as described in the paper are similar to those of American practice.] In a few cases the time limits are good for two hours or even for the entire day.

Children are carried free up to ages varying from two to six years or, in some instances, if they are not more than 1 m. (39.4 in.) tall. Most railways grant a concession to children up to twelve or fourteen years of age or, in some cases, if they are not more than 1.3 m. (51.2 in.) tall. The average reduction is 50 per cent, with some as low as 25 per cent and one as high as 88 per cent.

Three cities charge foreigners double to triple the standard rates.

A standard fare is the customary extra charge for parcels, only four undertakings charging by dimensions and three by weight. Twenty-three out of 33 which answered this question made no charge for small parcels. Twenty-five charged for large parcels and one carried them free with the understanding that the motorman would receive a tip. Large parcels are carried on the front platform.

Lap dogs are generally carried free, but sometimes a children's or a standard fare is exacted. Large dogs must ride on the front platform.

PREPAY TICKETS BECAUSE OF PAPER MONEY

Following the elimination of metal money up to 80 per cent of the properties came to sell prepayment tickets to avoid the bother of paper money. The reduction for these prepaid fares averages 25 per cent; and the proportion of prepaid riders from 30 to 40 per cent. Swiss properties make use of both ticket books and punch cards. The books contain 18 to 33 (occasionally 50) individual tickets sold at reductions of 16 to 30 per cent. All but 10 of the German roads sell books of 10 tickets ordinarily and in other cases

of five, six, 12 or 25 tickets. In but one case are these books non-transferable and usable only with the purchaser's photograph. These German books are sold at cuts of 7 to 20 per cent and they bring 15 to 25 per cent of the rides.

Of cities with more than 1,000,000 inhabitants, Vienna offers the only example of an important ratio of prepaid tickets. It has 21 varieties to account for 25 per cent of the traffic. The reduction ranges from 6 to 10 per cent for adults; and to 50 per cent for children.

Nine properties use punch cards and a still smaller number use tear-off coupons. Five properties issue paper tickets, but these are sold without any reduction in rate.

Four of the northern properties are using fare boxes and two of these also have automatic change-makers. Fare receipts are issued in many varieties with or without commercial advertising. On 15 properties in Germany, the fare receipts bear a simplified routing plan which is helpful to both passenger and conductor.

Almost all properties provide their conductors with punches and money satchels; with blue pencils for cancellation of receipts, transfers and tickets and with boxes for carrying the latter, etc. Practices concerning use of cancellation punch, tear-off and blue pencil vary greatly. Conductors are charged out daily with the value of tickets taken and they must make daily reports; but final settlement in most cases is made monthly, except on the smallest properties where daily settlements are the rule.

WEEKLY CARDS AND SEASON TICKETS SHOW WIDE DIVERSITY

Weekly cards and season tickets for periods ranging from half a month to a year are sold on all but nine properties. The weekly cards are for either 12 or 24 trips, such numbers as 13 and 14 being exceptional. Only 13 properties impose a non-transferability rule and of these but three require photographs of the original buyer. These weekly cards are usually limited to given routes and times of day. Exceptions include a weekly card which permits one ride on six successive Sundays. Weekly cards for students are sold at reductions up to 50 per cent.

As regards season tickets or passes there is a wide diversity in the extent to which they are used by the owners. It is assumed that a system-pass buyer will ride 100 to 200 times a month, and in some cases, 250 to 300 times. A traffic check made in Vienna during 1923 showed that the monthly cards were used about 200 times a month. [This includes the 80 per cent transfer ratio previously mentioned by the author.—Eds.] Individual route cards varied in use from 100 to 150 rides a month to a maximum of 210. The same habits are predicated of semi-annual and annual cards, but few are sold for such long periods. As transferable passes are assumed to have more use than personal passes, they cost 50 to 100 per cent more. Swiss

properties sell passes on the basis of a decreasing charge for successive months within the same year.

To avoid the uncertainty of unlimited-ride transportation, some railways sell season tickets limited to two or four rides a day, which makes them similar to punch cards.

The popularity of the weekly cards and season tickets is shown by the fact that they account for 18 to 27 per cent of the rides in the large cities and 44 per cent of the rides in the other cities. The weekly cards secure about two-thirds of this wholesale traffic, attaining in some cases to 30 per cent of all traffic in a given community. In the metropolitan cities, the weekly cards account for only 3.5 to 8.5 per cent of the traffic. The proportion of system to individual route cards is as 2:3.

A comparison of the year 1923 with 1913 shows that most railways are doing a bigger share of their business with these wholesaling plans than in the past. In Vienna the increase has been fourfold, due chiefly to the inauguration of such cards for shorthaul riding. The latter type of cards in themselves account for 11 per cent of the traffic. Many cities have doubled their use of these cards and a few have trebled.

Season tickets are almost always non-transferable, and of the non-transferable type, 49 per cent must bear the buyer's photograph. The cards are renewed from month to month by means of stamps or, where no photographs are used, by purchase of entirely new cards. Season tickets are generally good on all days of the week; otherwise some increment is charged for Sunday all day or afternoon riding. They are sold at special reductions to employees of the public services, students, war cripples, blind, feeble-minded, etc.

NUMBER OF PASSENGERS PER CONDUCTOR

From the author's researches, the number of passengers per conductor employed seems to average one per 105,000 passengers per annum. Only eight of the reporting properties used secret service in addition to the uniformed inspectors. On 15 properties, the ride-stealing passenger may be fined twice to ten times the standard fare.

The economic disturbances caused by the World War are shown at their worst in Germany where there were some 64 changes in rates, 30 to 40 of which occurred during the year 1923. During 1924, the gold standard mark (Rentenmark) was restored, and to date two to three reductions, amounting to 20 to 25 per cent, have usually been made in fares—sometimes three to five reductions. The succession states have had fewer variations in fares from pre-war days, viz., seven to 28. Vienna has had 22 changes in fares since 1913 of which nine came in 1922, when it was possible to make reductions of 5.9 per cent and 6.3 per cent.

The standard base fare in Germany before the war was 10 pfennigs (2½

cents). The present base fare on the gold standard is usually 15 pfennigs (3½ cents). Sometimes, the base fare is now figured on one instead of two initial sections or on a shortened initial section. Some properties charge double the original fare but have lengthened the ride for the base fare. In the neutral countries, present fares are 1.6 to 2 times the pre-war rates, and in one case they are 2.33 times as much.

These increases in fare were necessitated by increases in materials and wages. Before the war, wages amounted to 40 per cent of total expenses; during the war and after, to 70 per cent and more. In the neutral states, the ratio of wage increase to fare increase was as 1.7-2.3 to 1; and in the succession states as 1.6-2.2 to 1.

The only thing that enabled some undertakings to continue business under these conditions was that the density of traffic was raised in proportions like the following:

| Cities | Passengers per Car—Kilometer | |
|-----------------------|------------------------------|----------|
| | 1913 | 1923 |
| Scandinavian..... | 3.4—4.5 | 3.3—7.5 |
| Dutch..... | 4.0—4.3 | 3.6—5.3* |
| Swiss..... | 3.9—5.2 | 3.9—6.0 |
| Succession states.... | 2.1—3.9 | 3.4—4.9 |

* Year 1924

During the worst period of the exchange situation, 47 German street railways ceased operation. Nineteen of these were restored by May, 1924.

CONCLUSIONS

The changes which have occurred since 1913 have not been confined entirely to fares, although the tremendous upheaval caused by the war led to much experimentation back and forth—zone properties trying unit fares and vice versa. It is significant that in most cases the original system was restored, although compared with 1913 there seems to be a small increase in the number of unit fare systems.

Equipment and Possibilities of One-Man Cars*

More Than Half the Operators Use One-Man Cars—The Amsterdam Design Has Electro-Mechanical Safety Devices and, Like Malmo, Uses Passenger Stop-Light Instead of Bell or Buzzer Signals

BY T. EGBERT VAN PUTTEN AND EINAR HULTMAN
Amsterdam, Holland Malmö, Sweden

AFTER reviewing the course of one-man car development in the United States, the authors state that the consequences of the World War did not permit Europeans to follow with the same broad use of automatic equipment. The majority of one-man cars were simply the original vehicles with one man less and with entrance and exit (usually) at the front platform only. The delays so caused were not relished by the public nor did the operators themselves show enthusiasm for a system that increased their labors.

Nevertheless, the economies of one-man operation have been so great, even in the crudest installations, that every effort must be made to overcome these difficulties. This is obvious when one considers that on 55 properties which replied to the questionnaire and which operate very largely with two-man cars, the cost of platform labor averages 36 per cent of the income and 41 per cent of the outgo.

In view of this, it is desirable to introduce one-man operation gradually on many systems and, where possible, increase the service so that the rate of personnel reduction will not exceed the normal proportion of resignations. The authors of the paper, in submitting replies to the questions following, note that as conditions are rapidly changing, the answers received some time ago might be modified now.

Out of 57 replies to the question, "Do you believe that the increasing competition of motor buses will influence one-man car operation, aside from the general financial troubles now prevail-

ing?" 35 were negative, 10 positive and 12 were either in doubt or considered the problem did not touch them. The authors state that owing to the large increase in motor-bus competition during the preceding year, a round robin at this time might prove more instructive. They believe that the motor bus now run in part as one-man vehicles, can become a very serious competitor. The buses are allowed to operate under more favorable conditions, notably in having no responsibility for paving expense; and in not being as yet subject to the stringent regulations concerning labor, upkeep, etc., that have been the lot of street railways for decades. A number of bus installations have shown far less reliability and continuity of service than the older rail lines, but some are operated on almost as high standards as the tramways. While municipal authorities may be persuaded to limit parasitical competition, it is the duty of the existing transport undertaking to operate motor buses where necessary and to take fullest advantage of one-man car opportunities.

Out of 58 undertakings operating or contemplating the use of one-man cars, 25 had complete or partial installation, two gave up such operation, 14 intended it. The remaining 17 are not contemplating such cars. In most cases, the change has been made merely by blocking off the rear platform. In one instance, where operation is two-man in the city and one-man in the suburbs, a detachable door is carried on the car for addition and removal on the rear platform. In another instance, exit but not entrance is permitted on an unguarded rear platform.

Safety appliances are considered necessary on rebuilt cars by 17 out of

41 undertakings, while 21 do not and three favor them to a limited degree.

Out of 41 managements, six believe in the deadman's handle, 29 do not and six think such a controller desirable although not absolutely necessary. One argument is that a safety device practicable on the trackless bus system cannot be considered essential to a vehicle bound to a definite path.

Door and step control by the operator, whether manual, electric or pneumatic, is favored by 18 out of 41 properties replying. Another 18 do not favor them and two are in doubt as to which is most practicable. The majority favor door and step control as divided as to the merits of manual, electric or air operation.

Out of 38 replies, 15 consider it necessary to have distinct entrance and exit aisles. Of these, 14 would even use a barrier. Eighteen are against separation and 19 against barriers. Five see some usefulness in separation during rush hours.

As to the feasibility of having entrance at the front and exit at the rear with possible provision against entrance at the rear, of 36 managements, 14 favor it and 18 deny this, while four are in doubt. It is considered difficult because of the amount of supervision. To avoid loss of time from conflicting stream of passengers, it is suggested that during rush hours rebuilt cars might be operated with rear gates and eventually with rear doors under control of the operator.

A mirror is considered practicable in case of rear-platform operation by 14 out of 36 replies, while 14 do not consider it practicable and two are without a definite opinion.

Doors opening automatically in emergencies are favored by only one out of 41 replies, although all the others believe that as a matter of course the doors, gates, etc., should be arranged for opening by the passengers.

Out of 37 undertakings, 11 favor passenger-operated emergency brakes with cords or levers, although one reserves that an emergency connection of this kind is needless with deadman control; 24 do not favor this and two are in doubt. The authors point out that unnecessary application of emergency brake may cause danger. They suggest that a circuit-breaker connection might serve on properties in level country, leaving some passengers to manipulate the regular hand brake. However, it would be generally desirable to have some form of emergency connection which would both cut off power and operate the brakes.

Vestibuled platforms are felt to be a necessity on one-man cars by 30 out of 41 replies and unnecessary by nine, although some of the latter admit that vestibuling might prove advantageous. The authors favor vestibuling because this permits the removal of body doors and bulkheads to facilitate passenger movement and because a man handling paper money and receipts needs protection against drafts.

Out of 38 replies, five favor a seat for the operator, 27 do not and six are in doubt. There is a division of opinion as to where the seat should be placed. The authors suggest some type that can be moved when it is embarrassing to the operator.

*Abstract of a paper before the International Strassenbahn und Kleinbahn Verein, Homburg von der Höhe, September, 1924.

Of 33 replies, 19 favor bulkheads and some even consider them a necessity. Others even regard bulkheads as superfluous and three merely report that their present cars are so built. Those which consider bulkheads a necessity have platforms varying from 1 to 2 m. (39 to 63 in.) length. Most replies hold a minimum of 1.3 m. (51 in.) is required. The authors observe that the removal of the bulkhead is of advantage in enabling the operator to announce the stops more readily and to be more watchful.

Out of 34 replies to the question, "If you were buying new cars would you favor the American idea of full automatic equipment?" eight favor safety car standards, 17 do not and one would recommend only a portion of the devices. The authors in commenting on the replies feel that a plan which brings such great economies but which demands so much more from the platform man ought to enjoy at least some protection against overcrowding so that the time for stops could be kept within limits. Furthermore, the greater maintenance expense will absorb but a fraction of the savings with improved one-man cars.

The answers to three questions regarding type and size of one-man cars favored were very diverse. Some believed that one-man operation should be confined to cars up to 30 passengers, but others held that it was possible with cars of 50 to 60-passenger capacity. Separate exit and entrance would be favored even on the small cars, while the larger type might consider entrance at the front and exit at the rear. If all interchange is at the front, the dividing line might be carried into the carbody for a length of 1.5 m. (59 in.). The authors suggest that one-man cars up to 50 seats are feasible on systems operating with unit fares, while other systems must be guided by the character of their fare tariffs.

Four out of 36 say "No" to the question, "Would you continue to give fare receipts, especially if you added fare boxes?" three are in doubt and the remainder say "Yes." The last consider such control absolutely necessary, or at least for transfer passengers. The replies developed that some undertakings are operating one-man cars pay-leave. Only a few managements had any experience with fare boxes.

Of 38 replies, 12 have a flat-fare system, 23 have not and three say they use flat fares only in part. It is admitted that the flat fare is undoubtedly the most advantageous for one-man operation, but that the difficulties with zone fares are not so great as might be supposed because it is just in the rush hours that many passengers ride on passes or season tickets which, of course, lightens the operator's work quite materially.

Of 35 managements, 14 consider one-man operation practicable with zone fares and transfer privileges, nine do not, and 12 believe that it is limited to lines with light traffic. The authors comment that the extent to which such operation is possible depends upon local conditions and the co-operation of the platform men and the public. It is suggested that punching or other marking of receipts, transfers, etc., should be avoided in the course of a trip and

that every effort should be made to do this at the terminals. It should also be made easier for the operator to issue receipts as passengers board.

Reduced-rate prepaid tokens or tickets are considered desirable by 18 of 35 managements; eight do not and nine are in doubt. It is observed that if no fare box is used, the fare receipts for cut-rate tickets would have to be special.

Retention of the passenger's bell signal was favored by 24 out of 35 replies, partly because it is so widely used now and partly because an acoustic indication is considered better than a light indication. Three favor light with the bell in reserve and three either have no choice or consider a verbal demand good enough.

Trail cars with one-man motor cars was felt to be practicable by 21 out of 33 managements, while 12 are of the contrary opinion. There seems to be no choice between bell and light signals, but the authors believe the latter will probably become more common.

Out of 36 replies, 17 would pay a premium to one-man operators and 17 would not. The increase varies from 1 to 15 per cent, but the majority think 10 per cent right. The authors judge that an increase is justified in those cases where one-man operation has to be introduced gradually with some provision toward giving a share of the benefits to the personnel to secure their interest.

The replies varied greatly as to prohibition of smoking, but some permitted smoking on the rear platform at any rate. The authors state that special roof ventilators are expected to help in the question of better ventilation.

The advantages of one-man cars in the opinions of the operators are summarized as platform saving, better schedules at the same cost and fewer accidents.

The disadvantages are delays in heavy service, slower schedule speeds, more stolen rides and draftier cars. Some replies suggested that delays in standing time could be made up by faster running time.

ONE-MAN CARS AT AMSTERDAM

Following the questionnaire and replies thereto, the authors presented details of the modernized one-man cars which have been installed under Mr. Van Putten at Amsterdam and Mr. Hultman at Malmö. The latter was fully described in *ELECTRIC RAILWAY JOURNAL*, for Feb. 9, 1924.

As only a brief description of the Amsterdam car appeared in *ELECTRIC RAILWAY JOURNAL* for April 12, 1924, it may be well to mention its outstanding features. Mr. Van Putten, after visiting the United States was convinced that anything but real safety car operation was unthinkable for Amsterdam. He was unable, however, to use the then standard Birney type because the cars were too light, there was only one door for entrance and exit and the automatic equipment was air-operated. He therefore prepared specifications for a larger and heavier design with double-door platforms. Five such cars were built by the Linke-Hofmann Works, Breslau, and fitted with the Bergmann Electric Company's

one-man devices. These cars operate on a one-fare route with the comparatively high traffic density of 15 passengers per car-kilometer (a kilometer = 0.62 mile).

The special features of these cars include the following:

The "in" and "out" doors are controlled electro-mechanically by the operator, separately or in tandem.

The doors and folding steps work in unison.

The draft rigging with trailer operation has shock absorbers to avoid injury to riders when starting.

The car cannot start before the doors are closed.

The emergency opening of a door opens the power circuit.

Short-circuiting brakes are used, but part of the energy is shunted to two magnetic track brakes which show red signal lights on the bulkhead while in circuit.

Release of the deadman's control handle cuts off the motor circuit but sends current to the track brakes. The deadman's device can be made inoperative by a pedal when the seated operator is using both hands for fare collection and the like.

One $\frac{1}{2}$ -hp. 220-volt roof-mounted motor per platform cares for door operation. These motors have functioned successfully for two years in a daily service exceeding 200 opening and closing movements.

Another feature is the use of an illuminated fare box with coin-tilting table.

Because of the success with new cars, 15 old ones have been fitted with some of the same devices. As space limitations did not permit separate entrance and exit via the front platform, these cars are operated front-entrance and rear exit. Unauthorized rear entrance hitherto has been prevented by a three-arm turnstile. The older cars have no deadman's handle or track brakes.

Mirrors give the operator a view of the rear platform.

To reduce car noises, the passengers' push button does not actuate a bell or buzzer but closes a line-voltage circuit which causes a red lamp to light alongside the operator.

In general, these cars eliminate step accidents and do not delay passenger interchange owing to separate aisles for entrance and exit.

The standard 10-cent fare is dropped into a box. No receipts were issued during the turnstile period.

Smoking is permitted on the rear platform.

The reconstruction cost of the cars did not exceed 5,000 guilders (\$2,010) per car while the platform labor saving alone is 7,000 guilders (\$2,814) a year. The service was increased about one-sixth to permit an equal number of riders to be carried during the rush hours. The net annual saving on twelve cars is 50,000 guilders (\$20,100) a year.

Because of an accident in which a two-man car was derailed with its front end hanging over a canal, agitation was begun against one-man cars with rear platform turnstiles. As a result, the City Council ordered the removal of the stiles. This will necessitate a return to fare receipts which are to be issued by machine.

Maintenance of Equipment

Spinning Rivets on Controller Fingers

WHEN a rivet is driven by ordinary methods through a number of thin laminated pieces of material, it is difficult to make sure the several pieces are pulled down tightly against each other when the rivet head is formed. This condition



A Rivet Spinning Machine in the Twin City Rapid Transit Company's Shop Has Been Found to Do Very Good Work in Riveting Controller Fingers

is encountered in riveting together the laminations of controller cylinder fingers.

The mechanical department of the Twin City Rapid Transit Company has found a rivet spinning machine to be very useful for doing such work. Not only is the production equal to or greater than can be obtained by driving the rivets, but the spinning method has been found to give a much better job. There is no tendency for the shank of the rivet to swell between the laminations, as is the case with a driven rivet.

