

ELECTRIC RAILWAY JOURNAL



H. S. Williams, Assistant Superintendent of Equipment of the Department of Street Railways, City of Detroit. Mr. Williams is an authority on problems of noise reduction, and is Chairman of the Noise Reduction Committee of the A. E. R. E. A.

“To reduce noise in car operation”

“SOMETHING must be done to dampen the vibrations set up in the track rails if we are to go the limit in our efforts to reduce the noise in car operation.”

That is the opinion recently expressed by H. S. Williams of the Detroit Street Railways—an authority on noise reduction problems.

“This problem,” he continued, “did not exist in old-time construction on wood ties. But modern rigid construction possesses characteristics which make it exceedingly noisy when cars pass over it.

“As this type of construction is required for economic reasons, it be-

comes necessary to modify it to such an extent that it shall not be objectionably noisy. Otherwise, there will be such a racket within the cars as to drive away passengers, and also to cause serious protest from the residents of adjacent property.”

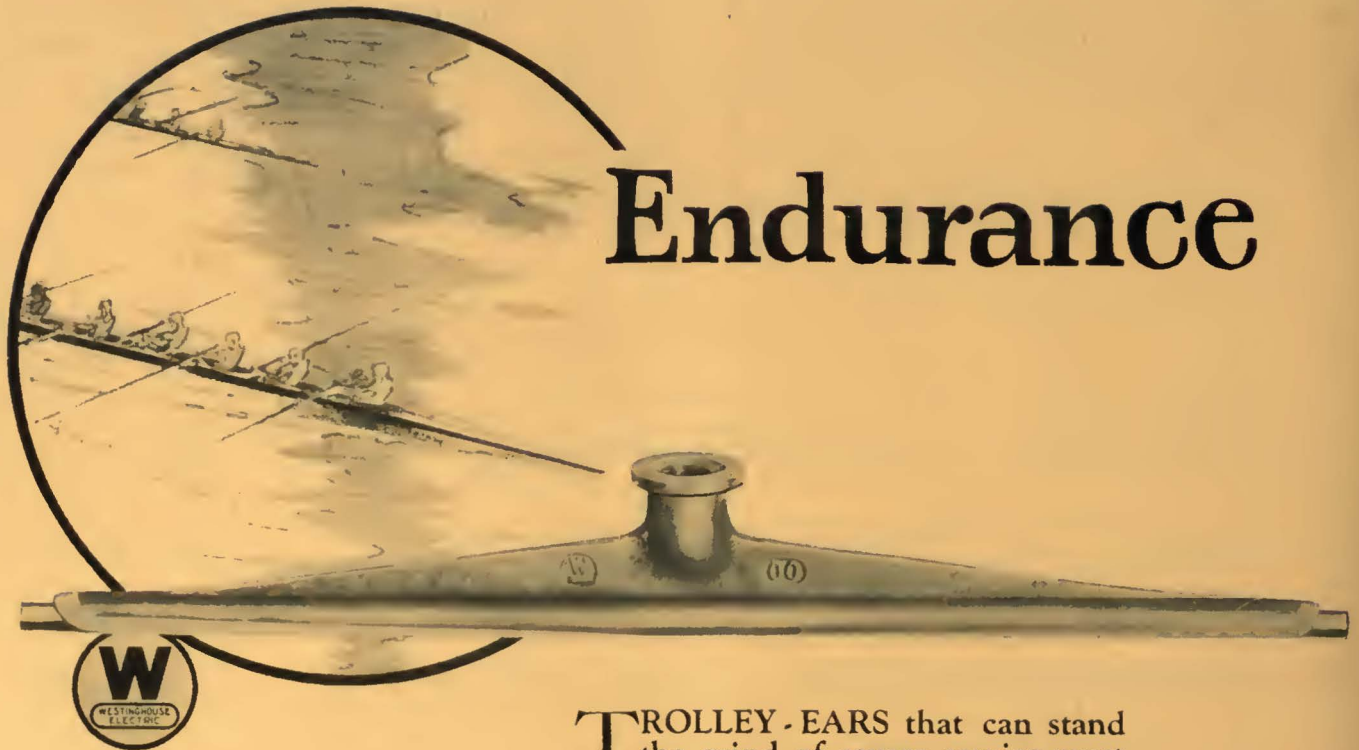
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Grand Rapids Leads the Way

A COMPLETELY illustrated article on the new Grand Rapids cars built by the St. Louis Car Company will appear in next week's issue of ELECTRIC RAILWAY JOURNAL.

At the Atlantic City convention last fall, much discussion was provoked by the three sample cars exhibited by L. J. DeLamarter, vice-president and general manager of the Grand Rapids Railway.

Now comes delivery of the 27 cars which are the outgrowth of this experiment. They include many novel ideas. Can street cars be more attractive to passengers? Mr. DeLamarter believes they can! He has faith in the possibilities of the street car. He has made a strenuous effort to stimulate improvement.

Street railway men who are thinking in terms of more modern transportation equipment should find next week's article of more than ordinary interest. There is food for thought in the Grand Rapids cars.

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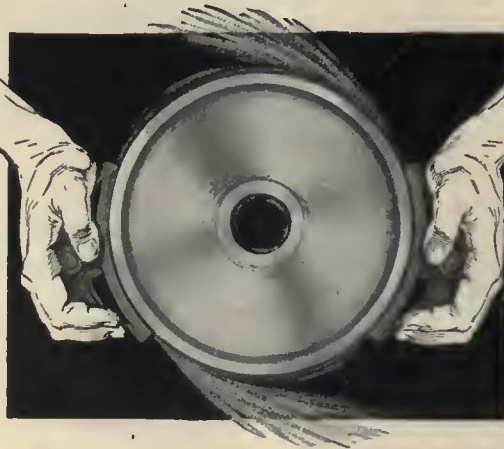