The die shown in the head of the machine in the illustration is a common commercial type of rivet spinning die. The various parts of the controller fingers are assembled in the jig shown, which is fastened to the bed of the machine. This

jig pivots about a point at the back end. The operator grasps the handle on the jig, holding the parts in place with his finger, as shown. He then swings the jig over so that the rivet comes into position under the spinning head. A pin in the bed of the machine, shown in the illustration, can be depressed so as to allow the jig to swing under the spinning head, and upon being released this pin engages a hole in the bottom of the jig, so as to hold it in exactly the right position. The head of the machine is depressed by means of a foot lever manipulated by the operator. The rivet head is formed very quickly, giving an unusually smooth, well-formed job.

Car Cleaners Use Self-Propelled Carriage

TO AVOID the necessity of the car cleaner climbing up and down a ladder and moving it from place to place when wiping the outside of a car and washing the windows, an easily movable carriage has been developed by the Boston Elevated Railway. This is a simple framework made of iron piping and placed on four small iron wheels. The car cleaner stands on the platform, which is so arranged as to



Easily Movable Carriage Which Has Doubled the Efficiency of the Exterior Car Cleaners

height that he can wipe the entire side of the car from top to bottom for as wide an area as his arms can reach. After he has done this he grasps the car body firmly and rolls the carriage to a new position. It is thought by the company that this device has more than doubled the efficiency of the men cleaning car exteriors. It is being used in all the shops and carhouses of the company where there is a concrete floor on which to operate the carriage.

Self-Closing Waste Can

REALIZING that good housekeeping is one of the most important elements of fire prevention, cleanliness has been promoted in the



This Type of Waste Can Has Foot Control of Hinged Cover

Wheaton shops of the Chicago, Aurora & Elgin Railroad by the use of improved waste cans. By the device installed there the problem of keeping the waste in the can and the lid shut was solved successfully. The can, of the usual 30-gal. sheet-iron variety, was provided with legs, and a heavy lid hinged at one point so arranged that it can be opened by means of a foot treadle. The four legs are made up of 1½-in. x ½-in. steel bars bent to the proper form and riveted to the side and bottom of the can. About 6 in. from the



The Cost of Car Painting Has Been Reduced by the Use of a Simplified Color Scheme Without Striping or Lettering

bottom of the can, two pieces of 1-in. x 1/4-in. steel bar, bent to form a right angle, were riveted to the side of the can. These form a support for the fulcrum of the simple lever which extends from the foot treadle in front to the connecting rods located on each side of the can. These rods connect with projections fastened on the lid and serve as a means of transmitting the motion of the lower lever to the can top. With this arrangement it is possible to step on the treadle at the front and cause the lid to rise. The foot lever is made up of 1/2-in. x 1-in. material, the connecting rods of 1/2-in. round steel and the projections on the lid are of 1/2-in. round iron forged out flat on one end in order that it may be riveted to the lid. The lid is held shut by its own weight. On each side of the can is a handle located in a convenient position for carrying.

The outfit is painted black, and the instruction "Throw Dirty Waste In This Can" is stenciled on it in yellow paint. Several of these cans are located about the shop and have proved a means of keeping the shop clean.

Simplified Color Scheme Aids Spray Painting

IN ORDER to reduce the expense of car painting, in so far as it is possible to do so without seriously detracting from the appearance of its vehicles, the Eastern Massachusetts Street Railway has reduced the number of exterior colors to two. The entire body is painted yellow, while gray is used for the roof, trucks and the other equipment under the car. No striping or let-

tering is done except the placing of a number in the center of the side.

Two exterior colors are applied by means of a De Vilbis spray painting machine. The window guards, which are black, are painted by a dipping process. Windows are left in place during the painting process and are protected by a coating of Preservit. After the painting has been completed, this coating is removed and takes with it all paint which may have spattered onto the glass.

Spray painting is used also inside the cars for the floors and sides. The headlining and the ceiling on the platform, which are white, are painted by hand. Such small equipment as may be located inside the car is also hand painted.

In order to encourage riding by keeping the rolling stock clean and fresh looking, each car is painted once every 14 months. It is said that the use of the color scheme here described and the spray painting process has cut in half the cost of car painting.

Clamp Holds Armatures in Vertical Position

By R. S. NEAL

Assistant Superintendent of Equipment,
Kansas City Railways

IN THE shops of the Kansas City Railways it has been found advantageous to handle armatures in a vertical position during the operation of dipping and baking. They are dipped with the pinion end down, and are baked in the same position, to avoid excess flow of varnish to one side, as would be the case if they were drained or baked horizontally.

The type of clamp shown in the accompanying illustration, while of simple construction, has proved handy and safe for lifting and moving armatures about by the commutator end of the shaft. This clamp is shown in both the closed and open positions. It consists of two forgings hinged together at one side, while the other side is held together with a bolt which pulls the clamp tight on the shaft and holds it securely. The inside faces of the clamp that come in contact with the shaft are lined with soft copper to prevent any possibility of scoring it.



This Clamp Is Used at Kansas City to Handle Armatures in a Vertical Position for Dipping and Baking

Sand Storage Simply Arranged at Decatur

SAND for use on the interurban cars of the Illinois Traction System is stored in a simple wooden sand bin in the Decatur shops. The bin is 6 ft. high by 6 ft. long by 5 ft. wide and has a capacity of approximately 6 cu.yd. The sloping top contains a six-mesh, No. 14 wire screen, 5 ft. long by 4 ft. wide. A sliding metal door at the forward end, operated by means of a lever and link, closes a chute opening by means of which sand may be poured into a wheelbarrow. To the rear of the bin is located a No. 2 Viloco sand dryer of 1 cu.yd. capacity, manufactured by the Vissering Company. After the sand has gone through the dryer it is shoveled onto the screen of the bin. The sloping top is thus of great convenience. This removes any



Sand Storage Bin of 6 Cu.Yd. Capacity Has Screen Sloping Top Through Which Sand Is Screened After Removal from Stove Type Sand Dryer

foreign matter or large particles of sand which would be undesirable for use in the sand box on the cars. Sand is drawn off into a wheelbarrow as needed. The simplicity in the construction of the bin and the lineup of the various parts of the apparatus are the outstanding features of the arrangement.

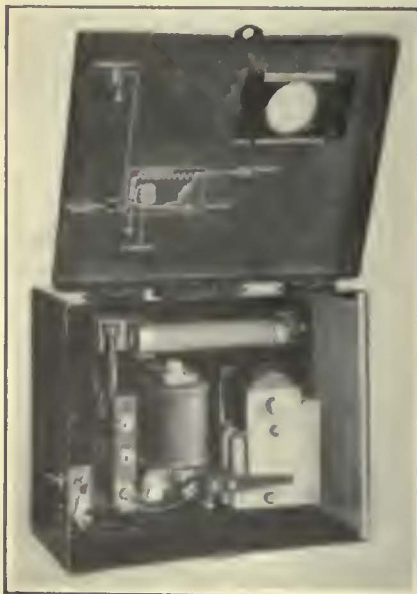
New Equipment Available

Developments in Thermostatic Control

BY LEE P. HYNES

Consulting Engineer Consolidated Car Heating Company, Albany, N. Y.

IN THE first thermostatic control equipments much of the sensitiveness of the thermometer was lost through the metal casing and also through the retarding effect of the car walls. Crews found that without fear of detection they could



Improved Main Switch for Thermostat Control

break the thermometer and keep the heat on continuously, by pressing on the metal case sufficiently to crush the glass tube.

A molded glass cover instead of a metal cover has provided a satisfactory solution of the trouble and is used in the Consolidated Car Heating Company's thermostat of the latest type as shown in an accompanying illustration. A back plate of molded insulation keeps the car wall from affecting the operation and provides insulation for the electrical connections. The molded glass cover is mounted on this base with a yielding cushion, covering the mercury tube, which is also mounted in yielding supports to take up any shocks or jars. The glass cover has no openings, as temperature changes are more readily carried to the mercury by direct conduction through a thin strip of copper. This is folded around the outside of the glass case, looped under its edges and clamped around the mercury bulb. This strip is insulated from actual contact with the cover. The glass cover must be smashed before anyone can tamper with the thermostat and the mercury tube is clearly visible.

Improvements have also been made in the main magnetic switch controlled by the thermostat. Early mercury thermostats were unable to

handle much current. Sparking on the contact points oxidized the mercury and ruined the tube. The new equipment includes simply a main switch having an operating magnet, a blowout coil, a series resistance and a fuse for the thermometer circuit. It has no relays, no auxiliary circuits nor contacts, no shunt resistances such as were used with previous equipments. The mercury simply shunts the magnet coil and

by a correct design and balance of current values, there is no overloading of the mercury contacts. Three new convenient features have been added to the equipment: (1) An indicator visible through a glass window in the switch box shows whether the switch is open or closed; (2) A small control switch on the side of the box permits the conductor to throw the heat control off or on at will; (3) An opening in the side of the box allows easy inspection and cleaning of contacts.

When the small switch in the "off" position, the main switch opens and keeps the heat off until the switch is reset to "on." When the control switch is thrown to the "on" position, it throws the thermostat into control. If heat is needed, it will be turned on, but the thermostat cannot be prevented from shutting off the heat when the car attains the desired temperature.

In the new design an inspector can see at a glance the position of the mercury column, owing to the glass thermostat cover, and also the position of the main switch through the glass window in the switch box. The switch box cover can be locked if desired and need only be unlocked for replacement of a fuse or inspection of contactor tips. The opening in the side of the box for inspection of the contacts is closed by a transite liner.

When the box cover is open, the transite wall shown at the right in the illustration can be pulled out and the contacts inspected or cleaned through the end opening in the box without removing the arc chute.



Visible Mercury Thermostat With Molded Glass Cover

The News of the Industry

Springfield Franchise Passed

Voters of Illinois City Pass Ordinance Giving Rights to Railway for Twenty Years

An extension of its street railway franchise was obtained by the Illinois Power Company in Springfield at the election on Nov. 4. The majority in favor of the proposal was 2,500. More than 26,000 votes were cast. The extension is for 20 years, the time limit in Illinois. The existing grant of the company does not expire until 1928, but the approach of the expiration date made it difficult for the company to plan ahead satisfactorily and to arrange the best terms for future financing.

PROPOSAL REJECTED IN THE SPRING

Early in the spring a franchise proposal was submitted to the City Council and approved by the members of that body, but when the matter went before the voters in April it was defeated by a small majority. At the spring election, just as at the later one, the principal dissenting voice to the company's proposal was raised by Commissioner Willis J. Spaulding. Mr. Spaulding operates a municipal electric light and power plant at Springfield and is president of the Municipal Ownership League of America. If the matter were left to him he would municipalize the entire transportation system of Springfield. He is also a motor bus enthusiast and professes to see the day ahead when street railways in cities of the size of Springfield, some 60,000, will disappear. In order to bolster up this profession he told only parts of the story with respect to the use of the bus in Bay City, Saginaw, Decatur, St. Louis and other cities. He dangled in the faces of the voters of Springfield the prophecy that a complete, new, modern bus system could be installed and operated successfully on a 5-cent fare either by the city or a private concern for \$500,000 and provide "much better and cheaper service" than that supplied by the railway.

ONE DISSENTING CITY COMMISSIONER

The Mayor and the three other commissioners answered Mr. Spaulding's strictures effectively. It is impossible here to recite all the points that they made. Their principal reasons for favoring the franchise were summarized by the commissioners and kept constantly before the public. As they saw it the ordinance does these things:

Protects all the rights of the people, including the right of purchase by the city, at fair value when the city is ready to buy.

Compels adequate transportation service to be furnished.

Requires the company to pay approximately a half million dollars into the city

treasury for use of streets during the life of the franchise.

Requires the company to pay the expense of paving between its tracks and 1 ft. outside of rails, thereby insuring no interruption of the city's great improvement program.

Does not in any way interfere with the use of streets for buses and other means of public travel. The franchise is confined to street car travel only. The city is free at any time to decide as to future plans relating to other means of transportation.

The Springfield company has not been slow to take up the bus. It is now operating five vehicles in service coordinated with its railway lines. The company also conducts the electric, gas and steam heating services in the city and supplies electric service to DeKalb and Sycamore. The present fare is 7 cents cash with four tickets for 25 cents and 40, 50 and 60-ride monthly tickets to be sold for \$2, \$2.50 and \$3 respectively.

Extension of Time Likely for Improvement of Yonkers Lines

Admission has been made by Assemblyman Alexander H. Garnjost of Yonkers, representative of the Fourth Assembly District, Westchester County, that the New York Central Railroad Company cannot be expected to fulfill the requirements of his electrification bill. This bill was adopted at the last session of the State Legislature and provided for the electrification of the Getty Square branch and main line of the Putnam Division within the Yonkers city limits by Jan. 1, 1926.

Assemblyman Garnjost says he will offer an amendment to his bill at the next Legislature granting the New York Central Railroad a time extension for the improvement of its Putnam lines in Yonkers.

The railroad has been working out the plans and specifications necessary for the improvement, but there are several reasons why the road could not be electrified by Jan. 1, 1926. Principal among these is the fact that all grade crossings must first be eliminated, in accordance with a recent state law. Another reason is the unavoidable delay which the railroad must face in securing steel for the various bridges which must be reconditioned.

Assemblyman Garnjost, after explaining these reasons, said the railroad must show "good faith" in its plans for the electrification of the Yonkers sections of the Putnam Division, i.e., must either make known its plans or commence the work, before he will offer an amendment to his bill granting the New York Central the necessary time extension.

George W. Kittredge, chief engineer of the New York Central, has estimated the cost of improving the Getty Square branch at \$2,000,000 and of the main line at \$4,000,000. The plans have not yet been approved by the Public Service Commission.

Buses for Detroit

Emergency Bus Lines Being Run There by Department of Street Railways as Municipal Enterprise

The Detroit Department of Street Railways does not own any buses, but one bus line is being operated by the city and another is to be put into operation. As soon as the buses are delivered that the city intends to purchase three lines will be established. The equipment in use on the Belle Isle line is owned by the Department of Parks and Boulevards. Bus service is being started on the Eight Mile Road, west of Woodward Avenue. The buses will run from the Eight Mile Road and Livernois Avenue district to the Highland Park plant of the Ford Motor Company. The route will cover approximately 5 miles in territory not now served by any kind of transportation. The seven buses to be used will be rented from the Detroit Motorbus Company.

As indicated by the desire of the commission to purchase additional bus equipment the new services just mentioned are only a beginning. The Street Railway Department has made extensive plans for bus service, including the conversion of the Kercheval-Concord carhouse into a modern bus terminal. It is proposed to use the terminal to house the buses on the Belle Isle line and the buses for the proposed Mack-Warren bus line. It is planned to care for the street cars now housed in the carhouse at the yards at St. Jean and Kercheval Avenue.

The rate of fare to be charged on the Eight Mile Road bus line has not been announced. The department will guarantee the bus company the cost of operation, but the line will be operated without profit to the department. It has been announced by the D. S. R. management that the fare will not exceed 10 cents, a charge which will be reduced as patronage of the line increases.

Three buses were supplied by the Detroit Motorbus Company when the D. S. R. was constructing the new Mount Elliott line, which has just been put into service. The new railway serves as a feeder to the Gratiot Avenue line and comprises 2 miles of new track beginning at Gratiot and McDougall Avenue. At Mount Elliott Avenue a spur track runs to the rear of the Dodge plant. Cars enter through a subway into a prepayment station similar to the one in use at the Ford plant at River Rouge.

The Street Railway Department recently placed posters in the cars stating that operation of the bus service depended upon the action taken by the Council. The posters show pictures of the double-deck buses which the commission has recommended for use.

Retail Merchants Want Cars

Discussion Between Mayor Hylan and President Huff of the Third Avenue Railway, New York, Broadcasted

Retail merchants on Forty-second Street and 125th Street, New York, bitterly oppose any plan to remove the crosstown tracks in those streets, as suggested by Mayor Hylan. They declare that such action would prove a great loss to their business, and they are decidedly against any suggestion for the substitution of buses for cars. The Third Avenue Railway has a pile of letters to this effect. They are the result of a brief canvass made by the company following a letter it received on Nov. 13 from Mayor Hylan. This letter, which was addressed to President S. W. Huff, said, in part:

Why do you send your people about getting petitions signed to continue a public nuisance? You realize that cars running in the middle of the street, as they do on Forty-second Street and 125th Street, as well as other streets in the city, are a menace to the lives of the people in boarding and leaving these cars.

You do not seem to realize that buses will replace these surface lines. At least you should be alive to the situation and make some progressive move yourself.

Some of the people who have signed these petitions and written letters I understand have expressed themselves in favor of buses.

The New York Railways realizes that buses will take the place of their surface lines and has made a request to the Board of Estimate and Apportionment to this end, and no doubt the board will give serious consideration to same.

On the day the letter was received a quick canvass was taken of the opinions of the retail merchants affected, and these testimonials, with a letter from President Huff, were transmitted to the Mayor on Nov. 14. The correspondence, with quotations from some of the letters from the merchants, was then made the subject of a radio talk Nov. 14 from the Third Avenue broadcasting station at Third Avenue and 130th St. A portion of Mr. Huff's letter to the Mayor follows:

Some of the more than 200 people who wrote personal letters opposing the removal of tracks on Forty-second Street and on 125th Street may have expressed themselves in favor of buses at other locations, but their letters undoubtedly expressed their wishes with regard to the street upon which their business is located, and they are emphatic against the removal of track from these streets.

Passengers in boarding cars away from the sidewalk expose themselves to no more risk, if as much, than they do in crossing streets. The records show that there have been comparatively few accidents from this source, and when once on the cars passengers are practically immune from accident by reason of the stability of the car and its freedom from danger to which buses are exposed.

You are correct in your statement that I do not seem to realize that buses will replace these surface lines. It is hard to realize a mere theory when you are confronted with facts that contradict it. The fact is that buses have not supplanted trolley cars to any substantial extent where the travel is sufficient to justify trolley car operation, and that where attempts have been made so to supplant car operation the business interests have suffered to such an extent that street car service had to be resumed. There may be developments in the future which may justify the substitution of buses for trolley cars. If so, it is purely an economic question and will solve itself, but there is nothing at the present time that would indicate such substitution will take place.

With regard to the proposal of the New York Railways to remove its tracks and substitute buses, I think you will be able to judge better just what this means if you were to ascertain which tracks they are proposing to remove. The companies of the Third Avenue Railway System have, by regular proceedings, abandoned and for the

most part removed during the last 5 or 6 years in the territory occupied by the New York Railways, approximately 27 miles of trackage for the reason that the operation over this trackage no longer served any large public purpose or was justified financially. During this period the New York Railways, although it had discontinued operation of a substantial amount of trackage, has not legally abandoned this trackage by reason of being in the hands of a receiver. When you have finally ascertained just what trackage that company is proposing to abandon, I doubt very much whether you will find that the New York Railways proposes to abandon any substantial portion of its trackage that is now being operated.

I wonder, Mr. Mayor, whether you could not find the time in the near future to talk this thing through with me. We are both trying to serve the same people, to ascertain their wishes and to do that which is best for them. Something might be gained by a free discussion of this matter. Will you see me?

Studies made by the Third Avenue Railway of the passengers and vehicles passing certain points in congested districts indicate the disproportionately large amount of street space per passenger carried taken by motor vehicles as compared with that taken by trolley cars. Below will be found a table of studies in congestion made during the early part of this year. Studies of this kind are being continued by the company.

STUDIES IN CONGESTION

| | Total Passengers | Total Vehicles | Passenger Per Vehicle | Square Feet Street Space per Passenger Carried |
|--------------|------------------|----------------|-----------------------|--|
| Count 1—Cars | 3,373 | 84 | 40 | 8 |
| Autos | 829 | 437 | 1.9 | 43 |
| Count 2—Cars | 14,031 | 500 | 28 | 13 |
| Autos | 4,948 | 2,546 | 1.9 | 42 |
| Count 3—Cars | 9,875 | 264 | 37.4 | 8.95 |
| Autos | 10,559 | 5,287 | 2 | 40.5 |
| Count 4—Cars | 2,487 | 39 | 64 | 5.6 |
| Autos | 2,438 | 877 | 2.75 | 28.7 |
| Count 5—Cars | 993 | 20 | 50 | 7.1 |
| Autos | 314 | 218 | 1.4 | 55.2 |
| Count 6—Cars | 5,590 | 138 | 41 | 8.7 |
| Autos | 2,598 | 1,779 | 1.5 | 35.4 |
| Count 7—Cars | 1,500 | 77 | 19.5 | 20 |
| Autos | 4,615 | 2,436 | 1.9 | 43 |

Count 1 was made at Forty-second street and Broadway Jan. 17, 1924, 5 to 6 p.m., westbound.

Count 2 was made at Forty-second Street and Broadway, Jan. 17, 1924, 12 to 8 p.m., westbound.

Count 3 was made at Broadway and Fiftieth Street, Jan. 23, 1924, 12 to 8 p.m., northbound.

Count 4 was made at Broadway and Fiftieth Street, Jan. 23, 1924, 5 to 6 p.m., northbound.

Count 5 was made at Broadway and Hudson Street, Yonkers, Jan. 7, 1924, 5 to 6 p.m., northbound.

Count 6 was made at Broadway and Hudson Street, Yonkers, Jan. 7, 1924, 12 to 8 p.m., northbound.

Count 7 was made at North Avenue and Burling Lane, New Rochelle, Jan. 19, 1924, 12 to 8 p.m., northbound.

New York City Must Answer \$30,000,000 Charge

Under a decision rendered by the United States Circuit Court of Appeals on Nov. 20 the city of New York must answer a charge made by Lindley M. Garrison, former receiver of the New York Municipal Railroad Corporation and allied companies, now included in the B.-M. T., that the city caused damages approximating \$30,000,000 to the railway corporations. The suit begun by Mr. Garrison charged that under an agreement made in 1913 the municipal authorities failed to carry out certain plans for the extension of the transit system to which they were committed.

Judge John C. Knox recently granted an order requiring the city to answer this complaint and corporation Counsel George T. Nicholson took an appeal to the Circuit Court of Appeals.

Report Delays Settlement

Citizens' Committee Insists on 7½-Cent Fare in Cincinnati—Directors Call Negotiations Off

Insistence upon an absolute and unconditional guarantee of a 7½-cent rate of fare for the first three years of the traction franchise by the citizens' committee in a report to Mayor Carrel threatens to undo at the eleventh hour the work of the conferees in the electric railway negotiations with the city of Cincinnati, the Cincinnati Street Railway, the Cincinnati Traction Company and the public. The result may be a continuance of a 10-cent rate of fare, if not a further increase, after Jan. 1. The directors of the Cincinnati Street Railway in a formal statement issued on Nov. 22 absolutely decline to accept the recommendations of the citizens' committee and insist that they will go no further with the present negotiations.

In its report to the Mayor, the citizens' committee says in substance that "the ordinance as drafted is much superior to the present ordinance, that there was an agreement as to fundamentals and that the ordinance should be sent to the City Council for passage after it is modified to provide for an absolute guarantee of a 7½-cent rate of fare for the initial three-year period of the grant." It is this provision to which the directors of the Cincinnati Street Railway take exception.

Under the terms of the ordinance as drafted the new operating company, the Cincinnati Street Railway, proposes to rehabilitate the entire system and to improve the service. It will immediately create a fare control fund of \$400,000 to insure stabilization of the rate of fare. If the operating expenses of the company exceed the income from fares, the company will be permitted to draw upon the fare control fund until it is down to \$200,000 if necessary before any increase of fares will be permitted. There is an additional guarantee for the first three years of a low rate of fare, since the proposed ordinance provides that during that period the company must feed into the fare control fund one-sixth of the return allowed upon capital as soon as the fund goes below \$400,000. So that under the terms of the grant, even before the fund is reduced to \$200,000 the company is compelled to give up a part of its earnings in the interest of a low rate of fare. After that has been done and the fund is reduced to \$200,000 an increase is then permitted. During the negotiations the company sought to modify that clause so that in the event of the granting of a higher wage to the platform men it would not be compelled to devote any of the return on capital to keep down fares. Upon the insistence of City Solicitor Saul Zielonka and Street Railroad Director W. J. Kuertz, however, that modification was not included in the grant.

The company's representatives, however, during all of the negotiations have refused to accept a clause that would guarantee unconditionally a 7½-cent rate of fare for the first three-year period.

Boston Mayor for Municipal Ownership

Mayor James M. Curley of Boston advocated before the special legislative committee on the finances and control of the Boston Elevated Railway that the Elevated should be taken over by the cities and towns in which it operates and the fares reduced to 5 cents. He would tax the communities for the deficit from operation. The committee heard the Mayor on Nov. 25.

Under the Mayor's plan the communities, constituting essentially the Metropolitan area, would take the Elevated by condemnation, after the property had been valued, and then manage the road by a board of public trustees, as at present. Mr. Curley says two of the trustees should be appointed by the Mayor of Boston and three by the Governor of Massachusetts. The Mayor contended that in regard to its importance to the public the railway should be considered a civic problem on a par with the schools, the water system or the sewerage system. High real estate values and proper conduct of business could be assured only if the railway received proper civic consideration. There are 500,000 private autos in Massachusetts and many bus lines, and it is the Mayor's idea that the car riders should no longer be required to support the electric railways. The Mayor figures that it would increase the taxes about \$9,000,000 to make the railway a direct charge on the community, but Representative Henry L. Shattuck of the committee estimated that the tax increase would be nearer \$14,000,000.

The committee is charged with the responsibility of recommending a policy with respect to the future operation of the Boston Elevated. It is expected to file its report by Dec. 15.

Bus Legislation Likely in Indiana

Utilities and bus operators are wondering what will happen at the session of the Indiana Legislature next January. It is significant to note that in the recent political campaign the successful candidate for Governor, while he stated that all unnecessary commissions should be abolished, did not specify just what commission he meant. This is considered by utility operators to mean that the administration will not look with favor on the abolition of the Public Service Commission.

On the other hand, the State Chamber of Commerce has launched a movement for a bus and truck regulatory law. It is planned to make a survey of the traffic needs of the entire state and present reports to the individual chambers of commerce and civic bodies in each city. They will be asked to study the reports and present suggestions to be condensed into a bill which will be introduced in the Legislature.

The question of bus regulation first came up two years ago at a meeting of the Assembly, but a movement to provide regulation was defeated. The development of bus transportation in the state has reached such huge proportions during the last two years that this question is most certain to come up again at the next session. In fact,

officials of city and interurban railways are insistent that some sort of regulation be imposed on bus lines. The main contention at the last session on the part of bus men was against the form of the bill rather than on the principle of regulation. It would appear to be natural to seek to put the bus lines under the jurisdiction of the Public Service Commission, but members of the commission say they are over-worked now and cannot assume additional responsibilities.

Objections to Pittsburgh Looping Will Be Heard

The City Council of Pittsburgh, Pa., recently voted to conduct hearings on request of objectors to the plan of the Pittsburgh Railways for rerouting downtown cars. The action was taken after the Council had been advised that a decision on the plan was a matter for the Traction Conference Board, and that the Council was not to be regarded as a factor in a rerouting plan. Much discussion has taken place since the company formulated its plan for short-looping in the business district. The main points in the plan were referred to in the *ELECTRIC RAILWAY JOURNAL*, issue of Nov. 22. In talking to the Real Estate Board recently about traffic problems, Arthur W. Thompson, president of the Pittsburgh Railways, discussed the proposed changes in routing and the reduction in the size of the loop in the downtown district. He said that at the present time there was a crisis in congestion caused by the increased number of vehicles entering the area during the day—80,000 vehicles at the present time, not including the street cars. Mr. Thompson said that it was because of the lack of transportation facilities that people had been forced to a greater use of automobiles and that this was one of the very things which was bringing about a greater congestion and which the company was trying to remedy or temporarily relieve.

He referred to the routes which would be shortened and the few streets to be converted into one-way thoroughfares. It was proposed, he said, that the loops be extended on Sundays, holidays and in off-peak hours at night.

Passes Popular the First Week in Oklahoma City

Whether the weekly passes now sold by the Oklahoma Railway, Oklahoma City, Okla., giving unlimited riding on the street cars for \$1.25 a week, will prove to be a sufficient booster for traffic to work the company's salvation in the crisis that has been growing more acute for several months, the pass is proving popular with some car riders. About 500 passes were sold during the first week. The records show that the average cost of each ride by holders of the weekly passes was 5.4 cents. The passes are transferable and are good on any street car at any time during the week for which they are sold for as long a ride as the holder cares to take. The company has an application pending with the Corporation Commission for a 10-cent fare, on which a hearing has been set for Dec. 5.

Fare Increase Imperative, Says Twin Cities Head

An oral hearing has been set for Dec. 1 before the Minnesota Railroad Commission, on the petition of the Twin City Rapid Transit Company for an increase from its 6-cent fare.

Horace Lowry, president of the company, recently stated that the present fare means confiscation of property, and that a 7-cent fare is absolutely necessary. The traffic decline on the line has been steady. In the first 10 calendar months of 1920, the peak year for Minneapolis and St. Paul, car passengers carried numbered 198,500,000, against 172,711,000 in the corresponding period for 1924. Mr. Lowry pointed out that in the summer of 1921 both the Minneapolis Street Railway and the St. Paul City Railway applied to the commission for valuation of property and fixing of a reasonable rate of fare. The commission granted a 7-cent fare, but both cities appealed and the courts reduced the fare to 6 cents on the ground that the state commission, not having yet valued the properties, could not reasonably fix a fare. Mr. Lowry said that expecting a value would soon be arrived at, the company continued to operate at the 6-cent fare for three years. He said the evidence of the company's financial condition has been filed with the commission.

Rights of Community Bus Line in Court

Although two court injunctions have been granted in Los Angeles, one on the application of the Pacific Electric Railway against the Community Donational Bus Line operating between the city of Los Angeles and the city of Venice, the operators of the free bus system have defied orders and continued operations. It was recently brought out that two days prior to the date of the issuance of the injunction the bus line was leased by the original owners to a Mr. Prole of Oakland, and under the name of the Merchants' Bus Service began operating under the Prole system. Mr. Prole, inventor of the Prole Transfer Coupon System, is running the buses by having the passengers buy coupons which are redeemable at stores in towns through which the buses operate.

After issuance of the first injunction, the Community Donational Bus Line appealed to the California Supreme Court to have the order of the Los Angeles Superior Court set aside, but the Supreme Court denied the defendants a writ of prohibition which would have prohibited the Los Angeles judge from enforcing the injunction, on the ground that the Superior Court had jurisdiction. After the buses were changed to the Merchants' Transfer Bus Line under the Prole system the operators were cited for contempt of court, being charged by the court with having violated the terms of the second injunction.

The bus line has also made application to the Railroad Commission for a permit to operate as a common carrier. The Prole or coupon system of buses is now operating while the matter is still in the higher courts for a decision.

Forfeiture Clause in Draft for Rockford Company

Mayor Herman Hallstrom of Rockford, Ill., has completed his draft of a franchise ordinance for the Rockford City Traction Company. This is in accordance with instructions in a resolution recently adopted by the City Council. The Mayor has sent copies of the draft to the railway officials and the Aldermen for their consideration. The Mayor said that the ordinance could be introduced as a substitute for the one now before the Aldermen.

It provides for a 20-year grant indorsed by referendum. The ordinance leaves the matter of the operation of motor buses subject to permits from the Council. The draft provides for assessing full cost of track paving against the street railway company, with permission for payments on the installment plan and for practically doubling the street improvement program for thoroughfares containing car tracks. The Mayor would abandon the plan for requiring a \$750,000 cash bond to guarantee completion of promised improvements and would substitute a forfeiture clause that the franchise shall end if promised improvements are not made within the time specified in the ordinance. Opinions on the Mayor's draft differed widely.

Transit Talks Tell Tale of B.-M.T.

With the desire on its part to inform the patrons of its difficulties and problems, and at the same time to express its intention of doing everything it possibly can to help its patrons, the Brooklyn-Manhattan Transit Corporation, through its chairman, G. M. Dahl, has been carrying on a series of advertisements in the daily papers. These advertisements are called "Transit Letters." In the first one Mr. Dahl gives some facts about the Brooklyn-Manhattan Transit Corporation as to its passenger traffic, its wages expenses, its miles of "L" and subway lines, and the number of cars which serve its patrons. In subsequent letters the ownership and directorship of the B.-M. T. are discussed, and in a later letter Mr. Dahl tells what the stockholders and directors have done for the patrons of the company during the past year and a half since they have been responsible for the policies of the B.-M. T. He says that from the very start the public interest has been the chief interest which has controlled the company.

Fare Request Refused in Malden

The Malden City Council has refused the request of the trustees of the Boston Elevated Railway for the right to raise the fares in that city from 5 to 6 cents without a transfer and to 10 cents with transfer. These rates were asked in accordance with a new fare schedule established by the elevated on other parts of the system.

The railway has been unable to put the increase in fares into effect in Malden owing to a clause in the franchise granted by the City Council permitting the company to run buses in that city, in which it stipulated that

local fares shall not exceed 5 cents. The ruling has caused some confusion. The fare from Malden to Medford, for example, is 5 cents, while from Medford, which is under the new rate schedule, to Malden, the fare is 6 cents on strip tickets.

The Malden City Council has also adopted an order requiring the Boston Elevated in the future to advertise two weeks in advance any proposed substitution of buses for electric cars in Malden.

The City Council has empowered the Mayor to call a meeting of citizens to discuss the traffic system of the city and the petition of the Eastern Massachusetts Street Railway for permission to run buses from Malden Square to the Revere Line, and so complete the system to Revere Beach.

One-Man Car Operation Planned in Cleveland

The Cleveland Railway has announced its intention of using one-man cars during non-rush hours on a number of lines in Cleveland, Ohio, that have not been meeting operating expenses. The announcement has met with opposition from Councilmen. John J. Stanley, president of the company, insists, however, that only the courts can stop his company from using the one-man cars.

The company plans to start the use of one-man cars on Dec. 1. They will be run on the Clifton Boulevard line, and possibly on the Fairmont Boulevard line, between the hours of 9:20 a.m. and 3:50 p.m. and from 6:20 p.m. to 12:30 a.m.

Paul Wilson, secretary of the railway, says the company's plan to use one-man cars is an economy measure. He points out that the company asked for an increase of 2 cents a car-mile in its operating allowance to bring this allowance up to 28 cents a car-mile, but that so far the City Council has not acted on this request.

Immediately after the announcement by the company of its intention to run one-man cars, the Lakewood City Council, at a special meeting, passed an ordinance making it a misdemeanor to operate a car with a one-man crew. The Cleveland City Council also adopted a resolution instructing the City Street Railway Commissioner to refuse to authorize operation of one-man cars.

It is the general opinion in Cleveland that the right of the company to operate one-man cars will be threshed out in the courts.

The City Council on Nov. 24 also received resolutions authorizing the Cleveland Railway to operate bus lines on four main arteries leading to the westerly limits of the city from the Public Square. The bus fare would be 10 cents, with a 1-cent transfer charge to street cars and a 4-cent transfer charge from cars to buses.

Actual operation of buses by the railway will not be undertaken, however, until the Ohio State Supreme Court has decided whether the City Council or the State Public Utilities Commission has the right to grant bus franchises within the city limits.

Railway Sustained in Revocation Action

Controversy has developed over the Eastern Massachusetts Street Railway's track location in Mason Street in Salem, Mass. In 1909 the Aldermen there awarded the railway a location in the street so as to supply the power house with coal. The company now purposes to convert the power plant into a carhouse and to have the approach through Mason Street; but the City Council of Salem last July voted to revoke the track rights in Mason Street and ordered that the tracks be torn up. The Council took the position that here was no "public convenience and necessity" for the use which the present Board of Public Trustees intended to make of the location. The Mayor of Salem approved the Aldermen's order. The trustees of the Eastern Massachusetts disagreed with this decision. As a result the Salem city government appealed to the Department of Public Utilities, but the department, on Nov. 24, filed a decision adverse to the city. The commission points out, however, that the Salem city government has the right to appeal to the courts. Two members of the Public Utilities Department dissented from the majority decision, partly on the ground that the decision of the city authorities should be undisturbed unless it was shown to be "unreasonable or ill considered."

Buffalo Conductors Put on Their Honor

Fare boxes on all cars of the International Railway, Buffalo, were abolished on Sunday, Nov. 16, as a result of the honor system to be put in operation by Mitten Management, Inc. Herbert G. Tulley, president of the International, said to the platform employees:

Mitten Management, Inc., has never considered the fare box in accord with the co-operative spirit. It has been awaiting an opportunity to make employees responsible for fares collected rather than depend upon a mechanical device to protect the company against employee dishonesty and to reduce the conductor to a mere change maker, hopelessly trying to watch myriads of coins dropping into a small glass case.

In the old days of low wages it was not considered an injustice to deprive the company of a few fares now and then. Those days are gone and most companies have replaced the old haphazard method with the drop coin fare box.

Where fare boxes are used the conductor is required to ring up on his register for every person passing the box. The conductor ordinarily protects himself from loss by actually keeping his register lower than that of the fare box and tallies the two at the end of the run by ringing up a sufficient number of fares to make the two agree. This procedure, while protecting the conductor against personal loss, provides him with neither the means nor the incentive to see to it that every passenger is obliged to pay a fare.

I. R. C. prefers to trust to the honesty of its men. This it has taken occasion to further encourage in that their higher wage will largely depend upon the collection of a fare from every passenger. I. R. C. trainmen have proved themselves worthy of this trust.

I. R. C. will protect its earnings, first, by making payment of fare a personal transaction between the passenger and the conductor, thus preventing the passing of passengers without payment of fare; second, by giving its men such an interest in its earnings that robbing the company means robbing themselves.

Some time ago the company stopped the registration of transfers and passes.

High School Points Moral in Atlanta

The opening of the Girls' High School, in Atlanta, Ga., the first of next year may bring to a head the right of the public to demand new accommodations while denying sustenance to its railway. When the school board asked for more trackage and more cars to carry girls to and from the new school building, the Georgia Railway & Power Company responded by stating it had no money to lay new track or to buy and operate any extra cars. Preston S. Arkwright, president of the company, recently reviewed the situation. He said it would be difficult in any event to provide transportation for the students of the high school as the building was located in a most inaccessible place. Further, he said that the company was financially unable to make any extensions. On this point he said:

You've got a right to depend upon the railway as the agency for reliable service. But that agency must be kept in condition to furnish the service on which you depend. You can't levy taxes, paving burdens and the like and on top of it all turn jitneys loose and expect the railway always to be in the position to meet the demands of the public. I guess it will be either the steel cars or the jitneys.

H. M. Atkinson, chairman of the company's board of directors, corroborated Mr. Arkwright's statements. The chairman said that the railway receipts were decreasing from the corresponding periods of last year at the rate of almost \$50,000 a month, and that even last year they were far below normal. He said that under the contract with the city the company was paying in 1924 in bridge rentals, paving service and taxes more than \$800,000, which is about one-sixth of the entire railway revenue.

It is expected that the John A. Beeler organization will soon report on the valuation of the Georgia property to the special councilmanic committee conducting an investigation into the petition for relief filed by the company with the City Council in December, 1923. The company sought relief necessary to place the railway on a "living basis." Among other things it asked for elimination of jitney competition on streets where cars operate, 10-cent cash fare, a continuation of the ticket rate for 6½ cents and the elimination of all gross profits taxes and street paving assessments.

New England Motor Transport Conference

A conference to discuss the highway transportation problems of New England will be held at Boston on Dec. 8 and 9, under the guidance of the National Automobile Chamber of Commerce, and with the co-operation of many New England organizations representing motor vehicle users. Electric and steam railroad men will be among the speakers, and special sessions will be devoted entirely to discussion of how electric railways are using the motor bus, and how railroads are solving, with the motor truck, the problem of handling local less-than-carload freight. Other topics will be intercity motor coach operation, what the commercial use of New England's new highway

system means, and how the automobile is helping to reclaim New England's deserted farms, the federal government's research program into the economics of road use and a discussion of safety and highway congestion.

Home Rule Law Ambiguous

Representative of Railways Wants the Measure Amended so There Can Be No Doubt About Its Meaning

The Home Rule Commission held a public hearing at Albany on Nov. 20. Since the enactment of the city home rule law, the Home Rule Commission has extended its study of municipal self-government in New York and other states and, as asked by municipal officials, has examined certain questions which have confronted several of the cities of the state in applying the provisions of the home rule law and in operating thereunder. The commission has attempted a solution of some of these difficulties and has endeavored to aid the cities with its advice in all cases in which application has been made therefor. The hearing was regarded as most important because of the possibility that some provision allowing cities further jurisdiction over public utility corporations might be allowed to get into the home rule for cities law.

James L. Quackenbush, on behalf of the Interborough Rapid Transit Company and other street railways, submitted to the commission a memorandum urging an amendment to the law. Very briefly the purpose of Mr. Quackenbush's proposal is to remove the doubt and uncertainty that prevails with respect to the power of the Municipal Assembly of New York City and the legislative bodies of other cities of the state to annul or supersede various provisions of the public service commission law, the railroad law, the transportation law and the rapid transit act.