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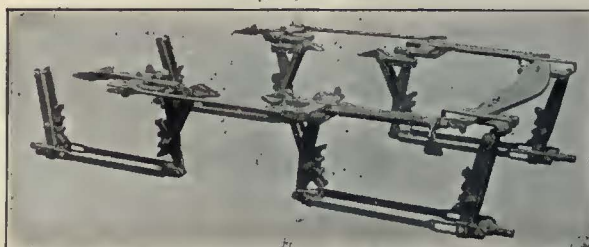
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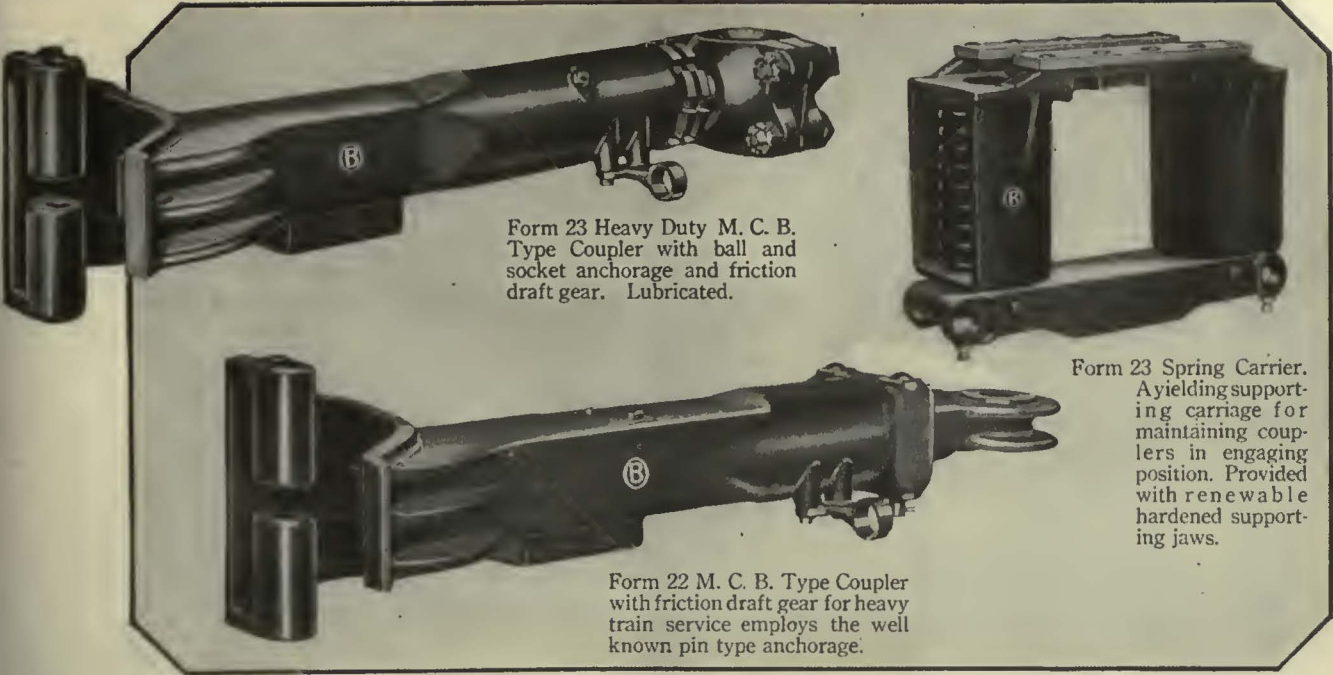
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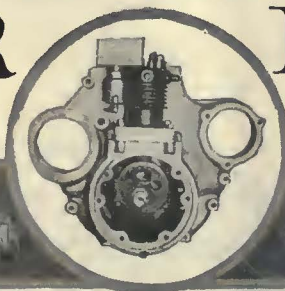
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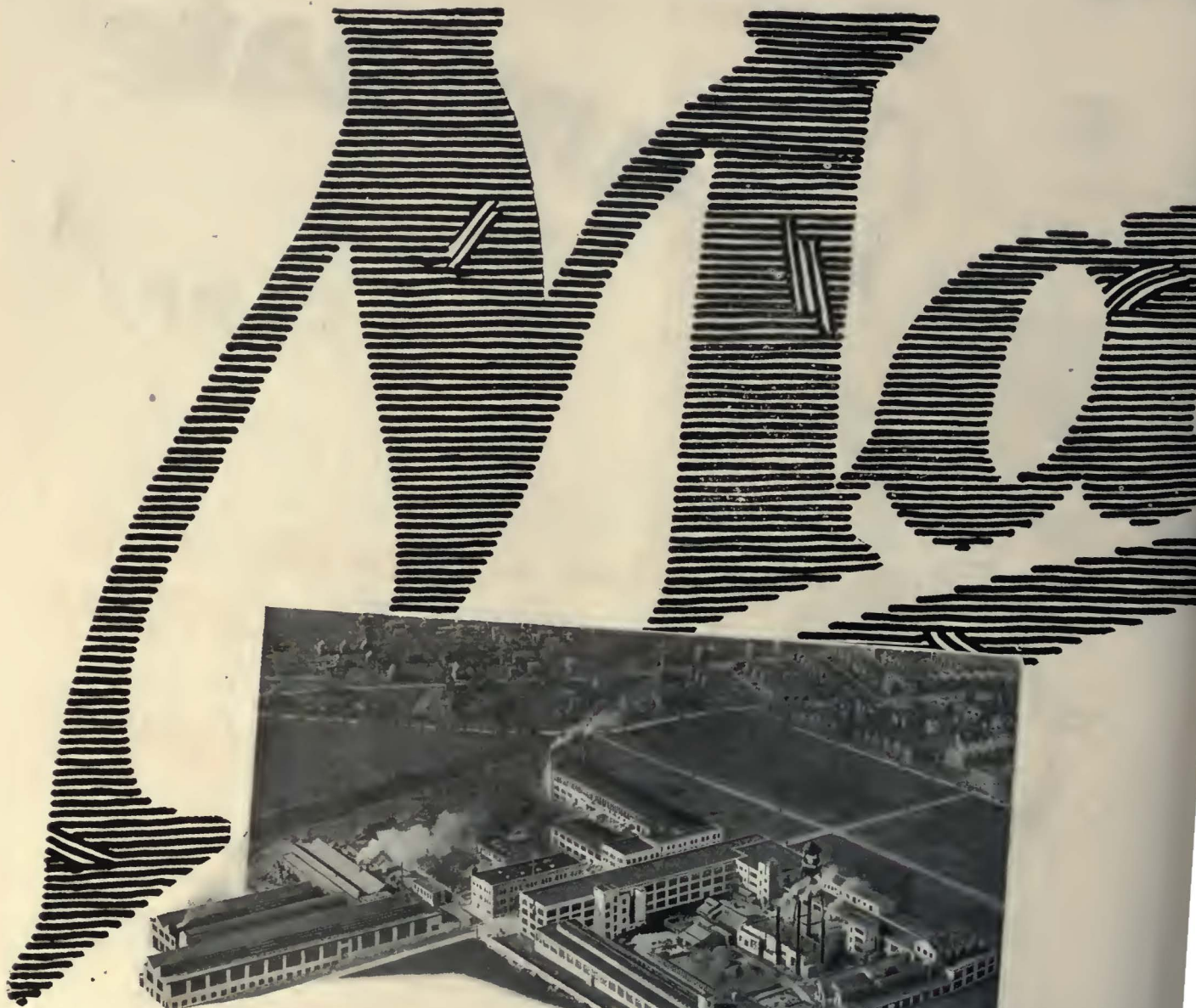
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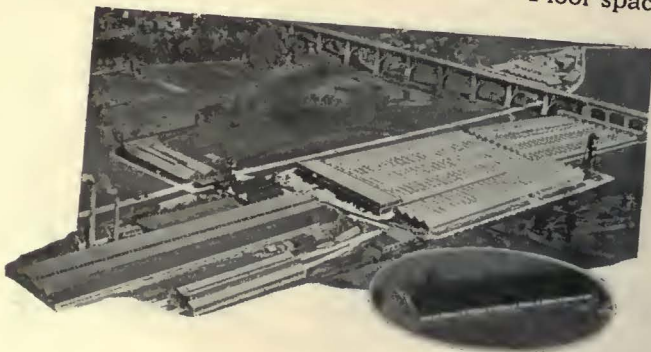
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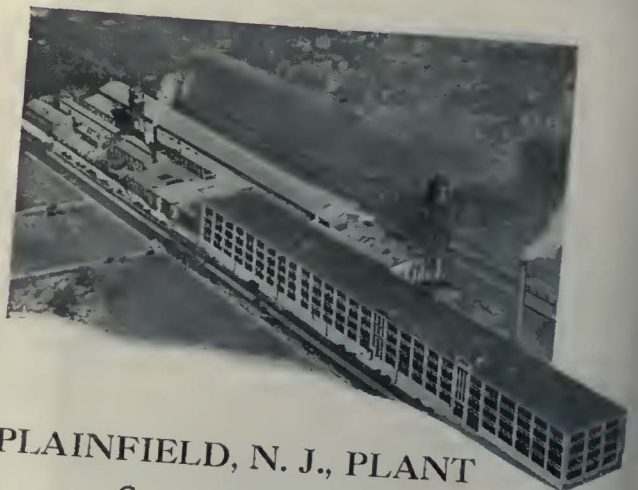
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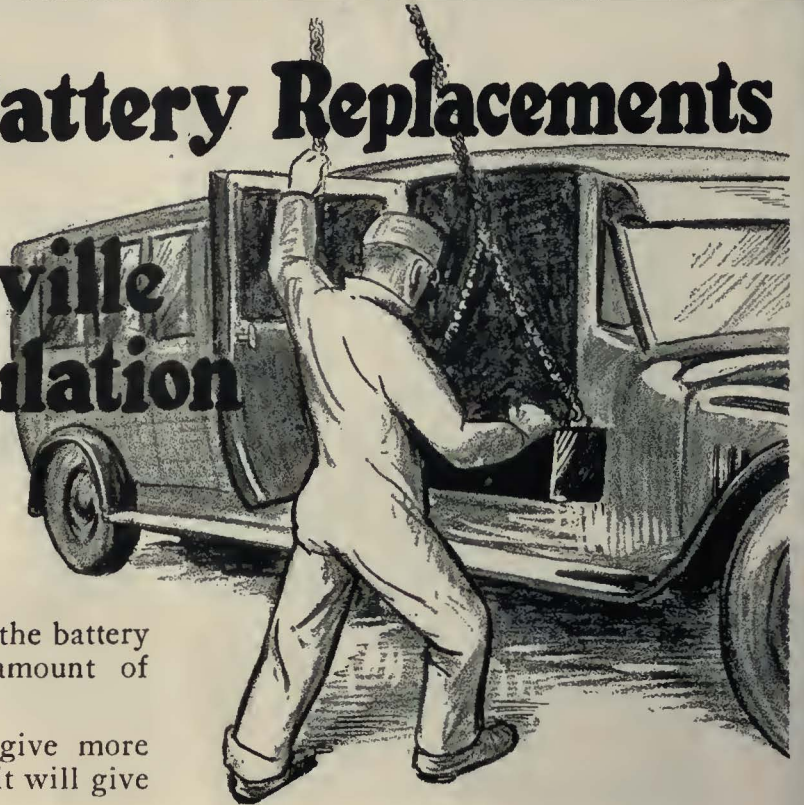
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The Phono Record

1865 A bulletin of Phono-Electric Achievement 1926



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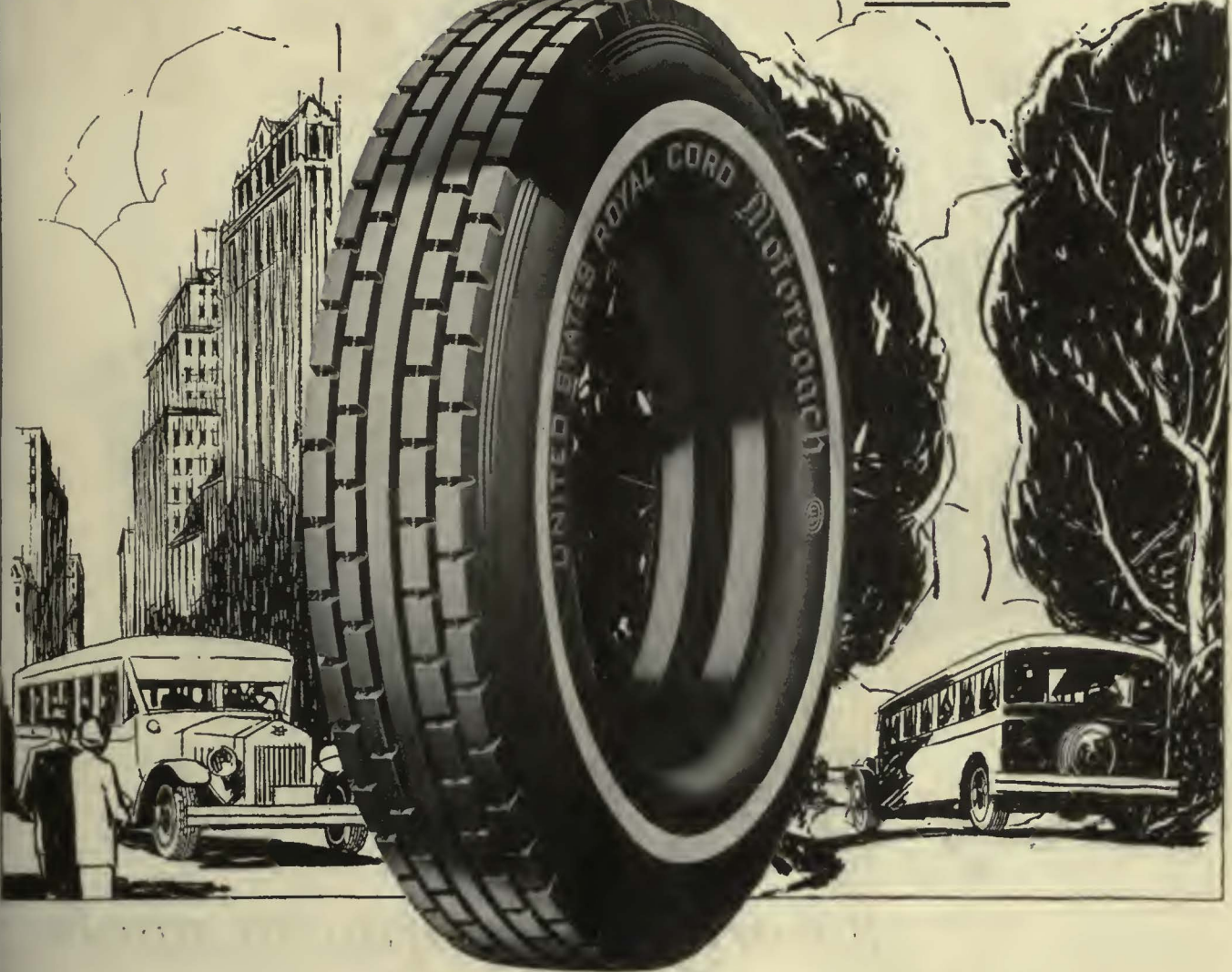
We will gladly mail a copy to any interested operator at his request.



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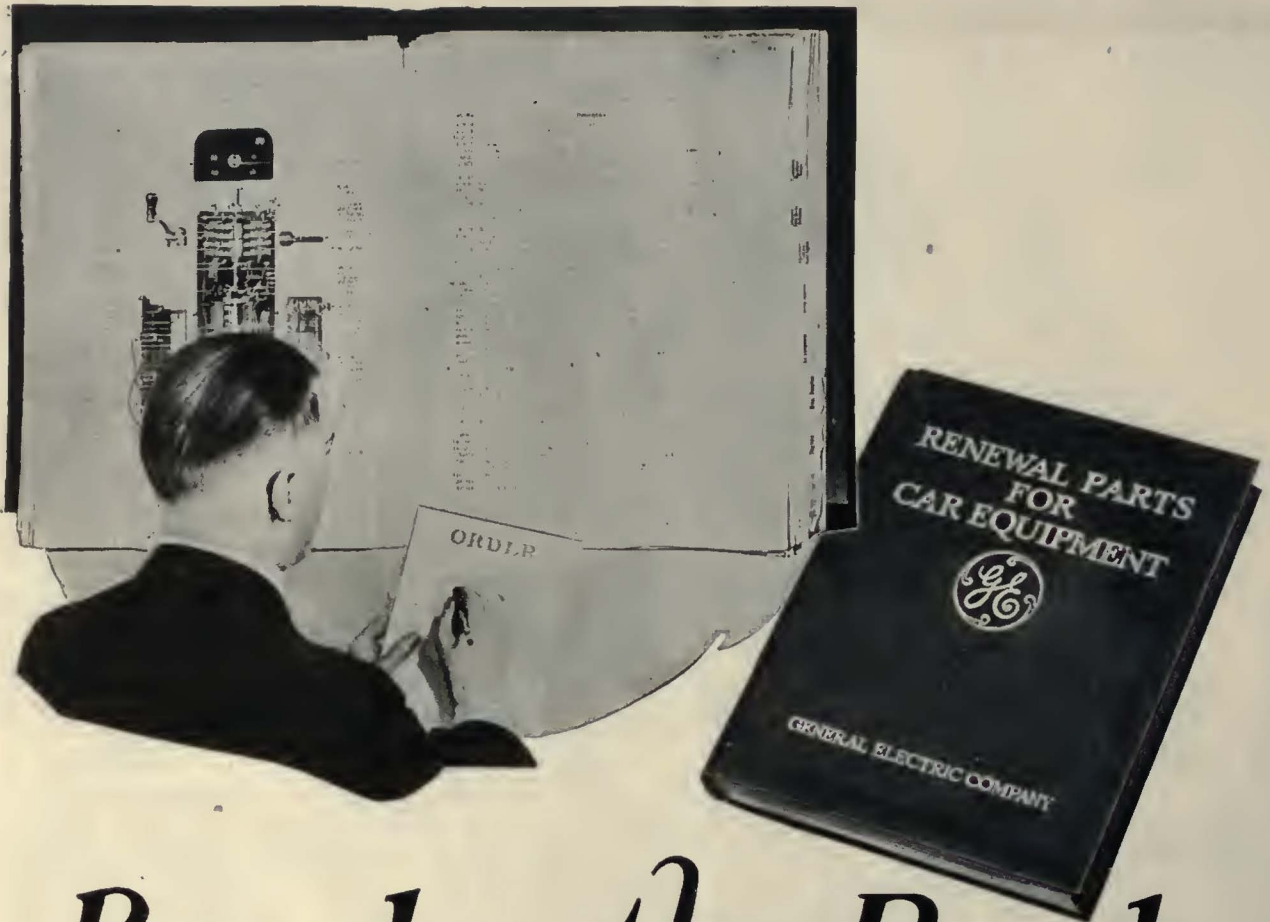
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GENERAL ELECTRIC

Electric Railway Journal

Consolidation of *Street Railway Journal* and *Electric Railway Review*

Published by McGraw-Hill Publishing Company, Inc.

CHARLES GORDON, *Editor*

Volume 67

New York, Saturday, May 22, 1926

Number 21

Leading the Way to Transit Improvement

ONLY within comparatively recent years has the need for city planning taken root and made progress. Until the combination of the modern skyscraper and the automobile brought matters to a climax, American cities, like Topsy, "just grew up." Present-day congestion results from the lack of early planning and inability to foresee the extent of the growth in demand for street space.

Public opinion has failed to keep pace with rapidly changing conditions. The individual property owner has been allowed the utmost freedom in the improvement of his holdings without regard to the cumulative effect on the community as a whole. City plans and zoning laws restrict the rights of the individual within the limits required by the community. But their ultimate effect is to the advantage of the individual.

Since city property value is created by the growth of the community, wise zoning measures designed to bring about orderly development and community stability react to the ultimate advantage of the individual. Nevertheless, zoning laws and city plans encounter a stiff resistance due to the inertia of the public mind in adjusting itself to the increasing importance of collective action brought about by growing congestion. In some communities such regulations as have been adopted are mere expedients to give some measure of immediate relief. Only recently has there been any tendency to get down to fundamentals.

Probably the most neglected and at the same time most important factor in modern city development is common carrier transportation. Failure to give transportation adequate consideration results in such facilities lagging behind the needs of the community. Even today, comparatively little progress has been made in considering transportation as a whole in its relation to city growth. There is increasing need to plan adequately for the development of future facilities on a scale which will enable each step in new construction to be made as part of a co-ordinated system. Progress demands that transportation be recognized as a constantly changing and developing art. The growth of the city itself brings new conditions and new requirements. This has been complicated by legislative attempts to fix for long periods of years conditions of operation that vary from day to day in accordance with economic and social changes. Community transportation has been treated as a fixed rather than a developing art. Consequently such progress as has been made is best described as a series of stumbles.

There is considerable encouragement in the growing approval of the terminable permit form of franchise. This arrangement eliminates the recurring periods of retarded development that are brought about by approaching expiration of fixed term grants and at the same time makes it possible to keep the transportation

system of a city attuned to changing conditions and requirements.

Surely the time is ripe for a broader and more fundamental approach to the local transportation situation. Along with the transportation of passengers between their homes and places of business comes the demand for preferred service in buses or taxicabs by those willing to pay the higher cost. The use of streets by trucks and other vehicles for the transportation of goods and commodities must also be taken into account. All of these agencies must receive consideration in a broad city plan.

Existing transportation executives with a direct interest in the solution of this vital community problem are the logical leaders of thought on the subject. But the degree of success accomplished will depend on the extent to which they identify themselves in the public mind with the interest of the community as a whole rather than that of a particular agency.

Chamber of Commerce Induces New Level of Thinking

SELF-GOVERNMENT in American business was the outstanding theme at the fourteenth annual meeting of the Chamber of Commerce of the United States, held in Washington last week. Of particular importance was the viewpoint of Secretary Hoover, reiterated by several other speakers, that we are gradually adjusting the nation's industrial system to the instincts of industrial freedom and equality of opportunity. We are also setting up a new relationship in industry which departs widely from that of the old world. This new conception of capital and labor point to a mutual understanding of the problem. As a result, labor-saving devices and better administration are reducing labor costs per unit of production below even those of cheaper labor abroad.

In the transportation field the result of this attitude can be seen in the widespread adoption of the one-man car and the greater productivity of labor in all departments. It is this co-operation which has been essential in keeping up the quality of service while rates have been held down.

Combined with this, a notable growth of a higher sense of co-operation in the whole community was remarked on by Mr. Hoover. Association activities, such as chambers of commerce and trade associations, were commended for the great part they have played in producing a more efficient, more ethical business practice and a better synchronizing of the parts of the economic machine. In no industry has this co-operation been more valuable than in transportation, for its success depends entirely on the service rendered and the recognition of the value of that service by the community.

No one could attend the sessions of this great body without realizing the force the Chamber of Commerce

has in the community today. Particularly should transportation men realize that they can well lend their support to their local commercial organizations. Both in the local sessions and in the annual meetings there has been introduced a new level of thinking and of business and industrial practice that is having its influence in all parts of the land.

His Formula Works in Practice

SAMUEL INSULL talked frankly about the electric railway situation at the Advisory Council conference in Chicago on Feb. 24. His general theme was merchandising. His formula is an old one to successful sales organizations: "Know your goods, sell yourself; then go after the customer."

That this formula works in the utility business is strikingly portrayed by the record of the properties which Mr. Insull heads. The record speaks for itself, but it is further emphasized by the fact that the National Electric Light Association at its convention this week again awarded the Coffin prize to an Insull property, the Commonwealth Edison Company of Chicago.

Electric railway operation today encounters problems peculiar to itself. But one thing of direct interest stands out in the record on which this latest award was made. Mr. Insull's formula works. In Chicago, 94 per cent of all homes use electricity. That record is the result of merchandising. A good sales job has been done there. The record of his electric railway properties likewise shows that the same formula works in the transportation business.

Public Transportation an Essential Industry

WERE additional evidence needed of the essential character of public transportation it would be found in the report recently made to the Traffic Survey Commission of Baltimore by Kelker, De Leuw & Company, a portion of which is abstracted in this issue. Many counts were made of the relative use of various transportation means. It was found that out of a total of 79,831 persons employed in the downtown district 64,664, or 81 per cent, use the public facilities offered them for transportation. Those using automobiles and taxicabs were only 8.5 per cent of the total, while the remaining 10.5 per cent walked. And this was in a city which the engineers state is more than usually compact.

Similar counts of workers in the principal industrial districts somewhat outside the congested zone show that while a far greater proportion of the workers walked, or 36.7 per cent of the total, only 7.3 per cent depended on private automobiles. This is the more surprising in that it is frequently assumed that the automobile is used to a greater extent in those localities where the space limitations for parking are less severe.

Another interesting count shows that the average airline distance of the residences of the street-car riders from their work is 2.52 miles, the steam and interurban railroad patrons 3.20 miles and the users of passenger automobiles 3.30 miles. This would indicate that as the distance to be covered becomes greater the advantage of taking a direct ride in one's own car becomes relatively more.

These observations go to show that there is room for more study on the reasons why some automobile owners

prefer to use their own cars. With the reasons ascertained, it should be possible to plan public transportation that will appeal directly to this class. For, small as it is, compared with those who use the rail and bus lines, it is the cause of a major portion of the congestion that is choking the streets of the cities. This was seen from the cordon count, which showed that 60 per cent of the total number of vehicles entering and leaving the central business district were passenger automobiles. Therefore anything that can be done to attract the automobile riders to public transportation lines will make a favorable showing in the relief it will bring to traffic congestion.

\$1,000,000,000 Traction Investment Subject to These Men's Judgment

NEW YORK has a new deal in regulation. Tammany and its cohorts have had their way. It was all a matter of attrition. Inch by inch the Republicans gave ground. Finally, they capitulated. To cover the happenings between the first attempt completely to Tammanyize New York City and the recent culmination in the appointment of the new Transit Commission by Governor Smith would be to write much recent political history. That is not necessary here. Forget the measures and examine the men! Governor Smith, self-pronounced friend of municipal ownership, has made a good record in office. The fact remains, however, that he is in a position to direct the transit policy of New York City. The Board of Transportation, although appointed by former Mayor Hylan, is controlled by two of the Governor's life-long friends. Now, by his appointment of three new members of the Transit Commission, that body has come under Democratic domination.