SAYS LAWS SHOULD LESSEN LITIGATION

Mr. Quackenbush said that it could be urged that judicial interpretation of the act would probably exclude the right of local legislative bodies to supersede any provision of the laws mentioned, but that so long as the home rule law remained in its present form and until the courts had construed its provisions in cases arising from time to time the uncertainty would remain and give rise, as it already had done, to many contentions, embarrassments and delays that could be obviated by the amendment proposed.

The attorney said that the limitations that the courts, by judicial construction, will ultimately place upon the right to supersede state statutes by local legislation should so far as possible be explicitly stated in the act itself. Mr. Quackenbush holds that otherwise the Legislature is placing an unnecessary burden upon the courts, and is chargeable with responsibility for the delays and uncertainties incidental to litigation. He says that laws should tend to lessen litigation rather than to encourage it. He then cited as a specific instance the difference of opinion between the Corporation Counsel and the Comptroller of the city

of New York with respect to the scope of the city home rule law that largely involves a determination of what are "matters other than the property, affairs or government of cities." This controversy involves in part the right of the municipal Assembly to amend a portion of the transportation corporation law in its application to the city of New York." In this controversy the comptroller clings tenaciously to the opinion that with the sanction of the municipal Assembly the city can proceed with the Mayor's municipal bus plan without the need for further enabling legislation, while the Corporation Counsel holds to a contrary view.

Other subjects discussed at the hearing were:

1. Necessary and desirable amendments to the home rule constitutional amendment.
2. Scope of term, "property, affairs and government." Does it include all matters usually embraced in city charters?
3. Right of the Legislature to enact general laws relating to property, affairs and government of cities.
4. What general laws apply "in terms and effect alike" to all cities?
5. Necessary or desirable amendment to the home rule law.
6. What difficulties or doubts have been experienced by municipal authorities in construing and operating under the home rule law?
7. Is the duty of the Legislature to limit the power of cities to borrow money, etc., under Sec. 1 of Article XII of the Constitution, to be performed by the enactment of general laws or emergency laws, or may the Legislature so act by a special law.
8. What disposition should be made of Article II of the general city law. (General provisions.)
9. What disposition should be made of the optional city law?
10. Should there be a statutory classification of cities for convenience in enacting city laws and relating to their property, affairs and government?

Advisory Council on Accident Prevention in Chicago

To co-ordinate activities in the important work of preventing accidents on the Chicago Surface Lines, a general advisory council on accident prevention has been established with the following members: V. T. Noonan, chairman; H. H. Adams, C. H. Evenson, H. B. Fleming, F. M. Hamilton, F. L. Kriete and J. Z. Murphy.

The direction of accident prevention work in each department will be delegated to departmental councils which will supervise and direct protective and preventive measures within their respective jurisdictions and carry into effect plans that will insure full co-operation on the part of all employees.

It will be the duty of the general advisory council to investigate reports of unsafe conditions or dangerous practices, to provide appropriate remedies therefor and to formulate policies for the most effective promotion of accident prevention.

New Cars Allocated in New York

The New York Transit Commission issued an order on Nov. 17 to the Interborough Rapid Transit Company allocating to service on various subway lines, where the commission believes there is the greatest need, the 100 new cars recently delivered of the 350 ordered by the railway under the commission's instructions. Improvement of rush-hour conditions at the Times Square station was an important item in the order.

Railroad and Ferry Traffic in 1923 —325,920,315 Passengers

The need of future provision for the handling of suburban passengers into New York City was recently made plain by figures made public by the New York Transit Commission giving the steam railroad and local ferry traffic into and out of New York in 1923. The great growth of local commutation traffic within the past few years has been studied by the engineers of the Commission who are preparing to arrive at a definite policy of handling the situation.

The trunk railroads entering New York or approaching from the Jersey side carried in 1923 a both-way passenger traffic of 234,867,481 people. This figure represents an increase of nearly 5 per cent over the traffic in 1922. This traffic includes the following: Baltimore & Ohio 620,000; Central Railroad of New Jersey 15,752,834; Delaware, Lackawanna & Western 22,201,447; Erie 30,889,917; Lehigh Valley 743,502; Long Island 69,766,867; New Haven 17,666,194; New York Central 30,025,529; New York, Ontario & Western 551,753; New York, Westchester & Boston 5,796,093 and the Pennsylvania Railroad 40,853,345.

In addition to the figures of steam railroads there were 42,014,142 local or rapid transit passengers carried in and out of the city by the Hudson & Manhattan Railroad which when added to the steam railroad traffic gives a grand total railroad traffic entering and leaving the city of 276,881,623. Even this total does not include the passengers entering and leaving the city on several ferry lines. Total traffic by ferry in and out of New York amounted to 49,038,692. With the steam railroad traffic there was a grand total of railroad and ferry traffic in and out of New York during 1923 of 325,920,315 passengers.

The number of railroad commuters entering and leaving the city on the various railroad lines was 147,172,484. The grand total of railroad and ferry commuters was 238,225,318.

Eliminating Sundays and holidays, and using a traffic year of 340 days, the basic figure generally employed by the Transit Commission—as a divisor—there are shown to be an average of 700,662 daily commuters in and out of the city. The total daily traffic in and out of New York City is 958,589. These figures represent two-way traffic passengers. The difference between the two, divided by 2, or 129,000 passengers, probably represents an approximate figure of the daily visitors to New York City, the great majority of whom arrive from outside the commuting zone.

State Control Urged for Missouri Bus Lines

The Missouri Legislature, which will convene next January, will be asked to enact a law placing all bus lines in Missouri under the control of the Missouri Public Service Commission. The measure that will be presented to the state lawmakers will probably require all bus companies and service car or-

ganizations to report regularly to the state body concerning their profits, etc., and also to provide indemnity bonds for the protection of their patrons.

In St. Louis the present regulatory body is the Board of Public Service, working under a city ordinance passed several years ago by the Board of Aldermen. Under the city ordinance the bus company pays the city 3 per cent of its gross earnings, but is not required to submit a statement of profits.

Richard W. Meade, president and general manager of the Peoples Motorbus Company, has stated that his company would welcome a law placing it under control of the Missouri Public Service Commission. Mr. Meade is quoted as follows:

Such control already exists in New York and other States. We would also favor a provision requiring monthly statements of earnings such as are submitted by other public utilities. The Peoples Motorbus Company already carries ample indemnity bonds and sets aside a certain percentage of its earnings for an accident reserve fund in addition.

Advertising to Help Company and Patrons

In an effort to picture some of the difficulties that are encountered in railway operation to the end that the public will give its co-operation in solving problems the Worcester Consolidated Street Railway, Worcester, Mass., has been using space liberally in the advertising columns of the Worcester newspapers. General Manager Henry C. Page says the results have been satisfactory and that he hopes advertising, never before done in Worcester by his company, will become a permanent policy. "We have a commodity to sell," Mr. Page explains, "which is as important to every householder in Worcester as the merchandise sold by the department stores, and the fact that we have a monopoly is no reason why we should not advertise it." He said he was particularly well pleased with the slogan in the recent advertising, "Help us to help you to better service."

British Expert Praises Detroit System

The Department of Street Railways, Detroit, Mich., has come in for a lot of praise from Lord Ashfield, one of the foremost authorities on transportation. The chairman and managing director of the railway, tramway and omnibus companies of the "Underground" group of London recently visited Detroit and predicted that the municipally owned lines would be a great success so long as the people continued to keep politics out of the system. He said that he had traveled on the lines and had been impressed with the smoothness of operation and the remarkable ability displayed in handling the crowds of workmen. He says it is an efficient system, splendidly managed. Lord Ashfield, formerly Albert Henry Stanley of Detroit, came with his family to Detroit when he was a small boy. He was general manager of the Detroit United Railway for twelve years.

Canadian Railway a Public Benefactor

Capilano Canyon, a famous beauty spot near Vancouver, B.C., has been presented outright by the British Columbia Electric Railway to the Vancouver Board of Trade, to be retained by it in trust for the public as a park. Approximately 145 acres is comprised in the gift. "We feel that this property should belong to the public in deed as well as in name," said George Kidd, president of the British Columbia Electric Railway in making the presentation.

The property was acquired by a predecessor company, evidently for a hydro-electric power site. Ever since it has been the Mecca for thousands of tourists. Recently the company was offered a considerable sum for a portion of the canyon by an individual who intended to promote it as a pleasure resort. Turning down this offer, the company decided to present it to the Board of Trade.

The gift has resulted in a great many expressions of appreciation by press and public. The following statement by J. K. Macrae, president of the Board of Trade, was only one of many: "The present offer was entirely unsolicited on our part, and the greatest credit is due to the company and to Mr. Kidd for the splendid public spirit which has prompted them to make this gift."

Wildcat Buses in New York a Menace

Condemning the "municipal buses" operated under the jurisdiction of the Department of Plant and Structures of the city of New York as "wildcat firetraps," the New York Transit Commission, in a statement issued by Commissioner LeRoy T. Harkness attacked the "emergency bus system" maintained by the present city administration. The attack came after a municipal bus, operated in Queens County, caught fire with serious injury to several passengers. An investigation of the matter by the grand jury is now under way. As no one was killed probably only civil indictments will result.

Commissioner Harkness disclosed the sensational conditions discovered by Transit Commission inspectors on several municipal bus lines in Manhattan, the Bronx and Queens. Not only was overloading revealed, but in many instances, it was charged, the vehicles were either not equipped with "emergency doors" in the rear, or these doors were fastened in such a way as to be useless in emergencies.

"The burning of passengers in these wildcat firetraps," said Mr. Harkness, "is not the only danger to the traveling public. Most of these buses are simply bodies mounted on truck chassis, and were never intended to carry human beings."

"The dangerous and deplorable conditions revealed by the Queens accident," the statement declares, "merely dramatized the menace to passengers through the operation of wildcat buses which do not have the safeguards provided by adequate franchise restrictions and general utility regulation."

Plea for Restoration of Service on Wisconsin Line Dismissed

The Railroad Commission of Wisconsin has dismissed the petition of residents of Omro who asked it to order the Wisconsin Power & Light Company to re-establish railway service between Oshkosh and Omro despite the fact that it has been operating at a loss due to improved highway conditions and the increased use of the private automobile. Bus service has been established on a schedule comparable with that of the discontinued interurban line, but fear was expressed that during the winter months bus service would not be as reliable as rail service. A statement of earnings and expenses introduced before the commission by the company for the year 1923 showed a deficit of \$4,215. The resumption of service would necessitate a complete rehabilitation in all departments of the system. To do this to conform with the present standards of the company would cost \$146,716.

Grand Rapids Company Submits Interesting Data on Car Capacity

A recent survey of daily traffic on Monroe Avenue in Grand Rapids, Mich., over which cars of practically all routes of the Grand Rapids Railway pass showed that from 4 to 6 p.m. on an average day 102 cars passed capable of carrying 4,032 passengers and actually carrying 3,628. In the same period 1,052 automobiles passed with a total capacity of 4,532 passengers and actually carrying 1,918. The street cars carried 98.8 capacity loads, while the autos carried 42.5 per cent.

The railway made a diagram of these figures and submitted it to its patrons. The diagram pictures one street car which would carry 48 passengers and under it and on the same scale were pictured 27 automobiles, the number needed to carry 48 passengers at 1.8 passengers per automobile, as was the case on the test day. The 27 automobiles easily took up six times as much space on the rush hour street as the single street car.

On the particular day in question the street space occupied by the street cars figured 4,692 ft. and that by the autos 14,728 ft. or 75.8 per cent of the street space or more than three times the space occupied by the street cars. These 102 street cars were only 8.83 per cent of the traffic, but they carried 63.8 per cent of the passengers.

Newly Organized Company Promises Good Service

The newly organized Erie Railways, Erie, Pa., will put into effect any reasonable measures which will improve service in Erie. These promises were made recently by R. A. Meyers, general manager of the property, at a conference held in the office of the city solicitor. Mr. Meyers said that some time ago a campaign was started to have service speeded up for the benefit of patrons, and it was in connection with this plan that the cars were made pay as you leave on out-bound trips to facilitate service down-

town. At the same time the pay-as-you-enter plan was put into effect on inbound trips to prevent delays in the business district and to aid in discharging passengers. He said that the plan was to increase the capacity in accordance with the demands for service and that every suggestion that had been brought to the company's attention for the betterment of service was receiving serious consideration.

Interurban Advertises Improvements in Service

Many improvements and innovations in service mark the general change of schedules put into effect by the Illinois Traction System, Peoria, on Sunday, Nov. 9. Without exception on the main divisions the changes include the addition of trains and shortening of schedules.

The principal innovation is the inauguration of three "fliers" each way

Another step forward is marked in the sleeping car service started on the route connecting Champaign, Decatur and St. Louis. The sleeping car leaves Champaign on Monday, Wednesday and Friday nights, and returning leaves St. Louis on Tuesday, Thursday and Sunday nights. It is named the "Illini," in deference to the famous university at Champaign-Urbana.

Service between suburban points and their nearest terminal cities has been augmented with the addition of "turn-around" trains, notably between Morton and Peoria; Danvers, Heyworth and Bloomington, and Riverton and Springfield.

No changes are made on the Ridgefarm or Catlin divisions, but train time has been altered on trains on the Homer, Mechanicsburg and Hillsboro divisions.

The improvements in service were advertised widely in the newspapers in the territory in which the company operates.

Another Paper Sees the Injustice of the Paving Charge

"As a matter of equity it does not seem fair that the International Railway should still be compelled to maintain the pavement and make repairs to the street between its rails," says the Buffalo Evening Sun in commenting on the franchise of the railway which provides that the company maintain the pavement between its tracks in the city. The newspaper says, "It is a heritage of horse-car days," and adds:

At the time when this system of street paving was adopted there was one or more perfectly good reasons for the practice: First, because the street car horses had to have a non-slippery surface on which to travel while drawing the cars with their heavy loads; second, because much of the heavy trucking in the city was hauled by horses that also required such a surface in bad weather.

Today this strip of rough stone pavement is an anachronism. The street cars are not drawn by horses and most of the heavy trucking is done by auto trucks. It is time that this historical rough strip be abandoned and that asphalt should replace stone as fast as new tracks are laid or important repairs are necessary. Those stone-paved surfaces are no more needed on the street with car lines than they are on any other comparatively level streets.

It may not be popular to say it, but it also is true that with the passing of the horse-drawn cars and the substitution of trolley-driven cars, all real reason has passed for saddling on the street car company the keeping up of the pavement between the tracks and along their outer rails.

It is true that the International Railway's franchise imposes this requirement on it—and the company has not been considerate enough of the Buffalo public to make a proposal to relieve it of part of its burden generally acceptable.

New Safety Laws Urged.—Amendment of the traffic law to provide for the full stop of all street cars before crossing arterial highways will be urged by City Commissioner Pier at an early meeting of the City Council of Portland, Ore. At present cars are not obliged to stop at the "full stop streets" and this is said to be confusing to motor drivers. Commissioner Pier has been investigating the matter and reports that in his belief many of the accidents in which street cars and motor cars figure are due to failure of street cars to come to a full stop at the busy arterial highway crossings.

NEW 6 FAST TRAINS
BETWEEN
PEORIA, SPRINGFIELD
and **St. LOUIS**
Chair Car Compartment. No Extra Fare!
Look For These St. Louis-Peoria "Flyers"

| | | |
|-------------|------------|------------|
| St. Louis | 10:00 A.M. | 10:00 P.M. |
| Peoria | 11:00 A.M. | 11:00 P.M. |
| Springfield | 12:00 P.M. | 12:00 P.M. |
| St. Louis | 1:00 P.M. | 1:00 P.M. |
| Peoria | 2:00 P.M. | 2:00 P.M. |
| Springfield | 3:00 P.M. | 3:00 P.M. |

Even the Color of New
It's a genuine
standard of high
service—dependable
and efficient
service—dependable
and efficient
service—dependable
and efficient

SLEEPING-CAR TRAIN
Highly Between Peoria-Springfield-St. Louis
Windows in upper berth, ashtray, reading lamp,
and blanket at disposal.
You really sleep in Traction sleepers.

NEW SLEEPING CAR
St. LOUIS-CHAMPAIGN
The ILLINI
Three Nights Each Week
From St. Louis—Tuesday, Thursday, Sunday
From Champaign—Monday, Wednesday, Friday
Reservations open at all times

CAPITOL LIMITED
De Luxe Parlor Car Train
The best used to travel under. Lounge
parlor chairs, library, observation, club seats—
best table service, continuous parties.
St. Louis 10:00 A.M. St. L. 10:00 P.M.
Peoria 11:00 A.M. Peoria 11:00 P.M.
Springfield 12:00 P.M. Springfield 12:00 P.M.
St. Louis 1:00 P.M. St. L. 1:00 P.M.

Illinois Traction System

Ad Typical of Recent I. T. S. Campaign

daily connecting Peoria, Springfield and St. Louis. These trains make the trip from the heart of Peoria to the heart of St. Louis in less than 5½ hours. They are in addition to a de luxe parlor car train each way daily which leaves each terminal at 10 a.m. The three new trains are distinctive in design. The coaches are painted a vivid tangerine color and contain a chair car compartment. No extra seat charge is made on these trains. They are to be known as the Peoria-St. Louis Fliers.

The de luxe parlor car train is known as the Capitol Limited. It continues to serve meals à la carte and has such refinements as library and club sections, observation platform and reserved parlor chairs.

On the Springfield-Decatur-Champaign-Danville division four fast trains have been placed in service each way daily instead of two. These trains make the trip from Springfield to Danville in 4 hours and 15 minutes.

Three fast limited trains have been placed in service each way daily connecting Peoria, Bloomington and Decatur, whereas two have been on the schedule.

News Notes

Tranway Wants Increased Fare.—The Denver & Crown Hill Railway, a branch line of the Denver Tramway, operating from a junction of the city lines to the Crown Hill Cemetery, a distance of about 1 mile, has petitioned the State Public Utilities Commission for permission to raise the fare from 5 cents to 8 cents, effective on Dec. 1. It is claimed that the road has operated at an annual deficit of between \$5,000 and \$8,000. Only one car operates on the line.

Must Continue Bus Service.—The Pennsylvania Public Service Commission recently disposed of an application to discontinue bus service. The York Railways, York, Pa., organized the York Transit Company to supplement railway service with buses. After eleven months operation an application to discontinue the bus service was filed. It had yielded \$3,011, which was \$5,717 less than it had cost. The commission held that the service was necessary and denied the application for permission to quit, giving the company the right to renew its application, however, if, after three or four months trial of rates considered by the company to be sufficient to yield operating expense and fair return, it should be found that the service could not be operated profitably. The old rates averaged 4 cents a mile.

Agitation Over One-Man Cars.—Formal notice has been served upon the International Railway, Buffalo, N. Y., by the municipal authorities demanding immediate withdrawal of one-man cars. The city also has asked the Public Service Commission to take action. Herbert G. Tulley, president of the International, says one-man cars have come to stay.

Petitions to Run Supplementary Buses.—The Roanoke Railway & Electric Company, Roanoke, Va., has petitioned the State Corporation Commission for permission to establish a supplementary bus line. The company states that its appeal is based on an understanding of the public's "demand . . . for interurban bus transportation."

Seeks to Enjoin Bus Operation.—Parlor car service of the Iroquoise Trails Motor Coach Lines, Inc., between Rochester and Buffalo, N. Y., was halted on Nov. 21 when the Rochester, Lockport & Buffalo Railroad obtained a temporary restraining order, pending trial of an action in Supreme Court. The railway will sue for a permanent injunction on the ground that the bus company is operating in competition without permission from the towns and villages it serves and without a certificate from the State Public Service Commission.

Railway Favored for Football Jaunts.—The Michigan Electric Railway, Jackson, Mich., has called the attention of parents to the desirability of having their children travel to the high school and college football games by the company's interurban system rather than

in automobiles. It draws attention to the fact that two serious mishaps have recently occurred near Jackson in such automobile jaunts. Athletic Director Mason of the Jackson public schools has taken a stand against boys traveling in automobiles to and from schools or to out-of-town events. He has arranged for special cars on the Michigan Electric Railway from Jackson to Grand Rapids for his team and any rooters who wish to accompany it. Special rates are granted, in such instances. The railway believes that at such times the excitement and natural exuberance over the coming events cause mishaps, and in that emergency the electric railway is the way of sureness and safety.