It is the principle, however, more than the politics, that is of interest. True, under the former arrangement of divided responsibility, with the Transit Commission on one side and the City Board of Transportation and the Board of Estimate on the other at loggerheads, there was no chance to get anywhere. Particularly during the administration of Mayor Hylan did a condition of open warfare exist. Since the first of this year under Mayor Walker the olive branch has been much in evidence, but time did not permit it to be ascertained whether this was merely a gesture. Just before the members of the old Transit Commission were decorated with the lily of oblivion by the Legislature the commission voted two to one as a fitting Parthian shot to require the Interborough to spend \$22,000,000 for new construction and new cars. And then the members feelingly added as an afterthought that, perhaps, the city could be induced to stand part of the cost. So passed out of the picture the men Hylan characterized as "tools" of the "traction crowd." Certainly the words never did fit the action of the old commission, but that meant nothing to Hylan.

Anyway, the Democrats are in the ascendant and their voices are being heard. The first is that of Transportation Commissioner Delaney. He tells City Comptroller Berry, an independent, that \$100,000,000 must be found at once or work will soon have to stop on the new system of subways intended for city operation. And Mr. Berry says the city's borrowing power has been exhausted and that if Mr. Delaney is to have his \$100,000,000 the amount will have to go into the tax budget. At which the taxpayer groans, for while

it is true the tax rate has not gone up much in the last six or seven years, many property assessments have doubled in that time.

Meanwhile the Board of Estimate has before it the myriad of bus proposals. Under the former alignment of forces the Transit Commission was confidently expected to offer a series of checks and counters to any action by the Board of Estimate in granting rights that might be prejudicial to the interests of the existing carriers. In this respect the old board, no matter what other criticisms might be directed against it, set a high standard. Whether the new board will measure up to its responsibilities remains to be seen. More than \$1,000,000,000 is invested in the local traction systems, of which more than \$350,000,000 represents funds of the city of New York. Many of the bonds of these companies are selling at receivership prices. Harmony of action is promised among the Board of Estimate, the Transit Commission and the Board of Transportation, but harmony of action alone will not settle properly the problems now up for consideration. Back of all the political jockeying is a significant change from the fundamentals which were in mind when the commission control was ushered in during the Hughes régime in 1907. It would be interesting if some student of politics and economics would dedicate himself to the task of tracing the history of all the changes—changes that amount to home rule, with the exercise of authority finally resting in one political party, with the prospect that it will continue to rest there.

If a Little Is Bad, a Good Deal Is Worse

CURIOS notions of economy seem to prevail among the municipal authorities in New York City. It has been decided that the present synchronized traffic lights on the principal north and south avenues of Manhattan shall be electrically connected so that all can be controlled from a single point. Similar arrangements are proposed for the other boroughs. As a result of this interlocking it is expected that many policemen now on traffic duty on these avenues will be released for other work and that the city will thereby save some \$200,000 a year.

Even the most optimistic of the city officials can hardly expect any other outcome than a reduction in vehicular speed, and hence a smaller traffic capacity on the streets thus controlled. That has been the result in New York and elsewhere on individual streets equipped with synchronized signals. When such a system has been extended to more than one street the consequent delay to traffic movement has been even more pronounced. A borough-wide system would appear to be the height of inefficiency. The police commissioner himself is said to believe that the synchronized signals will have to be ignored at a number of the more important intersections. Certainly that looks like an admission beforehand that the proposed system will not be very satisfactory.

Engineers state that the present congestion in New York costs above \$500,000 a day. Millions are being spent to widen streets to increase their capacity. Yet the city proposes deliberately to reduce the capacity of existing streets in order to save \$200,000 a year. It is just this kind of thoughtless procedure that has helped produce the present deplorable traffic situation. Instead of making a careful study of the problem, as was done

in Chicago with the co-operation of the Surface Lines officials, and working out a scientific solution, New York seems to think the disease can be cured by larger doses of a remedy which heretofore has served only to make matters worse.

Transportation Men Must Watch City Zoning

MEN in the transportation field have always followed the development of city planning with considerable interest. Naturally their greatest concern has been in the street layout and in provisions for handling street traffic. However, zoning restrictions covering height, area and use have not been watched so closely.

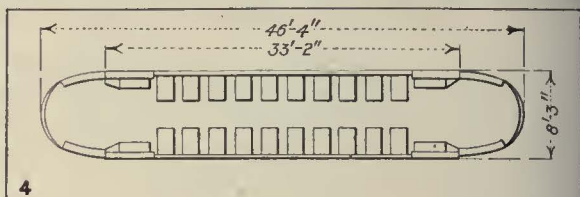
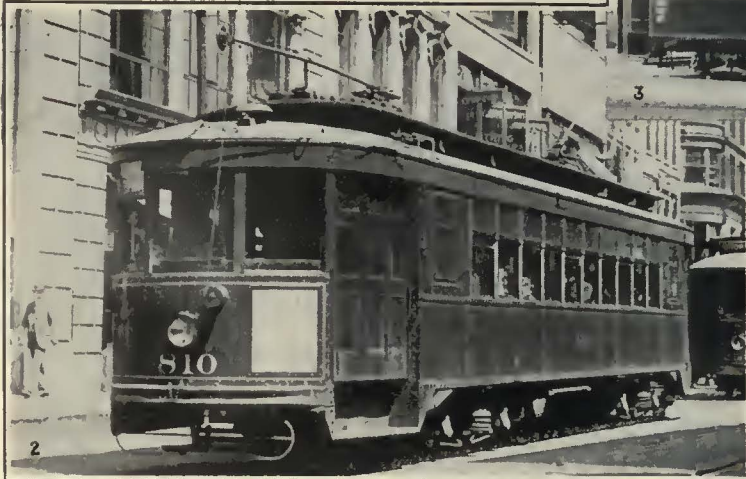
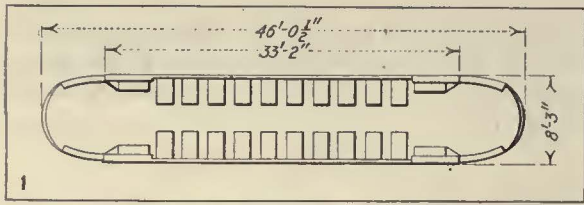
Ten years ago a city with a zoning ordinance was worthy of comment. Last year the United States Department of Commerce stated that there were 26,000,000 people living in zoned cities, towns and villages, or more than half of the total urban population. This development is extremely recent; more than 55 per cent of it was made during the previous four years.

Zoning is just beginning to be a powerful factor in controlling the method of a city's growth. It is getting to be a necessity, like an adequate water supply or a sewer system. No street railway man would stand by without a protest and see a sewer put in where it would weaken the roadway of a principal artery so that he could not run electric cars or buses over it. Neither should he stand by and see a slower but nevertheless a real loss of value in his plant because of some ill-advised zoning. He can be a positive factor in the matter, not for the benefit of his plant alone, but because of pride in his community; for zoning cannot be permanently successful unless the requirements for good transportation are met in the right way.

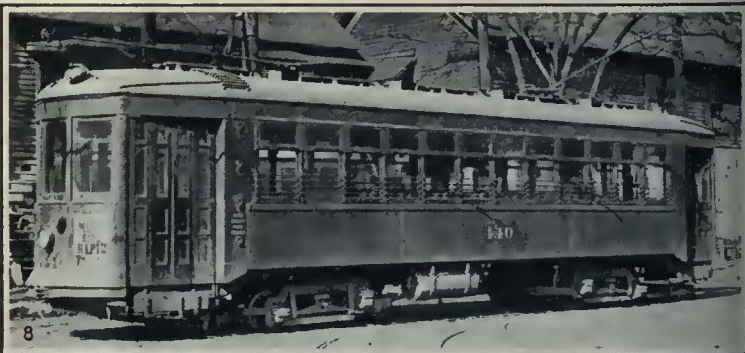
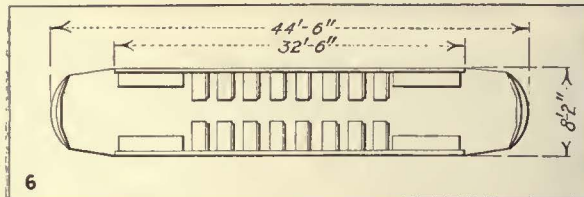
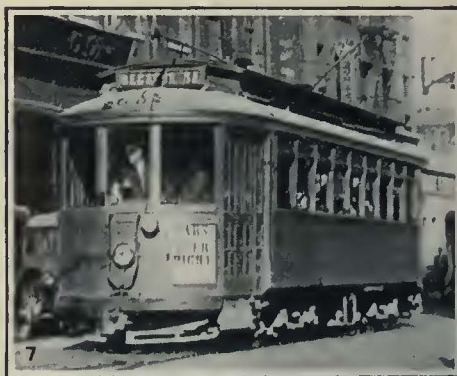
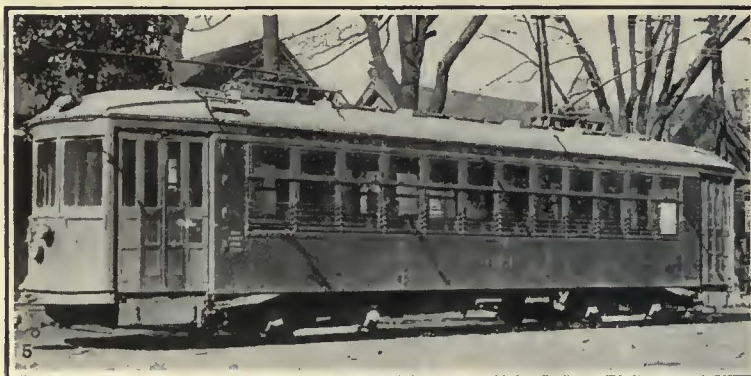
Unknown Opportunities in an Unheralded Work

BEHIND the lines in the operation of a railway occasions arise for the astute employee to advance his own interests and to increase the company's assets in good will. In the lost and found department is there just such an opportunity, for while the public retains its faculty for losing, railway managements will continue to supply facilities for finding and the employee will be enriched by his experiences as a medium of restitution. Forgetfulness is a human failing. Even from across the ocean reports emanate that our English cousins left many invaluable possessions on the cars in 1925. Over there, too, the lost article office of the railway is a veritable dry goods house-zoo-hospital-university combined.