Granted Bus Franchise.—The Portland Electric Power Company, Portland, Ore., has been granted a franchise to operate a bus line on East Thirty-ninth Street, to connect with the railway lines. The bus line will be operated as a cross-town line. The franchise will run for six months.

City Officials Sued.—Claiming that her husband was killed by a trackless trolley on Victory Boulevard, Staten Island, March 10, 1923, Mrs. Eva Chrampanis has filed suit for \$75,000 in the county clerk's office in St. George, Staten Island, against Mayor Hylan, the five Borough Presidents, Murray Hulbert, President of the Board of Aldermen, and Grover Whalen. This is the second time that Mrs. Chrampanis has brought suit in the matter. Following the accident she sued the city of New York and the case was argued before Justice Selah B. Strong in the March term of this year. Counsel for the city asked for a dismissal on the ground that since the trackless trolley on Staten Island was being operated without a franchise from the city of New York, the city could not be held responsible for the death of her husband. Justice Strong granted the request for dismissal. Arthur M. Simonson, attorney for Mrs. Chrampanis, then sought permission to lodge a complaint against individuals.

New Railway in Prospect.—Plans are under way for connecting Mariemont, east of Madisonville, with downtown Cincinnati, Ohio, by electric railway. Negotiations have been in progress for some time through which, if completed, the cars of the Cincinnati, Milford & Blanchester Traction Company will be brought over the tracks of the Cincinnati Traction Company to Cincinnati. B. H. Kroger, president of the Cincinnati, Milford & Blanchester Traction Company, said that the matter had been taken up with officials of the traction company and that plans had been discussed. Mr. Kroger said that plans are being held in abeyance until the new electric railway charter has been agreed upon. Recently the Cincinnati, Milford & Blanchester Traction Company purchased a strip of property in downtown Cincinnati which is being considered as a possible site for the new downtown terminal of the interurban.

Wages Advanced Two Cents.—Platform employees of the Rochester, Lockport & Buffalo Railway operating an interurban line between Rochester and Lockport, connecting at the latter city with the International Railway for

Buffalo, have been granted a wage increase of 2 cents an hour after a conference between the management and James Largay, Utica, vice-president of the Amalgamated. The agreement ends a two-year dispute over wages which threatened a strike two weeks ago. The new scale became effective on Nov. 1.

Eighty Buses in Service.—During the past month the Pennsylvania Power & Light Company started bus service between New Castle and Sharon, Pa. This addition brings the total number of buses operated by the Republic Railway & Light Company, the controlling company, up to 23 in interurban service and 57 buses in city service.

Seeks Advanced Rates.—The Virginia Railway & Power Company has petitioned the States Corporation Commission for permission to increase its present fare from Richmond to Petersburg from 47 cents to 60 cents and to advance the ticket rate from 42 cent to 55 cents. Commutation rates under this petition would be raised from \$1 to \$3.50 for a minimum distance and from \$13.75 to \$16.50 for the full trip. The petition was signed by President Wheelright. It said that the commission had found the value of the interurban division \$1,210,000, and that earnings for the nine months ended Sept. 30, 1924, were \$40,646 and for a similar period last year \$36,869. The actual return on this valuation for the year 1923 was only 3.43 per cent, deducting the sum of \$15,000 which the commission said was a proper charge to be made against the Richmond-Petersburg divisions for transfers to and from the interurban line.

Will Repeal Bus Tax Ordinance.—Acting on what it alleged was a refusal by the Duluth-Superior Traction Company to furnish bus service to residents in and between Allouez and Itasca, suburbs of Superior, the City Commissioners have voted unanimously to repeal the city's bus tax ordinance, which provided a tax of \$500 on each jitney placed in city service. The City Commissioners contend that when this ordinance was adopted it was the understanding of the City Commission that the railway would place a bus in service between these points.

Complaint Dismissed.—The California Railroad Commission has dismissed the complaint of the city of Piedmont against the Key System Transit Company, charging discrimination against the city of Piedmont in the matter of interurban fares. The defendant company has complied with the order of the commission to remove the discrimination. It is now operating interurban trains over an extension of the Piedmont line from Fortieth and Piedmont Avenue in Oakland to Oakland and Jerome, in Piedmont.

Seeks Increased Fares.—The Athens Railway & Power Company, Athens, Ga., has petitioned the Georgia Public Service Commission for permission to issue weekly passes for \$1 and to increase cash fares from 7 cents to 10 cents. The company also wishes to sell books of tickets at the rate of two for 15 cents if the 10-cent cash fare is granted. Fares in Athens have been 7 cents since September, 1921.

Financial and Corporate

R. T. Reports \$359,025 Deficit

Net Corporate Income Increased by \$1,202,972—Traffic Up on Subway and Manhattan Divisions

The net corporate income of the Interborough Rapid Transit Company, New York, N. Y., for the year ended June 30, 1924, was \$1,071,177, against a net corporate deficit of \$131,795 in 1923, or an increase of \$1,202,972. The surplus at the end of the year was \$391,534, compared with a deficit for the year ended June, 1923, of \$524,783.

The number of passengers carried was 1,074,343,243, compared with 1,025,175,131 last year, an increase of 49,168,112. This was due to a gain of 38,282,156 on the subway division and a gain

COMPARATIVE STATEMENT OF INCOME ACCOUNT, YEAR ENDED JUNE 30

| | 1924 | 1923 |
|---|--------------|--------------|
| Gross operating revenue.. | \$57,773,775 | \$55,559,435 |
| Operating expenses..... | 33,841,415 | 34,392,508 |
| Net operating revenue. | \$23,932,359 | \$21,166,927 |
| Taxes..... | 2,763,529 | 2,662,310 |
| Income from operation. | \$21,168,830 | \$18,504,616 |
| Non-operating income.... | 402,762 | 573,850 |
| Gross income..... | \$21,571,592 | \$19,078,466 |
| Income deductions..... | 20,500,416 | 19,210,261 |
| Net corporate income for the year..... | \$1,071,176 | \$131,794 |
| Add: | | |
| Surplus at beginning of year .. | 524,783 | 524,866 |
| Profit and loss account—net change during the year..... | 154,859 | 131,878 |
| Surplus or deficit at end of year*..... | \$391,534 | \$524,783 |

* Stated exclusive of accruals under contract No. 3 and related certificates payable from future earnings with full deduction for sinking fund on first and refunding mortgage bonds, the payment of which is under the "Plan of Readjustment," postponed for five years from July 1, 1921, provided an amount equal to such postponed sinking fund be expended for additions or improvements to the property.

† Stated exclusive of expenditures for maintenance in excess of contractual provisions aggregating \$1,430,202, leaving a balance (deficit) after actual maintenance of \$359,025 for the year.

Figures in italics show deficit.

of 10,885,356 on the Manhattan Railway division.

An expenditure of \$5,909,509 was made during the year for additions, betterments and replacements. This amount included the company's contribution toward construction and equipment under contract No. 3 and the related certificates, completion of the multiple-unit car door control device on 1,378 subway cars and a considerable portion of the cost of installing multiple-unit car door control devices on 465 Manhattan division cars, also the cost of completing 100 subway steel trail cars put into use during the summer of 1923.

The increase in revenues from transportation for the year was \$2,446,446. While the greater part of this gain was on the subway division, the Manhattan Railway division showed an increase of more than 3 per cent, most of which,

according to the report, may be attributed to increased service and improvements in the condition of the cars and stations, together with increased patronage resulting from advertising. There was a decrease in the other operating revenue of \$232,107, leaving a net increase in gross operating revenue of \$2,214,339. This falling off in other operating revenue resulted from a decrease in the sale of power of \$322,000, partially offset by an increase in advertising and rentals.

The cost of conducting transportation during the year was \$959,588 less than the previous year, although the car-miles operated increased 7,310,000 and wage rates were 5 per cent higher.

It was necessary to expend for maintenance \$1,364,464 more than in the previous year, to keep the property in a safe operating condition. Considering the actual maintenance expenditures the total expenses for operating and maintaining the property for the year were \$35,271,618, compared with \$34,829,706 in 1923. The increase in general expenses was \$36,720 over the previous year, although the amount expended in the settlement of accident and damage claims showed an increase of \$75,123, due largely to the necessary

STATEMENT OF INCOME DEDUCTIONS, YEAR ENDED JUNE 30, 1924

| | | |
|---|--------------|---------------|
| Gross income..... | \$21,571,592 | |
| Rentals: | | |
| City of New York: | | |
| Interest on city bonds | \$2,049,182 | |
| Sinking fund..... | 561,817 | \$2,610,999 |
| Manhattan Railway: | | |
| Interest: | | |
| Consolidated mortgage 4 per cent bonds..... | \$1,627,320 | |
| Second mortgage 4 per cent bonds..... | 180,920 | |
| Fixed rental—organization..... | 50,000 | |
| Dividend rental on capital stock..... | 2,723,877 | 4,582,117 |
| Total..... | | \$7,193,116 |
| Interest and sinking fund charges—On securities issued by Interborough Rapid Transit Company: | | |
| First and refunding mortgage 5 per cent gold bonds: | | |
| Interest.. | \$8,066,992 | |
| Sinking fund... .. | 2,170,556 | \$10,237,548 |
| Ten-year 7 per cent notes—interest..... | 2,246,419 | |
| Ten-year 6 per cent notes—interest..... | 260,908 | |
| Equipment trust certificates, Series "A"—interest..... | 70,420 | 12,815,297 |
| Other deductions: | | |
| Sundry rents..... | \$264,659 | |
| Interest on unfunded debt..... | 178,543 | |
| Interest on investment of depreciation reserve | 48,800 | 492,002 |
| Total income deductions..... | | \$20,500,416 |
| Net corporate income..... | | \$1,071,176 |
| Maintenance expenditures in excess of contractual provisions..... | | 1,430,202 |
| Balance (deficit) after actual maintenance..... | | \$359,025 |
| Per cent expense to earnings..... | | 58.57 |
| Passengers carried..... | | 1,074,343,243 |

postponement of the settlement of such cases during the past few years.

The net result of the operation of the Interborough system, after deducting the actual maintenance expenditures, shows an improvement over the previous year of \$209,966. This figure is arrived at after deducting the Manhattan dividend rental of \$1,013,877 in excess of the previous year, including a reserve of \$233,877 to cover the amount of additional dividend rental from July, 1, 1922, to June 30, 1924, which might become payable to owners of Manhattan stock not agreeing to the plan of readjustment.

Following an order from the Transit Commission, under date of Aug. 22, 1923, directing the purchase of 100 additional steel motor cars for use in the subway division, arrangements were made for the purchase of these cars through an equipment trust, whereby 25 per cent of the cost, estimated at \$3,000,000, was paid in cash and the balance through the issuance and sale of \$2,250,000 of equipment trust certificates, bearing interest at the rate of 6½ per cent.

BUSES AS ADJUNCT TO RAILWAY

In his report to the stockholders Frank Hedley, president and general manager of the Interborough property, states that since the report was prepared several applications for franchises to operate comprehensive bus systems have been filed with the public authorities. He said that the Interborough's position was that there should be no extensions of existing bus lines, except as feeders for the rapid transit lines. He said the operation of buses over the routes contemplated in the franchise applications recently submitted would seriously affect the net revenues of the company and its ability to pay interest on the city's bonds issued for construction purposes. It was his idea that bus operation should be rendered as an adjunct to the rapid transit lines, in which the city is financially interested under the provisions of the existing contracts. He concluded by stating that 30 years ago the city adopted a policy of underground transportation, with ultimate municipal ownership, and that it should not now revert to a policy of 70 years ago of coach transportation with private ownership.

The accompanying tables show the income account of the company for the fiscal year ended June 30, 1924, compared with the year before, also the income deductions for the year ended June 30, 1924.

Line to Be Reorganized.—The Portsmouth, Dover & York Electric Road, Portsmouth, N. H., will be reorganized under the name of the Portsmouth, Kittery & Eliot Railway. The company will operate its cars from Kennard's Corner, Eliot, to Sea Point, Kittery. It is expected that service will start early in the new year. The incorporators include W. W. Sargent, president of the Fitchburg & Leominster Railway; Zelig Van Loan, E. A. Pierce, general superintendent of the Bellows Falls & Saxon River Railway, and Dr. Samuel Nason.

St. Louis Plan Approved

Terms Announced Under Which the Reorganization of United Railways Will Be Carried Out

Holders of the securities of the United Railways, St. Louis, Mo., and its subsidiary companies, were notified on Nov. 26 of the perfection of the plans for the reorganization of the company. With the exception of the first general mortgage 4s holders are instructed to deposit their securities with the respective depositories on or before Dec. 24. The general 4s are undisturbed by the reorganization plan. Under the terms of the plan a total of \$41,296,000 of stock is eliminated, the amounts being \$16,383,000 of preferred and \$24,913,000 of common.

The reorganization is intended to terminate the receivership, bring about a fair adjustment of the respective interests of the various security holders, reduce the fixed charges to an amount safely within the earning capacity of the property, settle the litigation and controversies which have prevented reorganization of the properties, provide adequately for present and future capital requirements and place the property in a position to render the highest standard of public service. In particular, the reorganization is intended to prevent separation of the properties and to continue under one management all of the roads now comprising the United Railways system.

The new financial arrangement and

PRESENT CAPITALIZATION AND CHARGES OF UNITED RAILWAYS

| Amounts outstanding | Bonds | Annual charges |
|---------------------|---|--------------------|
| \$30,300,000 | United Railways Company first general 4s..... | \$1,212,000 |
| 2,000,000 | St. Louis & Suburban first mortgage 5 (8) per cent..... | 160,000 |
| 4,500,000 | St. Louis & Suburban general 6s..... | 225,000 |
| 1,640,000 | Cass Avenue & Fairgrounds Railway first mortgage 5 (6) per cent bonds | 98,400 |
| 986,000 | Compton Heights, Union Depot & Merchants Terminal Railway first mortgage bonds..... | 59,160 |
| 1,474,000 | Lindell Railway Company first mortgage 5 (8) per cent bonds.. | 117,920 |
| 9,790,000 | St. Louis Transit Company improvement 5 per cent gold bonds | 459,500 |
| 4,200,000 | Receiver's certificates Series B 6 per cent..... | 252,000 |
| | Total fixed charges | \$2,613,980 |
| | Stocks | |
| 16,383,000 | United Railways preferred stock | 819,150 |
| 24,913,000 | United Railways common stock | |
| \$96,186,000 | | \$3,433,130 |

against \$2,613,980 under the present organization.

The capitalization and annual charges after reorganization are estimated as shown in the accompanying table.

The proposed new capitalization is compared in the accompanying table with the obligations on the present outstanding securities of the company.

Holders of the bonds and stock of the company and its subsidiaries who have not already deposited their securities with their respective protective committees may become parties of the reorganization plan and agreement by depositing their securities with the depositories under their respective depository agreements.

Newman, Saunders & Company, Inc., New York, of which J. K. Newman, a member of the reorganization committee, is head, have agreed to form a syndicate of which it will be manager,

Chicago's Loop Has 1,200,000 People Daily

More than 1,200,000 persons pour into the loop district of Chicago every twenty-four hours, according to a traffic count made by the city's department of public service. Of the number more than 700,000 are carried by surface and elevated lines, buses and suburban steam lines. The figures were gathered by the department so that actual data might be had on a city's traffic problems for use in considering questions arising affecting pedestrians, motorists and street-car and elevated passengers might be settled on a definite basis with a regard for the greatest number.

The count showed that pedestrians numbering 182,011 came into the loop every day; 34,184 entered by commercial vehicles and 233,309 by passenger vehicles. The surface lines carried 475,237 persons and the elevated lines 189,905. Buses transported 74,000.

The figures for the loop-bound traffic of the surface and elevated lines are based on the average number of passengers carried a day during the first six months of the current year. The Chicago Traction and Subway Commission of 1916 had established, on the basis of an actual count, of all passengers carried by these lines, that of the 24-hour total surface lines traffic, 23 per cent was carried in or out of the loop, while of the total passengers carried by the elevated lines in 24 hours, 63 per cent are hauled to and from the loop district.

ESTIMATED CAPITALIZATION AND ANNUAL CHARGES AFTER REORGANIZATION

| | | |
|--------------|--|----------------------------|
| \$30,300,000 | first general mortgage 4s, undisturbed..... | Annual charges \$1,212,000 |
| 6,000,000 | first and refunding mortgage bonds or collateral gold notes of new company | 390,000 |
| 4,500,000 | first mortgage bonds of new Suburban..... | 225,000 |
| | Total interest charges..... | \$1,827,000 |
| | Sinking fund of \$100,000 annual for retirement of Suburban bonds | 100,000 |
| | 53,845 shares of new preferred 7 per cent stock..... | 376,915 |
| | 343,645 shares of new common stock of no par value..... | |
| | Total obligations on securities..... | \$2,303,915 |

agreement is dated Oct. 1, 1924. Under it the fixed charges of the company, including the sinking fund on the Suburban bonds, will be \$1,927,000 as

to underwrite the 245,745 shares of new common stock to be offered the preferred and common stockholders of the present company.

| | Latest | Month Ago | Year Ago | Since War | |
|--|----------------------|-----------------------|----------------------|-----------------------|----------------------|
| | | | | High | Low |
| Street Railway Fares* 1913 = 4.84 | Nov. 1924 7.17 | Oct. 1924 7.15 | Nov. 1923 6.95 | May 1921 7.24 | May 1921 6.68 |
| Street Railway Materials* 1913 = 100 | Oct. 1924 148.5 | Sept. 1924 151.4 | Oct. 1923 160.9 | Sept. 1920 247.5 | Oct. 1924 148.5 |
| Street Railway Wages*† 1913 = 100 | Nov. 1924 226.7 | Oct. 1924 220.6 | Nov. 1923 216.4 | Sept. 1920 232 | Mar. 1921 206.8 |
| Steel—Unfilled Orders (Million Tons) 1913 = 5.91 | Oct. 31 1924 3.53 | Sept. 30 1924 3.47 | Oct. 31 1923 4.67 | July 31 1920 11.12 | July 31 1924 3.19 |
| U. S. Bank Clearings Outside N. Y. City (Billions) | Oct. 1924 18.02 | Sept. 1924 15.90 | Oct. 1923 17.04 | Mar. 1920 18.54 | Feb. 1922 10.65 |
| Business Failures Number | Oct. 1924 1,574 | Sept. 1924 1,376 | Oct. 1923 1,608 | Jan. 1924 2,231 | Sept. 1924 1,276 |
| Liabilities (millions) | Oct. 1924 45.89 | Sept. 1924 26.95 | Oct. 1923 75.17 | Jan. 1924 122.95 | Sept. 1924 26.95 |

Conspectus of Indexes for November, 1924

Compiled for Publication in this Paper by
Albert S. Richey
Electric Railway Engineer
Worcester, Mass.

| | Latest | Month Ago | Year Ago | Since War | |
|--|----------------------|----------------------|----------------------|----------------------|----------------------|
| | | | | High | Low |
| Eng. News-Record Construction costs 1913 = 100 | Nov. 1924 205.7 | Oct. 1924 207.6 | Nov. 1923 220.9 | June 1921 273.8 | Mar. 1922 162.6 |
| U. S. Bur. Lab. Stat. Wholesale Commodities 1913 = 100 | Oct. 1924 151.9 | Sept. 1924 148.8 | Oct. 1923 151.1 | May 1920 247 | Jan. 1922 138 |
| Bradstreet's Wholesale Commodities 1913 = 9.21 | Nov. 1 1924 13.35 | Oct. 1 1924 13.00 | Nov. 1 1923 13.14 | Feb. 1 1920 20.87 | June 1 1921 10.62 |
| Dun's Wholesale Commodities 1913 = 120.9 | Nov. 1 1924 193.7 | Oct. 1 1924 190.9 | Nov. 1 1923 191.8 | May 1 1920 263.3 | July 1 1921 159.8 |
| U. S. Bur. Lab. Stat. Retail food 1913 = 100 | Oct. 1924 148.7 | Sept. 1924 146.8 | Oct. 1923 150 | June 1920 213 | Mar. 1922 139 |
| Nat. Ind. Conf. Bd. Cost of living 1914 = 100 | Oct. 1924 165.0 | Sept. 1924 163.7 | Oct. 1923 164.1 | July 1920 204.5 | Aug. 1922 154.5 |

*The three index numbers marked with an asterisk are computed by Mr. Richey, as follows: Fares index is average street railway fare in all United States cities with a population of 50,000 or over except New York City, and weighted according to population.

Street Railway Materials Index is relative average price of materials (including fuel) used in street railway operation and maintenance, weighted according to average use of such materials.

†Beginning with this issue a slight change is made in the weighting employed in the electric railway wage index. This index represents on the base of 1923 = 100, the trend of maximum

hourly wages of street and interurban railway platform men of about 100 of the largest companies in the United States. The weighting heretofore given to this index has been the number of passenger cars operated by the various companies. The weighting has now been changed to be in accordance with the number of trainmen (conductors, motormen and one-man car operators) employed by the various companies. Although the change is slight, it is thought the revised index is a more accurate measure of the trend in wages. Monthly index figures since January, 1923, on the old and new bases were published on page 757 of the issue of the paper for Nov. 1, 1924.

Canadians Oppose Stopping Service on Toronto Radial

Engineers of the Hydro-Electric Commission of Ontario have been authorized to prepare a report for submission to the city of Toronto setting forth the earnings, value and other statistics of the Schomberg division of the Metropolitan Radial Railway in explanation of the commission's decision to suspend service over the road. It was also decided to notify the municipalities which are affected that under the radial agreement they have the right to acquire the line if they so choose. Apparently the Schomberg division must go unless the municipalities which it serves choose to take over its operation.

King Township residents declare that the proposal of the commission to scrap the Schomberg division would bring economic destruction to the several villages which it serves. In consequence township officials are preparing a campaign of vigorous resistance to the project. York County Council will be asked by the township to join with it in a protest to the Hydro commission. In the event of this failing to bring results an appeal may be made to the Dominion Railway Commission to have the Schomberg line taken into the national system.

Employees Handle Stock Sale in Birmingham

Approximately 4,000 shares of preferred stock of the Birmingham Electric Company, paying 7½ per cent interest, were sold to Birmingham, Ala., people during the first week of a drive to sell an issue of 20,000 shares of the stock locally. The sale started formally on Nov. 10 and is being handled by employees of the company. Employees bought 2,400 shares of the stock before the formal offering to the public and more than 70 per cent of the employees subscribed, it is stated. The stock, which is no par value stock, is being sold at \$97 per share and is callable at \$110 per share. The proceeds of the sale are to be used in gas and electric extensions.

As an advertising feature in connection with the stock sale four cars of the company were painted white with advertisements of the stock sale in large black letters on them. The ads read "Invest in Our Preferred Stock. It Pays 7½ per Cent. It's Safe. Our Employees Sell It."

In addition to the white painted street cars, newspaper and billboard advertising as well as posters in all street cars are being used.

New Third Avenue Director.—At a meeting of the Third Avenue Railway, New York, on Nov. 12, William Carnegie Ewen was elected a director of the company. He succeeds Harry Bronner of Blair & Company, New York, resigned. Mr. Ewen is an investment banker with offices in New York. He has in the past specialized in New York city traction securities and is regarded as being unusually well informed with respect to the history of the various companies in New York City and on

the possibilities of the territory in which they operate.

City Wants Payments on Time.—At a conference with Mayor Kendrick, his cabinet, the Council and the Transit Commission, T. E. Mitten of the Philadelphia Rapid Transit Company announced that his company stood ready to carry the interest and sinking fund charges, but he asked that during the early operation of the new subway the amounts to be paid by the company be less than during the later years of the arrangement. He added that the company eventually would pay the equivalent of all interest and sinking fund charges of the entire 50 years. Both the Mayor and president of the Council declared that such procedure would impair the city's improvement program by tying up some of its borrowing capacity. A member of the Council's finance committee named by the Mayor as one of the four city representatives to confer with the company's officials on details of the Chestnut Street subway agreement said that the city must insist that the company be not permitted to interfere with the city's development program by slowness in taking over the full yearly burden.

Deficit in September.—For the month ended Sept. 30, 1924, the Municipal Railway of San Francisco, Cal., reports total receipts of \$270,881 and total operating expenditures of \$203,722. The excess of receipts over expenses for the month was \$67,160. After the consideration of reserves, amounts for depreciation and interest charges, the net deficit from operations for September was \$454.

Return Less than 1 per Cent in Mobile.—The financial statement of the operations of the Mobile Light & Railroad Company, Mobile, Ala., for the year beginning Oct. 1, 1923, and ending Sept. 30, 1924, made in connection with a recent abandonment petition shows railway revenue of \$747,801. Operating expenses and taxes were \$715,770; net \$32,031; bond interest, \$67,595; other interest, \$900; total interest, \$68,495; deficit after interest, \$36,463; paving assessment, \$2,216; deficit after paving assessment, \$38,680; sinking fund, \$25,000; deficit after sinking fund, \$63,680. Including operation of the Chickasaw line, which was not valued by the Public Service Commission, the net income was 0.85 per cent on the valuation of \$3,765,369, it was stated in the company's recent plea for abandonment of some lines.

Buses Meet With Losses.—Bus service maintained by the Seattle Municipal Railway in connection with the car lines is a financial loss to the railway system, Superintendent D. W. Henderson reported to the City Council recently. During the first nine months of 1924 the loss amounted to \$20,125. The Council has before it an ordinance appropriating \$17,000 to purchase two buses for operation on Empire Way, and Superintendent Henderson recommends against such a move, stating that at least three buses would be required, involving an initial investment of \$25,000.

Prior Preference Stocks Offered.—A syndicate including Otis & Company is offering at \$92 per share and accrued

dividend to yield 7.61 per cent, \$4,000,000 of the 7 per cent prior preference stock of the Continental Gas & Electric Corporation. This company is presently to be a subsidiary of the United Light & Power Company of Grand Rapids, Mich. The United Light & Power Company, through a subsidiary, has recently contracted to purchase more than 75 per cent of the common shares of the Continental Gas & Electric Corporation. The Continental Gas & Electric Corporation is a large utility holding company which controls among other companies the Columbus Railway, Power & Light Company and the Kansas City Power & Light Company.

Third Quarter Better Than a Year Ago.—For the quarter ended Sept. 30, 1924, the United Traction Company, Albany, N. Y., received in transportation revenue \$687,125, against \$696,940 for a similar period a year ago. Revenue from other railway operations for the same quarters was \$20,435 and \$22,434 respectively. The total operating expense for the third quarter of this year was \$631,987. The net surplus was \$75,574. After the consideration of taxes the operating loss was \$10,256. The operating loss for a similar period last year was \$61,960. The net corporate loss for the third period of 1924 was \$130,975. The net loss for the year, up to the close of the September quarter was \$205,986. This is \$12,452 less than the net loss for the first three quarters of 1923. For the nine months of 1924 the company collected 110,091 fewer passenger fares than for a similar period in 1923. For the first nine months in this year the company operated 3,945,745 car-seat-miles more than for the first nine months one year ago. The number of car-seat-miles operated for the quarter this year was 64,218,392.

Railway Appurtenances Sold.—The Southeastern Ohio Railway, operating between Crooksville and Zanesville, Ohio, was sold recently to Henry Goodman. He will dismantle the property. Officials say that bus lines depleted the railway income. Cars have not been running since last May. The likelihood of the abandonment of this 16-mile line has been referred to previously in the ELECTRIC RAILWAY JOURNAL.

Income Increases.—For the quarter ended Sept. 30, 1924, the New York State Railways, Rochester, N. Y., reports to the New York Public Service Commission a net income of \$217,774, compared with \$205,842 for the similar quarter in 1923.

\$7,900,000 Bond Issue on Account of Purchase.—Although the final railway purchase award at Toronto, Ont., calls for \$11,448,500, the issue of bonds by the city on account of the railway purchase is for \$7,900,000, as the city has already paid \$2,500,000 on account, and more than \$800,000 is still owing the city by the company in percentages. The terms of the award and the plans looking toward the liquidation of the Toronto Railway have been referred to several times in recent issues of the ELECTRIC RAILWAY JOURNAL. A meeting has already been called having for its object the winding up of the affairs of the company.

Personal Items

Assignments Made in Westinghouse Railway Department

Important changes, involving four division sales managers, have been made in the railway department of the Westinghouse Electric & Manufacturing Company. W. R. Stinemetz, manager of the heavy traction division, and K. A. Simmon, manager of the light traction division, have been appointed assistants to the manager of the railway department. To fill their places, A. J. Manson, manager of the transportation division at New York, has been elevated to the managership of the heavy traction division, as noted in the *ELECTRIC RAILWAY JOURNAL* for Nov. 22, and E. A. Palmer, manager transportation division, San Francisco office, has been advanced to the managership of the light traction division.

Mr. Stinemetz was graduated from Lehigh University in 1893. He was first employed by the Chicago Telephone Company and the Brooklyn Edison Company. He entered the employ of the Westinghouse Electric Company in 1897, was electrical engineer for power houses of the Third Avenue Railroad, New York, in 1899 and in 1900 was employed by the Westinghouse agents in Mexico. In 1901 he worked on the electrification of the Boston Elevated Railway and later launched the single-phase road of the Atlanta Northern Railroad. He then spent two years supervising the installation of single-phase railroads in France for the French Westinghouse Company and still later was engaged in installing the electrical equipment in the power house which supplied light, heat and power to the United States Capitol. In 1913 he was employed as a commercial engineer in the railway department of the Westinghouse company and several years ago was made manager of the heavy traction division of the railway department.

Mr. Simmon entered the employ of the Westinghouse company upon his graduation from the University of Minnesota in 1905. He attracted attention through the development of train-heating boilers for the New Haven locomotives. Railway control was his special work for some time and he became head of the railway control section of the railway engineering department in 1914. Four years later he became section engineer in charge of light traction motors and control in the railway engineering department. In 1921 he was appointed manager of the light traction division.

Mr. Manson's career was reviewed in the issue of the *ELECTRIC RAILWAY JOURNAL* for Nov. 22.

Mr. Palmer served with the Public Service Railway, New Jersey, upon his graduation from Cornell University in 1909 and was appointed assistant superintendent of the Plank road shops in 1911. Three years later he was made division master mechanic of the

Central Division in Elizabeth, N. J. He held this position until 1916, when he entered the employ of the American Brake Shoe & Foundry Company as mechanical expert. He was engaged by the Westinghouse company in 1917 and was assigned to the railway department of the San Francisco office.

T. R. Langan, manager of the transportation division at the Buffalo office, has been appointed manager of the transportation division at the New York office, to succeed Mr. Manson.

Mr. Ainey Heads Commissioners

Chairman of Pennsylvania Body Elected President of National Body at Phoenix Meeting

W. D. B. Ainey was elected president of the National Association of Railway & Utility Commissioners at the recent annual convention in Phoenix, Ariz.



W. D. B. Ainey

Mr. Ainey is chairman of the Public Service Commission of Pennsylvania. He was appointed to that body by Governor Brumbaugh in 1915 and three months later he was made chairman. Mr. Ainey performed the duties of this office so capably that in 1917 he was reappointed for a 10-year term.

Mr. Ainey is very well known among utility men operating outside of his own state. He has been a frequent attendant at the conventions of the utility managers and was one of the speakers at the Midyear Meeting of the American Electric Railway Association in Indianapolis in 1922. His subject at that time was "A Commissioner's Viewpoint on Some Electric Railway Problems." According to Mr. Ainey, it is in the management and in the management alone that there is to be found the solution of the utility problems of the country. He has said publicly that in so far as the public utilities are concerned it should be the policy of the law not to permit managerial responsibility to be avoided, but that respon-

sibility without authority to make itself effective is vain.

Mr. Ainey's principal interest lies, of course, in Pennsylvania, but he has long been a national figure. He was elected to Congress in 1911 and was there four years as a member of the Sixty-second and Sixty-third Congress. His election to this office was a tribute of his constituents toward the man. That his legal attainments have been given wide recognition is evidenced by the numerous occasions on which he has served as a delegate to international gatherings, including the Inter-Parliamentary Conference in Geneva, Switzerland, in 1912 and the Hague Conference in 1913, where he was made secretary of the Japanese-American groups of parliamentarians. In 1914, on the invitation of the Imperial Parliament, he visited Japan as a delegate from the United States.

Mr. Ainey is a native of New Milford, Pa. He was graduated from the law school of Lehigh University and was admitted to the bar in 1887.

Duties Reassigned in Schenectady

Changes in the personnel of the Schenectady Railway, Schenectady, N. Y., include the names of Messrs. Witherwax, Nellis and Palmatier.

C. J. Witherwax, for some years past connected with the company as general passenger and freight agent has resigned his position, effective Nov. 24, to engage in other business. When he took over the management of all special car movements, excursions and the investigation of irregularities in service about ten years ago his office was a new one with the company. Later he was appointed claim agent. Prior to his connection with the railway he was associated with the Schenectady Illuminating Company and the Mohawk Gas Company.

J. G. Nellis, who was appointed superintendent of the Schenectady Railway on Oct. 15, 1924, takes charge of the traffic department in addition to his other duties, vice C. J. Witherwax, resigned. Before going to Schenectady Mr. Nellis had been superintendent of the Auburn & Syracuse Electric Railroad and prior to that a division superintendent with the Fonda, Johnstown & Gloversville Railroad at Amsterdam, N. Y. The activities of both Mr. Witherwax and Mr. Nellis have been referred to previously in the *ELECTRIC RAILWAY JOURNAL*.

Frank Palmatier, who for many years past has been superintendent of power for the Schenectady Railway, has had his duties enlarged so as to have charge of both power and overhead lines.

Douglass Ford, superintendent of the North Branch Transit Company, Bloomsburg, Pa., has resigned, effective Dec. 1, to become general manager of the Trenton, Bristol & Philadelphia Street Railway, which is in process of merger with the Frankford, Tacony & Holmesburg Street Railway and the Pennsylvania & New Jersey Railway. The headquarters will be located at Bristol, but may be moved when the merger is completed.

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

Hoover Reviews Economic Progress

Outstanding features of the fiscal year ended June 30, 1924, were, according to Herbert Hoover, Secretary of Commerce, first, the advance in agricultural prices, which have lagged behind industrial prices for the last four years; second, the beginning of sound economic policies in German reparations, leading to a hopeful measure of economic recovery in Europe, and, third, the recovery of our own industry and commerce, great stability of prices, high production, full employment, expanding foreign trade and prosperity throughout the business world.

A slight slackening in production at the end of the year is indicated by the fact that the index for manufacturing output for June was 15 points below the average for the fiscal year, that for railway ton-mileage was 13 points below, for building contracts 6 points and for employment in factories 7 points below. Subsequent recovery is shown by the September indexes, which for manufacturing production stood thirteen points higher than in June, for mineral production nine points and for forest production one point higher.

Financing Machinery Purchases

A new method of financing the purchase of machinery has been developed by the Industrial Equipment Corporation of America, New York City. The proposed plan resembles in many ways railway equipment trust financing. Certain kinds of machinery are standard with certain industries and possess a substantial resale value. Figures obtained from dealers in second-hand machinery indicate that the cost of removing such machinery does not average more than 5 per cent of the original cash value. Moreover, the rate of depreciation on such machinery is not particularly high. These factors have made possible the new financing arrangement.

Under the usual railway equipment plan the equipment is purchased from a manufacturer and either leased under the Philadelphia plan or sold under the conditional sale plan. The user pays a sufficient rental to meet the face value and dividends in the first case, or the maturing principal and interest in the second case, as they become due. Title to the equipment is vested in a suitable trustee during the life of the trust and each unit of equipment bears evidence of the ownership of the trustee in the form of a metal plate or some other conspicuous designation.

In financing the purchase of machinery the lease plan will be the procedure employed. Through the application of this method there is no possibility of the borrower obtaining title to any of

the equipment pledged. Depreciation can readily be taken care of through an arrangement of serial maturities during the life of the trust.

This idea is not entirely new as purchases of other than railway equipment have been financed in the past in a similar manner. In fact, the beginning of the so-called railway equipment financing was not accomplished by a railway company at all, but is said to have taken place about 1845 when the Schuylkill Navigation Company desired to purchase some barges. Other instances of the application of this principal to the purchase of other material than locomotives and cars have occurred at various times. Machinery has been sold on the conditional sale plan to manufacturers and other types of industrial improvements have been financed through the recording of chattel mortgages and the issuance of serial installment payments against them. These transactions, however, have been more or less individual in nature and no successful effort has heretofore been made to develop the broad possibilities of the project as conceived by the organizers of the present corporation.

Lumber Prices Have Doubled in 50 Years

An interesting fact in connection with average lumber prices during the past 50 years is that between 1874 and 1904 there was comparatively little variation. Beginning in 1905, however, there was a steady rise, interrupted only by one marked recession, until 1920, which was the peak year. Then followed a slight decline, but the average so far for 1924 is almost as high as for 1920.

The lumber prices shown in the accompanying table from 1874 to 1909, inclusive, are for long-leaf yellow pine boards, 1x12 in.; from 1910 to date for long-leaf yellow pine timbers, 3x12 in.; all per thousand feet, board measure, in approximately 20-ft. lengths at New York, N. Y.

Metal, Coal and Material Prices

| Metals—New York | | Nov. 25, 1924 |
|---|-------|---------------|
| Copper, electrolytic, cents per lb. | ..... | 14.00 |
| Copper wire base, cents per lb. | ..... | 16.25 |
| Lead, cents per lb. | ..... | 8.80 |
| Zinc, cents per lb. | ..... | 7.25 |
| Tin, Straits, cents per lb. | ..... | 54.50 |
| Bituminous Coal f.o.b. Mines | | |
| Smokeless mine run, f.o.b. vessel, Hampton Roads, gross tons. | ..... | \$4.275 |
| Somerset mine run, Boston, net tons. | ..... | 2.075 |
| Pittsburgh mine run, Pittsburgh, net tons. | ..... | 1.875 |
| Franklin, Ill., screenings, Chicago, net tons | ..... | 1.475 |
| Central, Ill., screenings, Chicago, net tons | ..... | 1.30 |
| Kansas screenings, Kansas City, net tons. | ..... | 2.30 |
| Materials | | |
| Rubber-covered wire, N. Y., No. 14, per 1,000 ft. | ..... | \$6.25 |
| Weatherproof wire base, N. Y., cents per lb. | ..... | 17.25 |
| Cement, Chicago net prices, without bags. | ..... | 2.20 |
| Linseed oil (5-lb. lots), N. Y., per gal. | ..... | \$1.10 |
| White lead, in oil (100-lb. keg), N. Y., cents per lb., carload lots. | ..... | 0.152 |
| Turpentine (bbf. lots), N. Y., per gal. | ..... | 0.81 |

In 1912 pine lumber prices had reached a point not touched again until 1918. The slump, which occurred meantime, reached the lowest point between 1914 and 1915. It was caused by the opening of the Panama Canal, when Douglas fir shippers on the West Coast could send the lower priced lumber through to the Atlantic seaboard in competition with Southern pine.

| Year | Price | Year | Price |
|------|---------|------|---------|
| 1874 | \$26.00 | 1900 | \$24.50 |
| 1875 | 21.00 | 1901 | 17.50 |
| 1876 | 21.00 | 1902 | 21.00 |
| 1877 | 20.00 | 1903 | 23.50 |
| 1878 | 20.00 | 1904 | 21.50 |
| 1879 | 20.96 | 1905 | 24.92 |
| 1880 | 19.00 | 1906 | 29.33 |
| 1881 | 19.00 | 1907 | 30.50 |
| 1882 | 19.00 | 1908 | 30.50 |
| 1883 | 19.00 | 1909 | 33.04 |
| 1884 | 19.00 | 1910 | 36.00 |
| 1885 | 18.66 | 1911 | 36.00 |
| 1886 | 19.00 | 1912 | 40.00 |
| 1887 | 19.00 | 1913 | 35.25 |
| 1888 | 16.75 | 1914 | 29.50 |
| 1889 | 20.31 | 1915 | 27.75 |
| 1890 | 21.75 | 1916 | 32.62 |
| 1891 | 18.00 | 1917 | 37.33 |
| 1892 | 18.50 | 1918 | 42.66 |
| 1893 | 8.50 | 1919 | 50.87 |
| 1894 | 18.50 | 1920 | 63.73 |
| 1895 | 16.92 | 1921 | 48.16 |
| 1896 | 16.42 | 1922 | 47.05 |
| 1897 | 16.44 | 1923 | 55.22 |
| 1898 | 15.75 | 1924 | 58.00 |
| 1899 | 16.25 | | |

Growing Machine Tool Market

Machine tool makers are beginning to visualize the market ahead for them among the electric railways now operating buses. A good market exists for machine tool equipment of a type not now needed in the strictly railway shop. Some 2,000 buses are now being operated by the railways, and the number is growing rapidly. Garage installations of sizes varying from that needed for taking care of repairs on a few buses to that for several hundred are of almost daily occurrence.