Both intellectual and emotional stimulation are afforded the chief clerk of such a repository in peering into the innermost recesses of a vanity case, or clutching a set of teeth—still glistening—and in caring for a cat which became three while awaiting a claimant. However, the work of that department is not just a succession of glamorous experiences for the overseer's mental and spiritual education. Indirectly, the man engaged in this work is enriched by seemingly commonplace incidents. His development, though certain, is incidental. His real rôle is representative of the company. In this capacity, when answering unreasonable telephone inquiries and reassuring agitated patrons, he has the chance to show patience, understanding and sympathy.



Modern Cars Replace Old Types in Atlanta



THE cars used in Atlanta up to 1922 included almost everything, from a 28-seat single-truck car to double-truck cars of 60-seat capacity. The weights of these cars varied from 19,400 lb. to 46,500 lb. Some of the older types are shown in Figs. 7, 8 and 9.

The purchase of modern cars began in 1922, and the 40 cars acquired between that year and 1924 are represented by the "600" type (Figs. 5 and 6). Twenty of these cars were built by the McGuire-Cummings Company and twenty in the company's shops. Both lots were of the same size; that is to say, they had a capacity for 48 seated passengers, weighed about 37,000 lb. each and were equipped with double trucks, with 26-in. wheels and four GE-265 motors. Early in 1925 twenty cars of the "800" type (Figs. 1 and 2) were received from the Cincinnati Car Company. Although of the same seating capacity as the "600" type, they differ quite materially from the latter, both in outside appearance and in seating arrangement, as shown in the illustrations. Full particulars of these cars were published in the issue of this paper for May 2, 1925, page 695.

All of the cars added up to this time to the Atlanta system were designed for operation with two men. Later in 1925 forty cars were purchased very similar in outside appearance and seating arrangement to the "800" type, except that they were fitted with pneumatically operated doors and steps, with treadle for the rear door operation, so that they could be operated with one man. These cars (shown in Figs. 3 and 4) are known as type "900." In March, 1926, the company placed orders for 60 more city cars of the "900" type. A summary of the specifications of these cars accompanies this article.

About the same time or shortly before, the company also placed orders for ten single-end, one-man interurban cars. Further particulars of these cars are given in the accompanying article.



New Cars More than Pay Their Way

The Atlanta Management Believes in Modern Rolling Stock and Started on Its Campaign of Replacing Old Cars with New in 1922—One Hundred and Twenty New City Cars, About One-Third of the Total Number, Have Been Ordered During 1925 and 1926—New Cars for Interurban Lines Also

LARGELY through the addition of improved rolling stock and the scientific selection of the types of car to use, better public relations have been established in Atlanta and better financial conditions exist on the property of the Georgia Railway & Power Company. This was pointed out in an article in this paper for May 8.

The purchase of modern low-level four-motor cars for city service in Atlanta began in 1922, when the company purchased twenty cars of what is known as the "600" type. In 1923 twenty more cars of this type were built in the shops of the company, and in 1924 still twenty more cars of this type were ordered. These cars were received in 1925. Later the same year twenty cars of the "800" type were put in service, and still later in the year 40 "900" type cars were added. The accompanying engravings illustrate all of these types of cars and some of the earlier models.

The 40 cars of the "900" series, put in operation late in 1925, were the first designed for one-man operation to be used in Atlanta. Before their arrival some people were skeptical of their advisability because of the race problem, but a thorough trial has demonstrated the service by these cars to be a success. The fact that there are both front and rear exits helps the situation mentioned. The cars are painted green and cream, colors different from those of the other cars, and they are very attractive in appearance.

Before the last order for 60 cars was placed in March of this year the company made an exhaustive study of the type of car and equipment best suited to its conditions, including seating capacity, arrangement of seats, type of seats, etc. These studies took into consideration cars of a seating capacity of 32 up to 52.

The method followed was to make traffic counts for each line during different periods of the day, and sufficient counts were taken so that the average distribution for each line was determined. Obviously, however, the choice of equipment was not made on the conditions shown directly on these curves, because after their purchase the cars would have to run for ten years or more, so that conditions five years hence were taken as the average which they would meet. Hence, the curves were expanded and otherwise modified to represent traffic conditions expected in 1931.

On the traffic charts thus compiled the transportation engineers of the company plotted the cost of giving efficient service with cars of different seating capacities. The result of this study soon showed that the choice lay between a 40-seat and a 48-seat car. In the more detailed study then made of the relative merits of these two types consideration was given to the saving in energy from the operation of the 40-seat car, whose weight was taken at 32,000 lb., the gain which should be expected from the shorter headway with the shorter car, etc., against the higher platform cost per seat,

Extracts from Specifications for Last Order for Cars—Atlanta

The following extracts are taken from specifications covering 60 cars ordered by the Georgia Railway & Power Company in March, 1926

GENERAL DIMENSIONS

Length over dashers.....	45 ft. 4 in.
Length over body.....	33 ft. 1 in.
Length of platform.....	6 ft. 1 in.
Height, rail to top trolley boards.....	11 ft. 2 3/8 in.
Height, rail to first step.....	15 1/2 in.
Height, step to platform.....	14 1/2 in.
Ramp in car floor.....	31 in.
Post centers.....	29 1/2 in.
Clear height inside.....	7 ft. 11 1/2 in.
Width over eaves.....	8 ft. 3 1/2 in.

GENERAL INFORMATION

Seating capacity.....	48
Width of seats.....	34 in.
Width of aisle.....	27 in.
Width of front-entrance door.....	50 in.
Width of rear-exit door.....	32 1/2 in.
Truck centers.....	20 ft. 6 in.
Wheelbase.....	5 ft. 4 in.
Size of wheels.....	26 in.

Roof—Car body roof will be of the monir type.

Doors—All doors will be sliding, operated by National Pneumatic Company's door engine. Rear door will be treadle-

operated and provision will be made so that street collector can open this door from the outside with a key.

Curtains will be installed at all body windows, and there will be operator's vestibule curtains; material, pantasote.

Heaters—Each car will be equipped with twelve panel type electric heaters made by the Consolidated Car Heating Company and equipped with thermostatic control.

Seats—Each car will be equipped with twenty Hale-Killburn No. 400 reversible cross seats, 36 in. over all. Seats will be framed of wood and fitted with springless canvas-lined rattan panels in cushions and backs. Four longitudinal seats with same cushions and backs will be provided. One folding operator's seat will wood top on each platform.

Hand Brakes—The National Brake Company's Peacock staffless brake gear, ratio 12/52 with 20-in. iron brake wheel, will be installed in each vestibule.

Fenders—Each end of car body will be equipped with one "Atlanta" type drop basket life guard.

Mirrors—The cars will be equipped

with mirrors to give the operator a full view of the interior of the car.

Trucks—Car body will be mounted on Brill 177-E-1 trucks with Stueckl side bearings. Brake pins 1 1/8 in. in diameter.

Electric Equipment—Four General Electric Company's 265-A, 35-hp. motors with K-35-JJ controllers and line breaker for double-end operation.

Gears—Thirty cars to be equipped with General Electric Company's No. A-1 combination tempered and case-hardened long and short addendum tooth type.

Lightning Arresters—Aluminum cell lightning arresters to be installed on the platform No. 1 end.

Air Brakes—Westinghouse Air Brake Company's double-end, straight air brake equipment with all emergency and safety features, including D11-14 air compressor, 8 in. x 12 in. brake cylinder, Westinghouse R-4 type governor, M-28 brake valve, two 14 in. x 42 in. enamel air reservoirs, American Brake Company's type E-1 slack adjuster.

Safety Equipment—Full double-end safety car equipment as furnished by the Safety Car Devices Company.

increased traffic congestion, street accidents and other disadvantages accompanying the use of the small cars as compared with the large ones to provide the same number of seat-miles.

In this detailed comparison it was found that on the twelve more important routes the 48-seat car was the more desirable, but on the twelve other routes, with less traffic, the smaller and lighter car with a seating capacity of about 40 would be more economical. The decision was finally made to place the order for the 60 cars, all to be of the 48-seat type, so as to equip the more important lines first.

The car color decided upon was similar to the olive green color used on the other cars, except that, as stated, all safety cars have a cream trim, which makes them easily distinguishable from the two-man cars. A summary of the specifications for the new cars accompanies this article. The new cars ordered are said to be the first in this country to be built completely under the rules adopted late in 1925 by the National Board of Fire Underwriters. Owing to the fact that they are being built entirely in accordance with the national requirements, an annual saving in premiums of \$7.25 per car was secured.

OPERATING GAINS FROM IMPROVED ROLLING STOCK

As explained, the company has been operating modern types of cars (though mostly two-man cars) since 1923, so is in a good position to report on the benefits gained from their use. Those resulting from more attractive and more easily accessible rolling stock are rather hard to evaluate in dollars and cents, but the savings connected with the maintenance, larger capacity, increased speed and reduced accidents are susceptible of much more definite determination.

Table I gives a comparison of maintenance expenses in cents per car-mile, as determined by the records of the company. The new cars are those of the four-motor type or "600," "800" and "900." The "old cars" taken for comparison in this table are those of the same capacity as the new cars but purchased prior to 1922. The "600," "800" and "900" type cars, as previously explained, are very nearly alike in dimensions, capacity and electrical equipment, the chief difference being that the "900" cars are one-man cars and equipped with all safety features. The gain of the new cars in the cost of power and in maintenance of equipment and way and structures is due principally to their lighter weight. The saving in conducting transportation is due to their ability to maintain faster schedules.

TABLE I—SHOWING COMPARATIVE OPERATING EXPENSES IN CENTS PER CAR-MILE

	New Cars	Old Cars
Maintenance of equipment.....	2.18	2.49
Maintenance of way and structures.....	2.13	2.44
Power.....	5.03	5.74
Conducting transportation.....	13.39	14.05

The company estimates that with these savings and those due to larger capacity, increased speed and reduced accidents, the gain from the operation of the 60 new one-man cars ordered will be \$210,142. This gain is based on a comparison of the costs of operating the new one-man cars and the old two-man cars which will be retired. The cars to be retired will be partly double-truck and partly single-truck cars.

On the routes where the new cars replace double-truck cars the saving will result from lighter weight,

some increase in speed and the use of one man instead of two. Where they replace single-truck cars of 28 seats capacity fewer car-miles will be required because of the larger capacity of the cars. The aggregate of all of these savings is the sum mentioned.

Incidentally during the last five years, it might be said, the company has increased the scheduled speed on its city lines from 9.18 m.p.h. in 1920 to 9.79 m.p.h. at present. This gain is despite a slowing down of about 1 mile an hour in the business district following the introduction of traffic signals. The increased speed is attributed largely to better acceleration and braking through four-motor equipments and improved brakes.

SITUATION ON THE INTERURBAN LINES

Owing to the long distances between large cities in the Southern states there has not been the same development of interurban lines in that section of the country as in the North. The Georgia Railway & Power Company, however, has two high-speed lines, built for the greater part of the distance over its own private right-of-way, reaching suburban towns about 18 miles in each case from the center of Atlanta.

The service given on these lines is similar to that on the interurban lines in the Central states and the cars are run on about 1-hour headway. One line is known as the Atlanta Northern and reaches Marietta. The other is known as the Stone Mountain line and passes through Decatur en route.

The five new cars for the Atlanta Northern Railway are 52 ft. in length, with a smoking compartment and individual cushion seats. A new departure will be made by naming each car, like the sleepers and chair cars in Pullman service. The names given will be those of people who have been distinguished in the history of Georgia but are not now living. These names will be put on in gold letters on a red background. The remaining finish of the cars will be quite striking, as flamingo will be used as high as the water table and cream to the letterboard. The roof will be yellow.

These interurban cars will be equipped with multiple-unit control so that two-car trains can be operated, and there is a conductor's door at the end so that one conductor can collect fares in both cars. They were purchased from the Cincinnati Car Company and were to be delivered in May. Five similar cars have been purchased for the Stone Mountain line, to be delivered in June.

At present the Atlanta Northern line is being operated by two types of cars. One is the type "300" car bought in 1905 and weighing 67,000 lb. There are five of these cars and they will be scrapped when the new cars arrive. There are also four large cars purchased in 1921, each with four 100-hp. motors. These will be used as motor cars with a trailer to make a two-car train, the cars being permanently connected for traffic. That is to say, they are not disconnected except when one of the cars has to be sent to the shop. These trains will be used during the rush hours and the new light cars for the basic schedule.

On the Stone Mountain line the present equipment of six cars, which are more modern, will be retained, except that four of the cars will be connected up to make multiple-unit trains, and the five new cars ordered will be used on the basic schedule.

Before the order for the light-weight interurban cars was placed for the Atlanta Northern the company made

an extended study of their possibilities from a financial standpoint very similar to that conducted for the city cars, and before ordering new cars determined that operating economies of \$27,383 a year were possible. This figure was based on the cost for the five cars and accompanying equipment of \$123,750 and annual charges for interest and depreciation of \$13,200. This left a net saving of \$14,183 on the investment. The total cost as given includes changes in tracks, carhouses, etc., as well as the cost of cars, and the net saving was based on a proposed operating schedule which will provide more cars than at present. The annual platform expenses for the light-weight car were taken as \$22,141 and for the present equipment as \$32,193.

Some of this saving in lower platform cost is due to the smaller number of employees required per car from one-man operation on single cars and two-man operation on two-car trains and part is due to saving in dead mileage from storage of cars in Marietta. The figures of the proposed operations, it should be stated,

include some use of the older equipment during rush hours, as already explained.

It is estimated that the increased revenue from the improved service will amount to about \$20,000 a year.

Table II gives estimated figures for maintenance and power for the new equipment selected and for the present equipment. The figures relate to the Atlanta Northern Railway.

TABLE II—ESTIMATED COSTS IN CENTS PER CAR-MILE FOR MAINTENANCE AND POWER, ATLANTA NORTHERN RAILWAY

	With New Cars	Present Equipment
Maintenance, way and structures, motor car.....	2.095	3.300
Maintenance, way and structures, trail car.....	1.170
Maintenance, equipment, motor car.....	1.500	2.193
Maintenance, equipment, trail car.....	0.598
Power, motor car.....	5.490	9.452
Power, trail car.....	4.140

While, as stated, the figures given are for only one of the interurban lines of the company, it is expected that the savings on the other interurban line will be not greatly different from those mentioned.

Interstate Bus Regulation Desirable

The History of All Industry Shows that Control of Competition Between Utilities Is Desirable—Interests of Manufacturers of Automotive Vehicles Should Gain, as Risk Would Be Removed—Mistakes of Earlier Regulation Should Be Avoided

By John A. Ritchie

President Yellow Coach & Truck Manufacturing Company

TO REGULATE or not to regulate? That is the question about interstate motor vehicle traffic. For although 41 states do regulate intrastate traffic, there is as yet no interstate regulation such as there is with steam and electric railroads.

The history of industry sheds light on the problem, though Bernard Shaw is reported to have said, "The great lesson of history is that no one learns any lesson from history," and Henry Ford said, "History is bunk." Neither of them was right, however, for we do learn lessons from history. We find that regulation arose from necessity and has developed by orderly evolutionary process.

When did regulation begin? In the days of pure savagery the sole and ruling social philosophy was the welfare of the individual. The savage, whatever else he lacked, had complete personal liberty. No one has had it since, for as savagery developed into barbarism and barbarism into civilization restrictions or "regulation" of personal liberty became greater and greater, and all in the general interest. The history of civilization is the history of progressive curtailment of personal liberties. In all civilized countries the welfare of society as a whole now far outweighs all concern over the individual.

This evolution in political rights and usages has had its counterpart in industrial rights and usages.

The necessity of regulation grew out of evils due to unrestricted competition, or, as it is generally called, "cut-throat" competition. From the time of Adam Smith, the first great economist, and for more than a century, the slogan "Competition is the life of trade" was accepted without question. But in time it was

found that unrestricted competition was often the death of trade.

The belief was that competitors, in seeking trade, would try to excel each other in quality of output and reasonableness of prices. But it did not always work out that way. Many evil results arose from cut-throat competition, such as unrestricted child and female labor, corruption in public office, strangulation of competition by rate wars, rebating, greatly increased "overhead" or cost of doing business, needless duplication of facilities, and economic waste of many sorts, the cost of which all came out of the ultimate consumer in higher prices.

The problem is to preserve that idea involved in the word "competition" which we call "emulation" (or the effort to do things better and cheaper) while eliminating the evils of cut-throat competition. Thus the principle of regulation in industry arose, as a step between unrestricted private ownership and control and governmental ownership and control.

In the early days railroads, electric cars and stage-coach lines were regarded as much private business as a grocery store; but it was not many years before the fact that they were "impressed with the public interest," to use the legal phrase, became evident to everybody. The necessity of some regulation was clear and they were placed in that special legal category of businesses which affect the lives of every one and are called "public utilities."

It was recognized that in consolidation and unit control great economies could be effected. Economically centralization had its advantages. But the private control of prices was regarded as a source of evil, so pub-

lic utilities are no longer permitted to make their own rates; they are established by regulatory authority. While the power of oppression has gone, the economic advantages of co-ordination remain. And in a true sense public utilities are no longer evil monopolies. They are unified or co-ordinated industries.

The commercial transport of passengers and goods by automotive vehicles is a relatively new addition to our complete transportation machinery. The important thing to recognize is that it is a part of our national transportation machinery and, since it affects the electric railroads and the steam railroads, the nation has a very proper and deep concern in the basis on which it is or may be operated. To depend on individual competitive interest as a regulator is utterly to ignore the lessons of history. So the question is not so much one of recognition of principle as it is of the application of the principle. Has the time arrived for it, and what should the necessary legislation provide?

About these questions there is a great divergence of opinion and it will take time to pass the inevitable period of heated controversy to find all the basic facts and on them crystallize wise opinion in behalf of legislation making for the national welfare, upon which individual welfare depends.

In general, the interstate transportation agencies, electric and steam railroads, now under interstate regulation, feel that the new agency should also be regulated.

The organized motor coach operators feel the same way. Evidently some lessons have been learned from the cut-throat competition of the jitney period. Probably motor coach regulation now would not be premature, since the industry itself is for it.

WHY TRUCK OPERATORS OPPOSE REGULATION

But motor truck operators, for the most part, are opposed, if not to the principle of interstate regulation, at least to the bill now before Congress and, indeed, any bill at the present time, and it is seldom wise to enact drastic laws with the opinion of the industry all against it. The psychological factor is one of great practical importance.

The truck operators argue:

1. That the total amount of interstate tonnage hauled by common carrier trucks in competition with the railroads is negligible, and, being all short-haul traffic, is not profitable to the railroads anyhow.
2. That trucks cannot economically do a long-haul business, and hence their operation, even though it involves crossing a state line, is essentially local.
3. That their rates average higher than railroad rates because they do the work quicker, pick up at point of origin of traffic and deliver at ultimate destination, and render other special services which railroads cannot render, and for these reasons their service is of special character and not wholly competitive with railroad service.
4. That automotive common carriers are not and cannot become a monopoly, since the customer, at all times, has the alternative of employing the private contract carrier or doing his own hauling, as so many industries are now doing.
5. That interstate regulation of common carrier trucks involves dangers to both private and contract haulage.

There are other arguments, and one may grant the validity of most of them, though, frankly, many untenable arguments have also been advanced, such, for example, as this: That "the railroads have returns guaranteed by the government," a misstatement that has been spread from one end of the country to the other.

Some of these arguments relate solely to the present situation, which is temporary, but we should also look

to the future. Certain it is that the persistence of cut-throat competition at any time, in any form of public transportation, either interstate or intrastate, is contrary to the public welfare.

The very nature of the motor coach and motor truck business, covering, as it will in future years, all of the highways of the country, will make it necessary that there be some regulation.

The interstate commerce act in time became so drastic and it was applied so ruthlessly that it began to injure the railroads and limit their ability to serve. The same thing applies to the supervision exercised over street railways by state commissions.

We should aim to avoid all this in any regulation which is proposed for the motor coach and motor truck. The largest users of the motor coach and motor truck are going to be the steam railroads and the street railways. They have an especial interest, therefore, in the avoidance of drastic automotive regulation.

We should ask the question, were this need of regulation put up to the steam railroads and street railways as applying to their own business, whether they would be inclined to suggest the same kind of regulation they have suffered, or, whether they would not be inclined to offer many modifications which would give the railroads ample latitude in administrative and financial matters, and in management? Above all, we should ask them whether they would be inclined to subscribe to the principle that by law the net earnings of the steam railroads and street railway companies in their future automotive activities should be limited to a mere interest return on investment.

It would be better to suffer another year or so of irritation and then enact constructive legislation rather than to act too quickly and suffer ever after from destructive legislation.

EFFECT ON THE MANUFACTURER

Thus far no mention has been made of the particular interest of the automotive vehicle manufacturers, and it is an important factor in the problem.

Given a certain amount of service to be performed in any community, the provision of more facilities than are needed to perform the service represents an economic waste, which the ultimate consumer, in the end, has to pay for. To the manufacturer this can mean only one thing, a market filled with risk, or, to state it more strongly but just as truly, filled with certainty of bad risks, with an unavoidable increase in the manufacturers' prices to take care of those risks.