In these shops in varying degree there will be installed lathes, drill presses, brake relining machines, chain hoists, cylinder boring and honing tools, portable drills and grinders, ball bearing jacks, gear type jacks, heavy duty dolly jacks, universal bench saws, wheel pullers for light duty and wheel pullers for heavy duty. This list includes some things that are not machine tools in the strictest sense, but all come under the general head of labor-saving machinery.

Each extension of the use of the bus means a direct need for the installation of machine tools by the railways. The electric railways are not equipped with the types of machine tools needed for garage work, even if they were inclined to attempt to turn their present equipment to such use. They must buy new equipment of one kind or another.

Moreover, the present is a most propitious time for just such buying. For a long time now the machine tool market has been more or less flat. True, it is improving, but when a large company like Niles-Bement-Pond feels called upon for the first time since 1899 to pass the payment of the dividend on its preferred stock a pretty good criterion is furnished of the extent of the period of readjustment through which the machine tool industry has been passing since the war. The management very frankly stated publicly that the business had not been profitable for the last three years.

Burned Carhouse to Be Rebuilt

On Nov. 21 fire destroyed the carhouse and 10 cars of the Schuylkill Railway, located at Girardville, near Mahanoy City, Pa., with a loss of \$150,000. The fire for a time threatened the entire plant of the company and interrupted trolley service throughout the northern end of the county for 5 hours. It has been announced that the buildings will be rebuilt. The company is considering the question of replacing the rolling stock which was destroyed.

Rolling Stock

Illinois Central Railroad has decided on certain details of the 215 new cars which it has ordered, as mentioned in *ELECTRIC RAILWAY JOURNAL* for Nov. 22, page 905. Of this order 130 will be motor cars built by the Pullman Car & Manufacturing Company and 85 will be trailers built by the Standard Steel Car Company. General features of the motor cars are given in the accompanying table.

| | |
|--|---|
| Builder of car body..... | Pullman Company |
| Type of car..... | Passenger motor |
| Seating capacity..... | 84 |
| Estimated weight: | |
| Car body..... | 57,000 lb. |
| Trucks..... | 33,000 lb. |
| Equipment..... | 35,000 lb. |
| Total..... | 125,000 lb. |
| Bolster centers, length..... | 47 ft. 9 in. |
| Length over buffers..... | 72 ft. 7 1/2 in. |
| Truck wheelbase..... | 8 ft. 0 in. |
| Width over all..... | 9 ft. 9 1/2 in. |
| Height, rail to roof..... | 13 ft. 0 in. |
| Body..... | Steel and aluminum |
| Interior trim..... | Aluminum |
| Headlining..... | Agasote |
| Roof..... | Monitor |
| Air brakes..... | Westinghouse type PS |
| Control..... | General Electric type PC |
| Destination signs..... | Hunter |
| Gears and pinions..... | With motors by manufacturer |
| Journal bearings..... | Plain |
| Lightning arresters..... | General Electric |
| Motors..... | Westinghouse and General Electric specials* |
| Seating material..... | Rattan |
| Slack adjuster..... | American |
| Trolley..... | Pantograph |
| Wheels..... | Rolled steel 38-in. |
| *Motors—inside hung 4 per car—250 hp. two motors in series on 750 volts. | |

The trail cars will differ from the motor cars in weight and in size of wheels. Estimated weights for these cars are as follows: Car body, 57,000 lb.; trucks, 26,000 lb.; equipment, 1,000 lb.; total, 84,000 lb. Trucks will be built by the Commonwealth Steel Company and will be equipped with 33-in. rolled steel wheels. Additional details concerning these cars and the motor cars will be published as soon as the company has decided upon them.

Connecticut Company, New Haven, Conn., has just received four White buses.

Pittsburgh Railways, Pittsburgh, Pa., last spring let a contract to the Standard Steel Car Company for the construction of 125 cars, as mentioned in the *ELECTRIC RAILWAY JOURNAL*, issue of May 10, 1924. These are now being built at the plant of the Osgood-Bradley Car Company, Worcester, Mass., for the account of the Standard Steel Car Company.

Grays Harbor Railway & Light Company, Aberdeen, Wash., recently purchased two double-truck light-weight safety cars, representing an investment of \$25,000, and completing the

\$60,000 improvement which the company has made in 1924. The cars were built by the American Car Company of St. Louis, and each has a seating capacity of 52. They will be used to meet the traffic demands on the line between Aberdeen and Hoquiam.

Tennessee Electric Power Company, Chattanooga, Tenn., includes in its budget for 1925 \$100,000 to be expended on track improvements in Chattanooga and the reconstruction of rolling stock. A large part of this amount will be used to rebuild 30 of the most modern cars now in service. These will be equipped with complete safety car service.

Illinois Power & Light Corporation, Chicago, Ill., has placed an order with the Yellow Coach Manufacturing Company for six type Z, 29-passenger, single-deck buses. These buses will have 6-cylinder engines and will be used in the city service at Peoria, Ill.

San Antonio Public Service Company, San Antonio, Tex., has purchased one type Z, 4-cylinder, 29-passenger, single-deck bus from the Yellow Coach Manufacturing Company.

Department of Street Railways, City of Detroit, has received offers from three bus manufacturers who are willing to supply buses on the rental plan proposed by the city. These are Dodge Brothers, Yellow Coach Company and Mason Motor Truck Company.

Power Houses, Shops and Buildings

Grand Rapids Railway, Grand Rapids, Mich., has awarded the contract to F. W. Burgstahler & Sons, Grand Rapids, to rebuild its Hall Street carhouse, which was recently destroyed by fire. The general contract price is given at \$33,450.

Track and Line

Los Angeles Railways, Los Angeles, Cal., has reconstructed Central Avenue track from Fourteenth Street to Slau-son Avenue.

Chicago Surface Lines, Chicago, Ill., has opened up its 1 1/2-mile extension to the Hegewisch, Ill., plant of Henry Ford. The South Chicago Chamber of Commerce took over the sale of bonds covering the cost of the extension. The new line runs through Prairie on Torrence Avenue from 112th Street to 124th Street.

Boston Transit, Department on Nov. 25 opened bids for the building of the first section of the work of making the Shawmut Avenue branch of the New York, New Haven & Hartford Railroad into a branch of the Boston Elevated Railway. This section includes the extension of the Dorchester subway at Andrew Square and the building of an incline to the New Haven tracks. The contract has not yet been awarded, but the bids are as follows:

| | |
|---------------------------------|-------------|
| Reynolds Brothers, Inc..... | \$1,074,295 |
| Simpson Brothers Corporation... | 1,033,520 |
| C. & R. Construction Company... | 1,019,930 |
| Martin F. Gaddis..... | 1,013,640 |
| A. G. Tomasello & Son..... | 991,460 |
| Coleman Brothers, Inc..... | 969,530 |

Trade Notes

Lindsley Brothers Company, New York City, N. Y., pioneer operators in the Northwest since 1896 in Western red cedar poles, has recently established a New York office at 150 Nassau Street, in charge of Walter E. Mitchell as Eastern representative. Mr. Mitchell has been engaged in the pole business in the East since 1904.

Gibb Instrument Company, Bay City, Mich., has changed its name to Gibb Welding Machines Company. This is a change in name only and denotes no change in organization. As the company no longer makes instruments, but is engaged exclusively in the manufacture of electric welding and heating machines, the new name was adopted as more exactly descriptive of the product.

New Advertising Literature

Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., has just issued a new edition of its publication "Cars and Car Equipment." This is a 20-page book, 8 1/2 in. x 11 in., resembling in a general way the book published under the same title in 1920 by this company. Service performance, general data, weights, dimensions and information on electrical equipment and mechanical equipment, together with photographs and floor plans, are included for fifteen different cars. These include the light-weight cars of the Boston Elevated, Eastern Massachusetts, Lewiston & Reedsville railways, the Cincinnati and Wheeling traction companies and the North Shore Line. Moderate-weight cars of the Brooklyn City Railroad, Los Angeles Railway, and New Orleans Public Service, Inc., are shown. Suburban and interurban cars pictured are those of the Monongahela-West Penn system, Ohio Valley Electric Railway, the Indianapolis & Cincinnati Traction Company. A multiple-unit car of the Chicago elevated is also included.

American Rust Proof Company, New York, N. Y., has issued a 15-page pamphlet called "Rust and Rust Prevention." It describes the preservation of steel from rust by Vatu.

Barber-Greene Company, Aurora, Ill., has issued an attractively illustrated 25-page pamphlet called "Snow Insurance." Detailed specifications of the Barber-Greene snow loader are included and stories of its successful operation in many cities in the country. In addition, the pamphlet explains the practical solution of snow removal, stressing the great cost to the merchant, the community and the street railways where snow is allowed to remain unremoved. It states that the record of the New York car lines shows that \$1,000,000 was lost in fares in the winter storms of 1919.

Ohio Brass Company, Mansfield, Ohio, has issued an illustrated 30-page booklet called "Trackless Trolley." It contains descriptions of overhead materials, current collection equipment and bus equipment.

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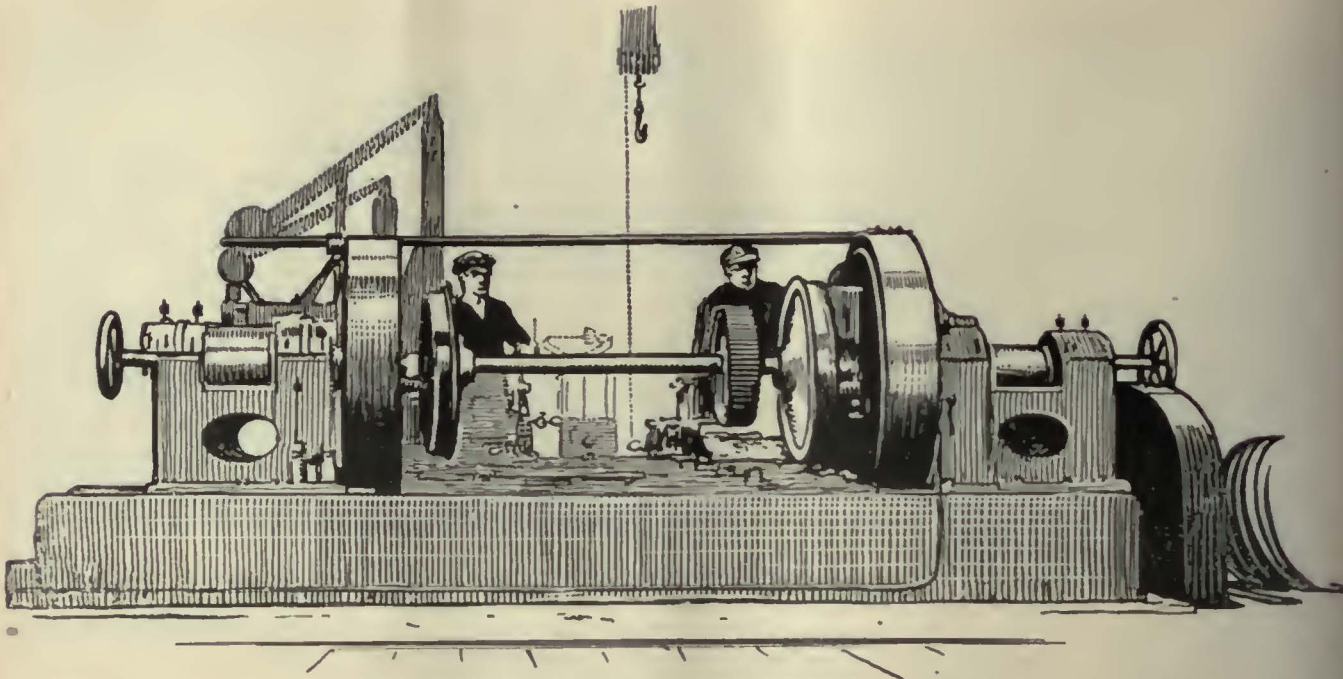
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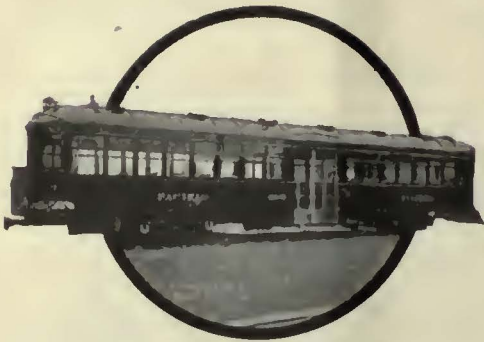
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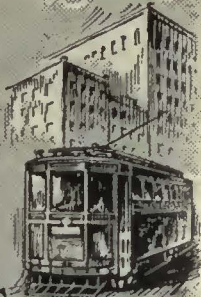
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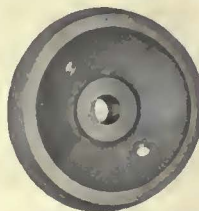
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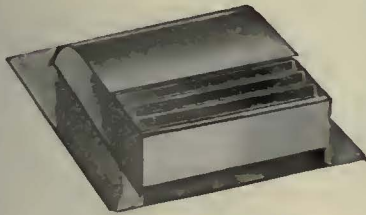
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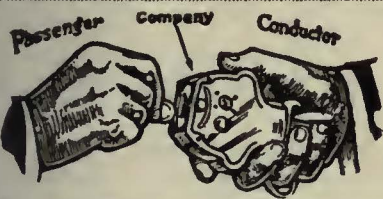
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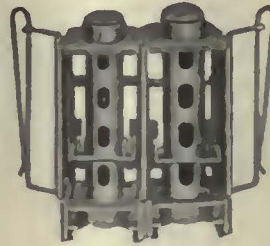
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Made of extra quality stock firmly braided and smoothly finished. Carefully inspected and guaranteed free from flaws. Samples and information gladly sent.

SAMSON CORDAGE WORKS, BOSTON, MASS.

Advertisements for the Searchlight Section

Can be received at the New York Office of Electric Railway Journal until 10 a. m.



Wednesday

For issue out Saturday

PROVIDENCE FENDERS

H-B LIFE GUARDS

The Consolidated Car Fender Co., Providence, R. I.
Wendell & MacDuffie Co., 110 E. 42nd St., New York
General Sales Agents

SEARCHLIGHT SECTION

USED EQUIPMENT & NEW—BUSINESS OPPORTUNITIES

UNDISPLAYED—RATE PER WORD:

Positions Wanted, 4 cents a word, minimum 75 cents an insertion, payable in advance.
Positions Vacant and all other classifications, 8 cents a word, minimum charge \$2.00.
Proposals, 10 cents a line an insertion.

INFORMATION:

Box Numbers in care of any of our offices count 10 words additional in undisplayed ads.
Discount of 10% if one payment is made in advance for four consecutive insertions of undisplayed ads (not including proposals).

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

DESIGNERS and draftsmen with electric railway power experience wanted for work in the East. Applicants will please state age, experience in detail, salary expected and when they will be available for employment. P-754, Elec. Ry. Journal, 10th Ave. at 36th St., New York.

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 or assistant. Twenty years' experience in electric light, power and railroads. At present employed but desire to make change. PW-750, Elec. Ry. Journal, Leader-News Bldg., Cleveland, Ohio.

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-753, Electric Railway Journal, Old Colony Bldg., Chicago, Ill.

EXECUTIVE, Urban and Interurban. Wide successful experience in all departments of construction and operation. PW-740, Electric Railway Journal, Leader-News Bldg., Cleveland, Ohio.

MASTER mechanic desires change; 18 years' experience on city and high speed interurban. Best of references furnished. PW-756, Electric Railway Journal, Old Colony Bldg., Chicago, Ill.

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.

WANTED MANAGER

To take charge and operate Railway Department, 125 miles of city and interurban track. 300 street cars. Reply, giving full particulars, to

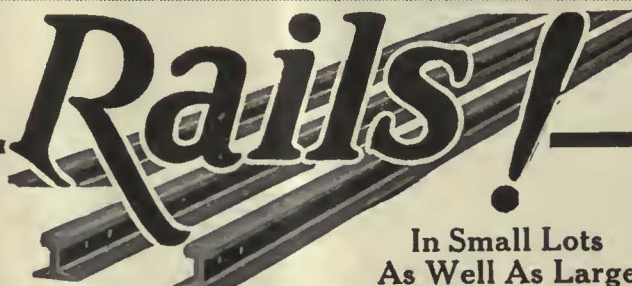
Winnipeg Electric Co.
Winnipeg, Canada
A. W. McLimout, Vice President

WE WANT TO BUY 30—West, 306-C.V.-4 MOTORS

Have you any to offer?
ELECTRIC EQUIPMENT CO.
Commonwealth Bldg., Philadelphia, Pa.

WANTED LATHE

In good condition with at least 8 ft. between centers and 36-in. swing, suitable for turning wheels; motor driven preferred.
ATLANTIC CITY & SHORE R.R. CO.
Atlantic City, N. J.



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 Stewart St.

Yards: St. Louis, East Chicago, Ind., McKee's Rocks, Pa., San Francisco.

Cable Address: "Hymanmikel"

World's Largest Distributors of Rails

FOR SALE

Three Trolley Cars

Double end operation—42 feet overall—
seating capacity 44.

MONSANTO CHEMICAL WORKS
St. Louis, Missouri

FOR SALE

MOTORS

22—G.E. 210; practically new.

TRANSIT EQUIPMENT COMPANY
601 Fifth Ave., New York

NEW GEARS, PINIONS AND GEAR CASES FOR SALE

GE-1000 Motor:
173 15 tooth pinions
107 69 tooth gears
16 Sheet iron gear cases

GE-900 Motor:
4 malleable gear cases and 3 bottom halves
FS-749, Electric Railway Journal
10th Ave. at 36th St., New York City

RAILS

New

1 TON OR 1000

FROGS
SWITCHES
SPICE BARS
BOLTS
NUTS
TIE PLATES
RAIL
BRACES

Relaying

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

L. B. Foster Co.

PITTSBURGH-PA
NEW YORK

SPARE MOTOR BARGAIN

Suitable for spares on grinders, pumps, compressors, etc., D.C. 550 v., 1700 r.p.m., with pulleys, rails and starters. 1—10-hp. at \$84. and 2—7½-hp. at \$72 each. Condition O.K. Overhauled.