To sum the situation up as it now appears to us, the following conclusions seem justified:

1. That we cannot escape recognition of the principle of regulation.
2. Since the principle must be recognized our efforts should not be wasted in barren opposition, but centered upon constructive action.
3. That the time for federal regulation of the motor coach industry is generally recognized to be at hand and sufficient bodies of fact and competent opinion are available upon which to base a wise act.
4. That the situation in the motor truck industry is far different and that it would seem wiser to delay regulation in that department until a greater body of facts and a more general consensus of competent opinion in favor of regulation can be obtained.
5. That automotive regulation should avoid the mistakes of previous regulatory acts and put the industry in position to pioneer, to earn adequate returns and thus realize its greatest possibilities for the benefit of the nation as a whole.

Texas Properties Are Getting Results from Good Merchandising Work

FIRST ARTICLE

Houston, Galveston, Beaumont, El Paso, Austin, San Antonio, Dallas and Fort Worth Companies, Each with Its Own Peculiar Problems, Recognize Transportation as a Competitive Industry, and Are Energetically Developing Modern Merchandising Methods — Efforts Made to Relieve Traffic Congestion and Eliminate Parking

By John A. Dewhurst

Associate Editor ELECTRIC RAILWAY JOURNAL



This Picture of Dallas, from 3,100 Ft. in the Air, Shows the Extensive Development of This Metropolis

UNDER four different managements, the electric railway properties in the eight important cities of Texas are developing novel and effective methods of selling service. One gains the instant impression that in all of these fast-growing cities the personnels consist of wide-awake boosters who take a leading part in civic undertakings, and at the same time are providing an ever-increasing economical transportation service to their respective communities. There was, and still is, much to accomplish in changing the attitude of the public in order that the companies may keep pace with the enormous growth in population.

Dallas has just passed a new ordinance, giving the Dallas Railway a 7-cent fare with five tokens for 30 cents. This breaks the 5-cent fare basis that this city

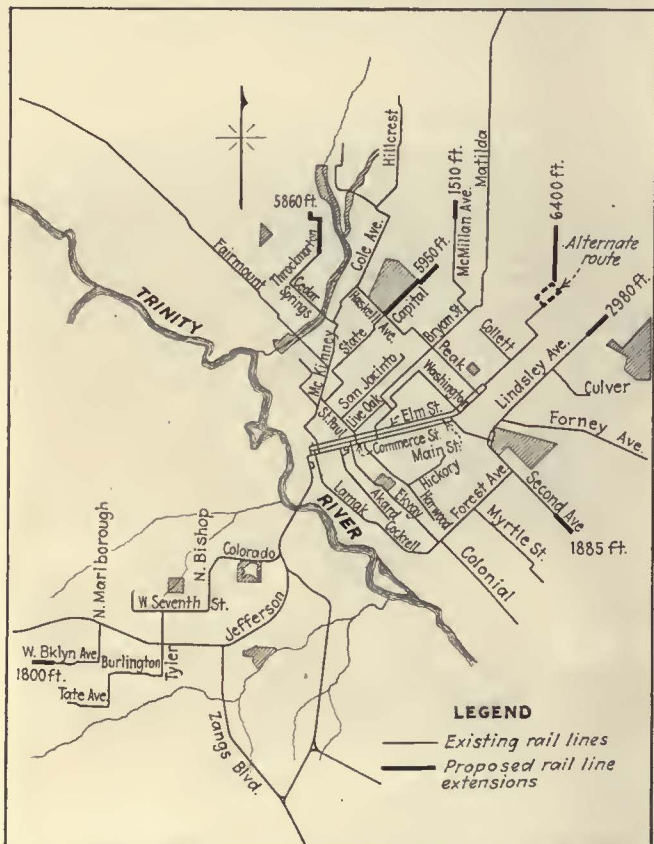
was slow to relinquish. The effect will be instantaneous. The company is already starting to expend \$1,500,000 for much-needed extensions and betterments. The text of this ordinance and the plans of the company were presented in an article in this paper for May 1, 1926, page 750.

Interesting in this connection are the 5 miles of track extensions into new territory on seven lines, a part of which has heretofore been served by buses during the development period. The buses thus replaced will be used to extend still further into newly developed communities. Thirty new cars will be purchased and several more will be constructed new in the company's shops. In addition 50 more cars will be remodeled for one-man operation during the next few months.

Public relations in Dallas are the concern of the

entire personnel. To be sure, they are under the direct leadership of C. J. Crampton, manager of the publicity department, who is directly associated with Richard Meriwether, vice-president and general manager of the Dallas Railway. Both of these men appreciate that the important matters of selling transportation and the establishing of public relations are a part of every employee's job, and can be successful only so far as every man and woman in the company co-operates in the work. As was expressed by T. P. Walker of El Paso at the recent Galveston meeting, public relations work depends on personality, which in turn is composed of a multitude of little things.

Among the duties performed by the director of pub-



Map of Dallas City Lines. Showing the Rail Extensions of Railway Service Planned for This Year as a Part of the \$1,500,000 to Be Expended in New Plant and Betterments

lic relations in Dallas is the directing of all advertising and the writing of all car cards for use on the system. In addition to this, the director makes many calls, trying to create at least ten new acquaintances every day. The people visited are the corner grocer, the butcher, or the drug store clerk in various parts of the city. Friends thus established are called on again and again, so that in the course of a year many thousands of people have a direct and frequent contact with a company official. Such men might otherwise never know other than the street car operators on their line. Obviously much valuable information is thus obtained that might otherwise remain a dark secret to the company.

A standing offer exists for suggestions that can be worked into cards of advertisements of five dollars for each suggestion that can be used. In addition the employee's name is used showing the origin of the thought.

In addition to this an informal lyceum bureau is

maintained, and every day the Dallas Railway is called on to produce lecture or entertainment talent for various functions, from church socials to rotary luncheons in Dallas and neighboring communities served by the affiliated interurban lines to Denton and Terrell. Not all of such talent comes from the company's staff, and outside local talent is used extensively.

MANY RIDE-SELLING NOVELTIES IN FORT WORTH

In Fort Worth the street car system stands out above all other industries. One is conscious of a superior system from the time of entrance on the brilliantly painted cars of the Crimson Limited, until riding to the depot on one of the clean white painted single-truck cars or perhaps the latest type "No. 566." After reading the dash signs on all cars, "New model car No. 566 at your service," a genuine interest is aroused. This car is painted a light gray with a cream superstructure and a dark green roof. Inside, the car is fresh and clean, with battleship linoleum on the floor and a white enameled ceiling. The appearance of the fare box has been improved by nickelplating all metal parts. Many of the other cars are painted with white enamel on the exterior, making a very attractive appearance.

Selling rides in Fort Worth is a daily job of thinking up new stunts. Walter H. Burke, manager, and F. G. Gannon, assistant treasurer, have created many novel business-getting methods. When the American Legion had its convention in Fort Worth last fall, this organization wanted to provide its delegates with admissions to all events and transportation to and from places of meeting. The company printed books with the necessary tickets of admission, plus ten coupons, each of which was good for a street car ride during any of the four convention days. These books were distributed at the registration desk and when used the cover could be presented for a new book. At the close of the convention the company counted the coupons collected in the fare box and billed the Legion treasurer for nearly \$1,500. Obviously the street cars were used much more extensively than would have been the case otherwise. Also the cost was lower than would have been possible had autos and taxicabs predominated, as so often happens at conventions.

Slogans painted in large letters on the outside of many of the city cars carry the railway's message home very effectively. Some of the slogans used are:

- Our service is more convenient.
- Parking time can be put to better use.
- You are the one inconvenienced by parking.
- Save the difference today and every day.
- Park not, worry not. Ride the street cars!
- Street car shopping is easiest.
- Get the street car habit—it pays.
- Don't try to park, use our service.
- Parking time is money—Save it.
- Howdy, folks! It's a pleasure to serve you.

Inside the car are displayed from time to time attractive messages that draw comparisons with facts well known. It is one thing to say the car mileage in Fort Worth is 18,000 daily, and another to say that this equals a round trip to Hong Kong every day. In these days \$7,000 does not mean much, but to say that every car equals the price of a good home means much to the average passenger who is buying one and who is struggling to make payments on the mortgage.

A few of the thoughts used in these car cards are reproduced as being particularly meritorious:

Things Worth Knowing

The steel structure of our tracks weighs nearly 9,000 tons, or as much structural steel as contained in all the buildings in Fort Worth.

600 Horse-Power in Motors

That is the reason the interurban train provides you with speed and dependability.

Things Worth Knowing

The street cars in Fort Worth travel 18,000 miles per day, or the distance from Fort Worth to Hong Kong and back again.

Things Worth Knowing

The street cars in Fort Worth use 55,000 kilowatt-hours per day, or more than is used to light all the homes in Fort Worth.

for every trainman. This costs the company 50 cents apiece for each uniform. Calls are made on a regular schedule. The appearance of the trainmen is naturally much improved.

Due to the scattered development of Fort Worth, relatively more trackage now exists per unit of population than is the case in many cities. Buses have been used for specific purposes previously and were discontinued when the object was accomplished, or when it was found that they were hopelessly unremunerative. On March 14 of this year a new bus line was started to a development at Oakhurst, and four buses now supply a fifteen-minute headway on this 3.2-mile line from 5:30 in the morning until midnight. A blanket franchise was obtained, allowing the company an opportunity of extending this type of service to other communities, as conditions warrant. Five 20-passenger buses were purchased, partly of Yellow Coach manufacture and partly Reos. A 10-cent fare is charged and express service is rendered from the downtown section



A Traffic Scene Looking East on Main Street, Dallas, from the Intersection of Field Street

The Payroll

of this company is \$1,000,000 per year, or \$115 per hour for every hour in the year.

Another Thing Worth Knowing

A street car costs about the same as a good home, from \$7,000 for a Birney car to \$23,000 for an interurban car.

There is no ordinance in Fort Worth prohibiting smoking on cars, so the following card was designed and found effective in moving smokers to the rear:

Smoking a cigarette, pipe or cigar?
 Why not go to the rear of the car?
 That's the proper smoking place,
 And you won't blow smoke in your
 Neighbor's face!

Recently the Northern Texas Traction Company has contracted with a cleaning establishment to call for and clean and press two uniforms a month, free of charge,

to the new development at Oakhurst, which is beyond the district served by cars.

Free transfers are given from buses to cars. When a passenger boards a street car and desires to transfer to the Oakhurst bus, he pays a 10-cent fare on the car and receives a bus transfer, thus avoiding a second fare transaction when boarding the bus. This avoids inconvenience and saves time to passenger and operator alike.

Before the bus line was started an extensive selling campaign was instigated. An attractive four-page folder in colors was printed entitled "A New Transportation Service." In the folder a complete description of the new service is given, showing why the Northern Texas Traction plans to operate buses, the type of vehicle to be used, the service to be offered, giving schedule and fares, the route, and closing with a request for suggestions for improving the service. These folders were distributed from house to house by

the bus operators before the service was started. This gave the operators a valuable opportunity to become acquainted personally with many of the prospective passengers and to add a few words beyond what was said in the folder.