STANDARD ELECTRIC MACHY. CO.
9 E. Hill St., Baltimore

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.
- Achors, 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.
Westinghouse E. & M. Co.
- Axles (Front & Rear) Motor Cars and Passenger Car**
Timken-Detroit Axle Co.
- Axles, Trailer & Motor Bus**
Timken-Detroit Axle Co.
- Badges and Buttons**
Elec. Service Supplies Co.
International Register Co.
The
- 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**
Stuckl 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.
National Brake Co.
St. Louis Car Co.
Safety Car Devices Co.
Westinghouse Tr. Br. Co.
- Brushes, Carbon**
General Electric Co.
Jeandron, W. J.
Le Carbone Co.
Westinghouse E. & M. Co.
- Buses, Motor**
Brill Co., The J. G.
International Motor Co.
St. Louis Car Co.
Six Wheel Co.
- Bushings, Case Hardened and Manganese**
Bemis Car Truck Co.
Brill Co., The J. G.
St. Louis Car Co.
- Cables. (See Wires and Cables)**
- Cambric Tapes, Yellow and Black Varnish**
Acme Wire Co.
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.
McGure-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 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.
- Castings, Malleable and Brass**
Amer. Br. Shoe & Fdy. Co.
Bemis Car Truck Co.
Fort Pitt Steel Castings Co.
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**
Haskellite Mfg. Co.
- Chains, Pulling Car**
Heywood-Wakefield Co.
- Change Carriers**
Cleveland Fare Box Co.
- Circuit-Breakers**
Anderson, A. & J. M., mfr. 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)**
- Coll Banding and Winding Machines**
Elec. Service Supplies Co.
- Colls Armature and Field**
General Electric Co.
Westinghouse E. & M. Co.
- Colls, Choke and Kiecking**
Elec. Service Supplies Co.
General Electric Co.
Westinghouse E. & M. Co.
- Coll Counting Machines**
Cleveland Fare Box Co.
Intern'l Register Co.
Johnson Fare Box Co.
- Coll Sorting Machines**
Cleveland Fare Box Co.
- Coll Wrappers**
Cleveland Fare Box Co.
- Commutator Slotters**
Elec. Service Supplies Co.
General Electric Co.
Westinghouse E. & M. Co.
- Commutator Truing Devices**
General Electric Co.
- Connectors or Parts**
Cameron Elec'l Mfg. Co.
General Electric Co.
Westinghouse E. & M. Co.
- Compressors, Air**
Allis-Chalmers Mfg. Co.
General Electric Co.
Westinghouse Tr. Br. Co.
- Concrete Reinforcing Bars**
Laclede Steel Co.
- Condenser Papers**
Irvington Varnish & Ins. Co.
- Condensers**
Allis-Chalmers Mfg. Co.
General Electric 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.
Internatl Register Co.
The
Roehling'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.
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**
Wah-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.
Safety Car Devices 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.
Ohio Brass Co.
- Dryers, Sand**
Elec. Service Supplies Co.
Ohio Brass Co.
- Fans**
Ohio Brass Co.
- Electrical Wires and Cables**
Amer. Electrical Works
Amer. Steel & Wire Co.
Roehling'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.
- Engineers, Consulting, Contracting and Operating**
Allison & Co., J. S.
Archbold-Brady Co.
Beeler, John A.
Buchanan & Layng Corp.
Bureau of Commercial Economics, Inc.
Bylesby & Co., H. M.
Day & Zimmerman, Inc.
Drum & Co., A. L.
Ford, Bacon & Davis
Hemphill & Wells
Holst, Engelhardt W.
Jackson, Walter
Eng. Joe R.
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.
Ohmer Fare Register Co.
- Fare Registers**
Ohmer Fare Register Co.
- Fences, Woven Wire and Fence Posts**
Acme Wire Co.
Amer. Steel & Wire 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**
Westinghouse E. & M. Co.
- Field Colls (See Colls)**
- Floodlights**
Elec. Service Supplies Co.
- Forgings**
Brill Co., J. G., The
- 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 Co.
General Electric Co.
Westinghouse E. & M. Co.
- Fuses, Cartridge, Non-Refillable & High Voltage**
Johns-Pratt Co.
- Fuses, Refillable**
General Electric Co.
Johns-Manville, Inc.
Johns-Pratt Co.
- Gaskets**
Westinghouse Tr. Br. Co.
- Gas Producers**
Westinghouse E. & M. Co.
- Gas-Electric Cars**
General Elec. Co.
Westinghouse E. & M. Co.
- Gates, Car**
Brill Co., The J. G.
St. Louis Car Co.
- Gear Blanks**
Bethlehem Steel Co.
Brill Co., J. O., The
- Gear Cars**
Chillingworth Mfg. Co.
Elec. Service Supplies Co.
Westinghouse E. & M. Co.
- Gears and Pinions**
Bemis Car Truck Co.
Bethlehem Steel Co.
Elec. Service Supplies Co.
General Electric Co.
Nat'l Ry. Appliance Co.
Nuttall Co., R. D.
Tool Steel Gear & Pinion Co.
- Generating Sets, Gas-Electric**
General Electric Co.
- Generators**
Allis-Chalmers Mfg. Co.
General Electric Co.
Westinghouse E. & M. Co.
- Grider Rails**
Bethlehem Steel Co.
Lorain Steel Co.
- Gong (See Bells and Gongs)**
- Greases (See Lubricants)**
- Grinders and Grind Supplies**
Indianapolis Switch & Frog Co.
Railway Track-work Co.
- Grinders, Portable**
Railway Track-work Co.
- Grinders, Portable Electric**
Railway Track-work Co.
- Grinding Belts and Wheels**
Railway Track-work Co.
- Guard Rail Clamps**
Ramapo Ajax Corp.
- Guard Rails, Tre Rail & Manganese**
Ramapo Ajax Corp.
- Guards, Trolley**
Elec. Service Supplies Co.
Ohio Brass Co.
- Harps, Trolley**
Elec. Service Supplies Co.
More-Jones Brass Metal Co.
Nuttall Co., R. D.
Star Brass Works
Thornton Trolley Wheel Co.
- Headlights**
Elec. Service Supplies Co.
General Electric Co.
Ohio Brass Co.
St. Louis Car Co.
- Headlining**
Haskellite 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.
- Hydraulic Machinery**
Allis-Chalmers Mfg. Co.
- Indicating Signals**
Oskel Equipment Co.
- Instruments Measuring, Test Ing and Recording**
Elec. Service Supplies Co.
General Electric Co.
Johns-Pratt Co.
Westinghouse E. & M. Co.

You're having brush trouble
CORRECT IT

USE LE CARBONE CARBON BRUSHES

They talk for themselves

**COST MORE PER BRUSH
COST LESS PER CAR MILE**

W. J. Jeandron

345 Madison Avenue, New York

Pittsburgh Office: 634 Wabash Bldg.

Chicago Office: 1657 Monadnock Block

San Francisco Office: 525 Market Street

Canadian Distributors: Lyman Tube & Supply Co., Ltd.,
Montreal and Toronto



"Differential Two-Car Train. Trailer dumping load clear of trench."

DIFFERENTIAL CARS

Standard on Fifty Railways for

- | | |
|--------------------------------|--------------------|
| Track Maintenance | Track Construction |
| Ash Disposal | Hauling Crossties |
| Placing Ballast | Disposal of Waste |
| Coal Hauling | Snow Disposal |
| Concrete Materials to the Job | |
| Excavated Material to the Dump | |

For Economy

- THE CLARK CONCRETE BREAKER
- THE DIFFERENTIAL BOTTOM DUMP CAR
- THE DIFFERENTIAL COMBINATION CAR-WHEEL TRUCK and TRACTOR

THE DIFFERENTIAL STEEL CAR CO.

Findlay, Ohio, U. S. A.

The 50,000 Mile Trolley Device



The Thornton is all that and MORE. Some users figure to get 100,000 miles from them. None of these hearings have yet worn out. This long life is due to the design and construction of the bearings and the method of lubrication. No vibration. No noise. Fewer inspections. Less oil. Get the facts!

Thornton Trolley Wheel Co.

Incorporated

Ashland, Kentucky

Griffin Wheel Company

410 North Michigan Ave.
Chicago, Ill.

GRIFFIN F. C. S. WHEELS

**For Street and Interurban
Railways**

FOUNDRIES:

Chicago
Detroit
Denver

Boston
Kansas City
Council Bluffs

St. Paul
Los Angeles
Tacoma



MORE-JONES "TIGER" BRONZE AXLE & ARMATURE BEARINGS

**Strong - tough - durable
anti-frictional
economical**

MORE-JONES BRASS & METAL CO

ST. LOUIS

MISSOURI

- Insulating Cloth, Paper and Tape**
General Electric Co.
Irvington Varnish & Ins. Co.
Okonite Co.
Stand. Underground Cable Co.
Westinghouse E. & M. Co.
- Insulating, Silk & Varnish**
Irvington Varnish & Ins. Co.
- Insulation (See also Paluts)**
Electric Ry. Equipment Co.
Elec. Service Supplies Co.
General Electric Co.
Irvington Varnish & Ins. 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.
- 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 and 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, Wire, etc.)**
Archbold-Brady Co.
Electric Ry. Equipment Co.
Elec. Service Sup. Co.
General Electric Co.
Hubbard & Co.
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.
- Lubricating Engineers**
Galena Signal Gil 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**
Ralls
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.
Westinghouse E. & M. Co.
- Paints and Varnishes (Insulating)**
Irvington Varnish & Ins. Co.
- Paints and Varnishes for Woodwork**
National Ry. Appliance Co.
- Paving Material**
Amer. Dr. Shoe & Fdy. Co.
- Pileup, 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**
Westinghouse Tr. Brake Co.
- Planers (See Machine Tools)**
- Plates for Tee Rail Switches**
Ramapo Ajax Corp.
- Pliers, Rubber Insulated**
Elec. Service Sup. 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.
- Pipes, Tubular Steel**
Elec. Ry. Equipment Co.
Elec. Service Sup. Co.
- Porcelain Special High Voltage**
Lapp Insulator Co., Inc.
- Pathways**
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.
- Punches, Ticket**
Bonney-Vehelase Tool Co.
Intern'l Register Co., The
Wood Co., Chas. N.
- Rail Brakes & 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. B.
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
Ohmer Fare Register Co.
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 Colls)**
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 Car**
Pantastote Co., Inc.
- Roofs**
Haakelite Mfg. Co.
- Sanders, Track**
Brill Co., The J. G.
Elec. Service Sup. Co.
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.
Pantastote Co., Inc.
St. Louis Car Co.
- Second Hand Equipment**
Electric Equipment Co.
Hyman-Michaels Co.
Transit Equipment Co.
- Shades, Vestibule**
Bell 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.
Oskel Equipment Co.
- Signal Systems, Highway Crossing**
Nachod Signal Co., Inc.
Wood Co., Chas. N.
- Signal Systems, Block**
Elec. Service Sup. Co.
Nachod Signal Co., Inc.
- Stack Adjusters (See Brake Adjusters)**
- Steel Wheels and Cutters**
Anderson Mfg. Co., A. & J. M.
Elec. Ry. Equipment 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-Flows, Sweepers and Rkoms**
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Consolidated Car Fender Co.
McGuire-Cummings Mfg. Co.
St. Louis Car Co.
- 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**
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Lorain Steel Co.
- Spikes**
Amer. Steel & Wire Co.
Splicing Compounds
Westinghouse E. & M. Co.
Splicing Sleeves (See Clamps and Connectors)
- Springs, Car and Truck**
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Bemis Car Truck Co.
Brill Co., The J. G.
Fort Pitt Spring & Mfg. Co.
St. Louis Car Co.
- Sprinklers, Track and Road**
Brill Co., The J. G.
McGuire-Cummings Mfg. Co.
St. Louis Car Co.
- 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.
Oskel Equipment Co.
- Storage Batteries (See Batteries, Storage)**
- Strain, Insulators**
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Ohio Brass Co.
- Strand**
Roebbling's Sons Co., J. A.
- Straps, Car, Sanitary**
Railway Improvement Co.
- Subway Boxes**
Johns-Pratt Co.
- Superheaters**
Babcock & Wilcox Co.
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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**
Railway Track-work Co.
- Tapes and Cloths (See Insulating Cloth, Paper and Tape)**
- Tee Rail Special Track Work**
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Ramapo Ajax Corp.
- Telephones and Pans**
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- Terminals, Cable**
Std. Underground Cable Co.
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Gold Car Heat. & Ltg. Co.
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Metal Safety R. R. Tie Co.
- Ties, Mechanical**
Dayton Mechanical Tie Co.
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International Steel Tie Co.
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Westinghouse E. & M. Co.
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- Transformers**
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More-Jones Brass & Metal Co.
Ohio Brass Co.
- Trolley Wheel Bushings**
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- Trolley Wheels & Harps**
More-Jones Brass & Metal Co.
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Amer. Steel & Wire Co.
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Railway Track-work Co.
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General Electric Co.
International Oxygen Co.
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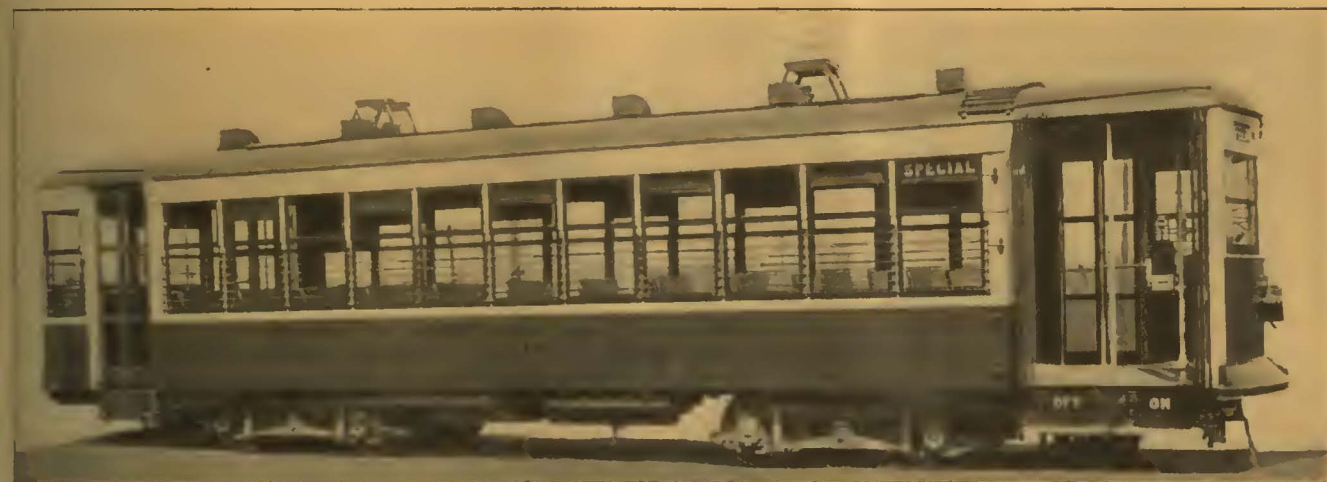
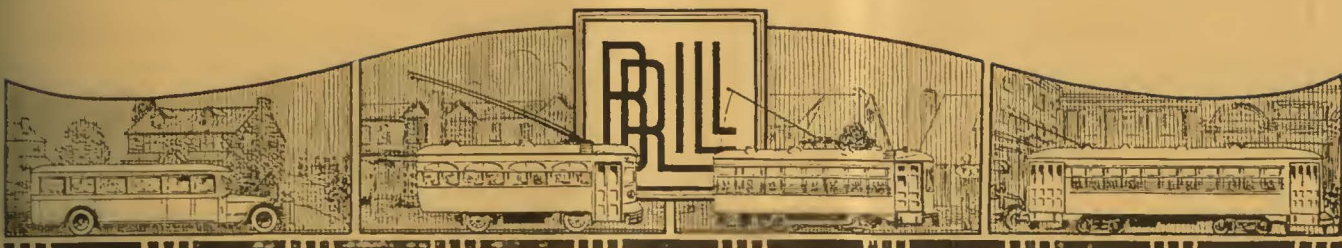
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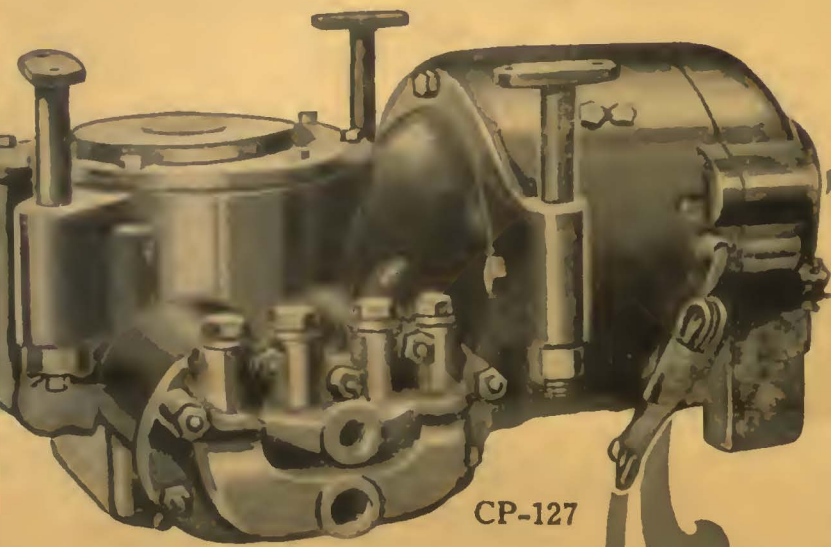
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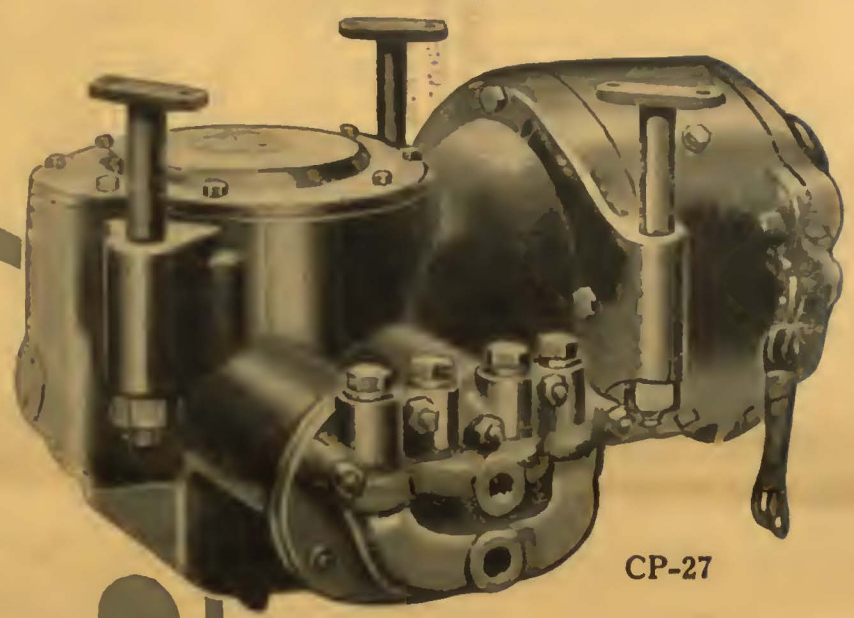
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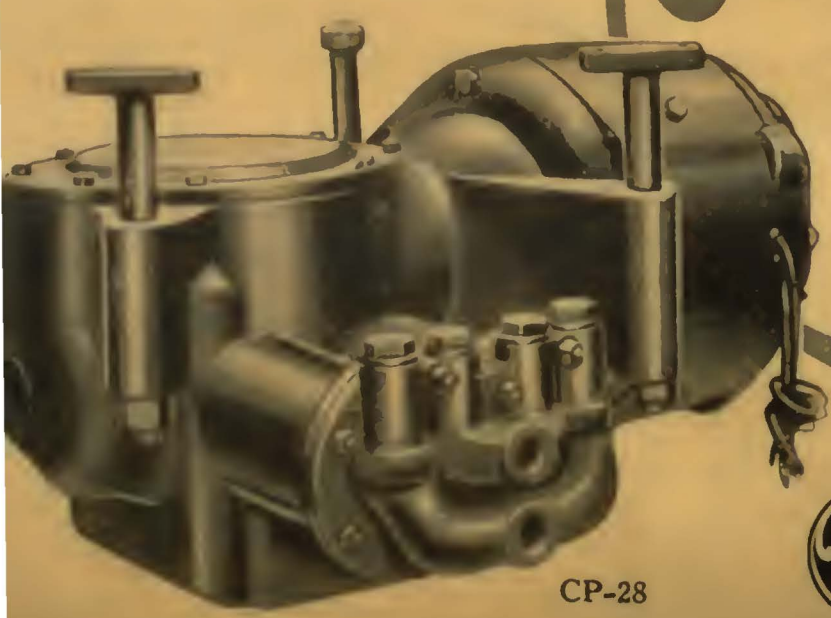


CP-127

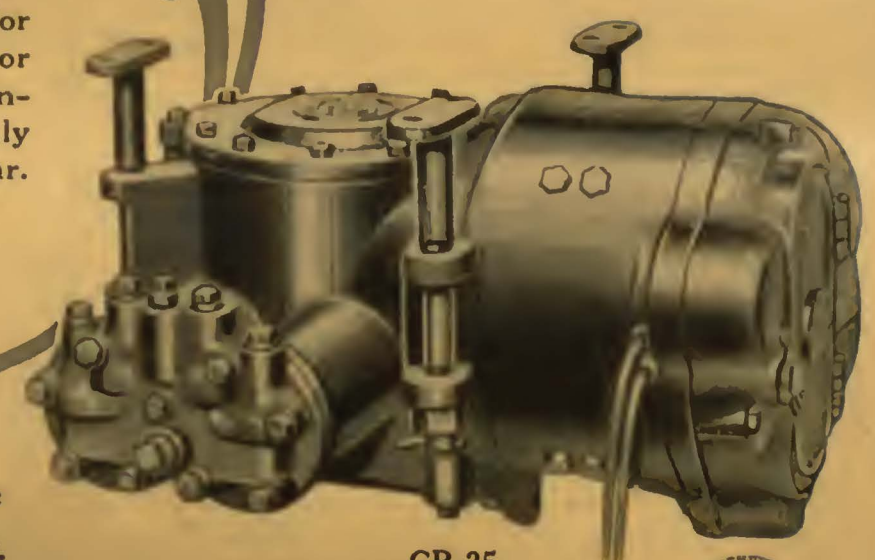


CP-27

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CP-28



CP-25



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