In addition to this, one of the buses was exhibited at the Fat Stock Show. The operators were again present to explain the service about to be rendered and to show visitors the new vehicle.

This year the third public speaking class has completed its course of twelve lessons. The company pays the costs of this instruction. The first class was for department heads; the second year assistants and junior executives were given the course, and this last year many other junior officials received this training, which is valuable because of the many opportunities that are always available for carrying the company's message to local community gatherings.

The Texas Electric Railway, which operates 282 miles of interurban trackage, besides rendering a high-grade service to the many communities served, also supplies a personal service to its patrons through its

Chartered car rates have been revised so that definite rates are provided for parties of any size. This avoids the bad psychology of requiring a party of 30 to pay for 40 tickets in order to obtain a private car.

James P. Griffin, vice-president of the company in charge of the traffic, has stated that the transportation companies must adapt their service and schedules to fit the requirements of the riders and not expect the public to change its plans to meet the old-time standards of fares and schedules. Traffic rules and methods of handling special business are assembled in a handy book which is given to all agents and conductors.

Railway Operates from Union Bus Station at Rochester

ALL INTERURBAN bus and trolley lines of the New York State Railways in Rochester, N. Y., are now operating from a union terminal. The Rochester & Eastern and Rochester & Sodus trolley lines, hitherto using the terminal at Exchange and Court Streets, now operate from the Bus Terminal building at South



Front and Rear Views of the Dallas Interurban Terminal Building Used Jointly by the Texas Electric Railway, the Texas Interurban Railway and the Northern Texas Traction Company

traffic organization. Any one desiring a Pullman reservation may apply to any agent and the order is telephoned over the company's private system, generally to Dallas, as this is the principal point on the system, where its riders transfer to steam railroads. The reservation is obtained and a confirmation phoned back to the local agent. The reservation is either held or picked up and paid for as instructed by the passenger.

A similar service is performed in obtaining theater tickets, baseball and football tickets, or reservations to any similar functions. Generally the company is able to obtain an allotment of seats to athletic games so that Texas Electric patrons can be assured good seats. These tickets can be paid for at the local company office or they be held and paid for on arrival.

To encourage riding, this company has advertised extensively a 20 per cent reduction in return trip tickets during April and May of this year. Results are not yet available to show whether this has increased riding or not. The standard reduction for return trip tickets is 10 per cent. Many other forms of reduced rate transportation are in effect to meet the individual requirements of the various localities served.

Avenue and Broad Street. The old trolley station is to be abandoned.

The move is in the interests of economy, James F. Hamilton, president of the railways, announced. Under a new routing schedule, the interurban trolley lines are to enter South Avenue via St. Paul and Andrew Streets and leave the terminal through Court Street to Clinton Avenue. No new tracks are necessary.

Where the company has hitherto used the Broad Street, or side entrance, for unloading and loading bus passengers, the entire lower floor of the building has been taken over by the railways and the front entrance used for trolley passengers. The station will be enlarged within a short time.

The merging of the trolley and bus stations will not affect the terminal for the Rochester & Syracuse, Buffalo, Lockport & Rochester and Lockport & Buffalo lines at the Erie Station.

The New York State Railways took over the bus terminal, previously operated by independents, early in 1925, after the traction company had acquired control of every bus line entering Rochester with one exception, the Rochester-Batavia-Buffalo route.

Better Car Routing and Traffic Control Proposed for Baltimore

FIRST ARTICLE

Report Presented to Traffic Survey Commission of Baltimore by Kelker, De Leuw & Company Proposes Radical Changes in Street Car Lines and Handling of Vehicle Traffic, Particularly in Central Business District—Many Detailed Counts Taken Show Seriousness of the Problem

REROUTING of street cars and buses, traffic control and carrying out of a major traffic street plan are the three methods proposed for the improvement of traffic conditions in Baltimore, Md., by Kelker, De Leuw & Company. These recommendations are incorporated in a report presented to the Traffic Survey Commission of Baltimore after an investigation covering six months. While the report states that the efforts of the engineers have been directed to the preparation of recommendations that would specifically conform to local conditions, much of the material contained is general in character and is applicable to similar problems in other cities. The following is a greatly condensed abstract of the principal features of the report.

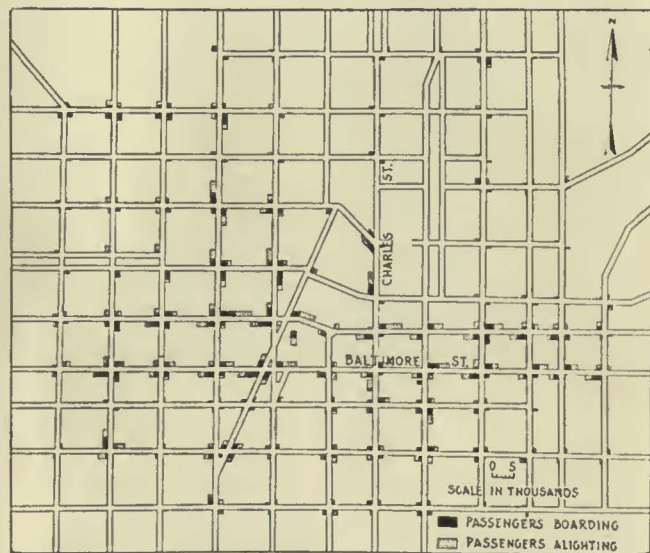
Development of the modern skyscraper, at first without restrictions as to height, is given as the primary cause of traffic congestion. Zoning ordinances, where they have been adopted, have been of assistance, but, in the opinion of the engineers, there has been no real effort to restrict building construction to conform with the limits which are imposed by the available street space in the zoned areas. Consequently it is not uncommon to find housed in a single building during the working hours a population equivalent to that of a small city, with the street on which the building fronts having sufficient space only for the needs of a small town. To sum up, there are five principal causes of congestion:

1. High buildings, causing concentration of large numbers of people in small areas;
2. Insufficient roadway and sidewalk space in the streets on which such buildings front;
3. The ever-increasing number of pleasure and commercial vehicles without a corresponding increase in roadway space;
4. Failure to provide a sufficient number of well-paved streets and to maintain them;
5. Use of a portion of street space for the parking of vehicles, thereby reducing the space available for moving vehicles.

Among the means which have been adopted by various cities for improvement of traffic conditions the following are listed:

1. Rerouting of street railway and bus lines;
2. Elimination of left-hand and right-hand turns at certain intersections and in certain areas;
3. Control of pedestrian traffic;
4. Elimination of parking, both partial and complete, in congested districts;
5. One-way streets;

6. Automatic signals with unit control;
7. Electric signals manually controlled;
8. Safety zones for street car passengers;
9. Segregation of various classes of traffic;
10. Creation of boulevards and through streets;
11. Minor changes and improvements in roadway and sidewalk design;



Passengers Boarding and Leaving Street Cars in the Central Business District from 6 A.M. to 7 P.M. on a Typical Week Day in November, 1925

12. The removal of obstructions from sidewalks and their full utilization, from building line to curb, for pedestrian traffic;
13. Street opening and widening projects to secure an adequate system of major traffic and distributor streets;
14. Construction of underground or overhead structures for partial removal of street railway lines from the downtown district;
15. Construction of subway or elevated railroads to provide rapid transit service, and
16. Construction of pedestrian tunnels.

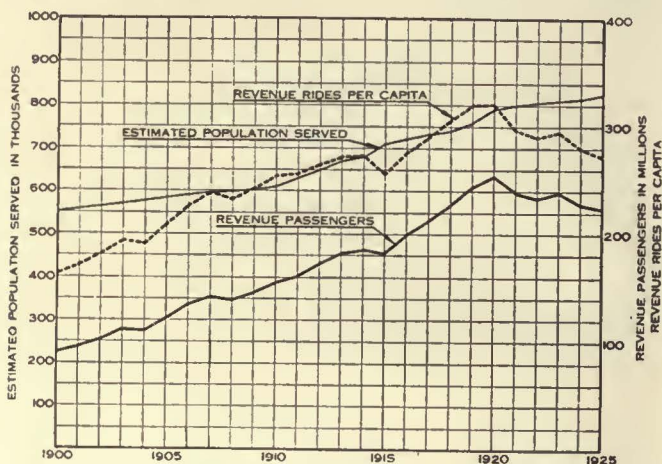
The general plan of the downtown streets in Baltimore shows a great similarity to that of a century ago. As the city grew the streets were extended and homes were located along and adjacent to the major radial streets, following the expansion of the street railway system. The congestion in the central area, due largely to the construction of high buildings in the retail, financial and wholesale districts, would be greater were it not for the accomplishment of the Burnt District Com-

mission in widening the streets after the fire of 1904. The City Plan Committee has done able work in preparing for the future by outlining a system of major streets and also in carrying to completion many important widening and opening projects. The United Railways & Electric Company has extended its lines and increased its service to meet the demands of the growing population. Bus service has been introduced to supplement the street railway service. The routing of the lines has been in general of such a character as to require the least possible amount of transferring and also to follow closely old-established lines of travel in carrying passengers to and from the downtown district.

Despite all the street improvements now under way or in contemplation, and despite the increases in street railway and bus service, the great increase in the use of the motor vehicle has brought about congestion in traffic movements throughout the city, and in the central business district in particular, which requires co-ordination and additional measures of traffic control so as to obtain the most effective use of the streets.

GROWTH IN MOTOR VEHICLES ENORMOUS

Since 1915, the increase in the number of annual revenue passengers carried by the United Railways has been 42,000,000 (23 per cent) and in motor vehicles registered 61,000 (307 per cent). During 18 hours of



Annual Revenue Passengers Carried, Rides per Capita and Population Served by the United Railways & Electric Company of Baltimore, 1900-1925

a normal week day 176,000 motor vehicles enter and leave the central business district, the corresponding number for the maximum hour of the afternoon rush being 14,000. Using the most accurate data available, and checking carefully with the experience of other cities, it is estimated that at the end of 1930 the number of motor vehicles registered will be 154,000, and that the number of motor vehicles entering and leaving the central business district for the eighteen-hour period will be 308,000 and for the maximum hour 24,000.

With this change in the situation imminent, the problem is not only to relieve the conditions of today but to plan wisely for those of tomorrow. While the recommendations for street railway and bus routing and traffic control may appear radical and drastic, say the engineers, if nothing is done shortly to reroute the street car lines and effectively to co-ordinate traffic control, these measures will seem mild when compared to the regulations required to meet the conditions five years hence.

Rerouting of street railway lines in a large city is a

complicated matter, as the limitations imposed by street space, track capacity and service require that each line be fitted in carefully with the other lines to make a complete and workable plan. Obviously, no rerouting plan can be proposed that will exactly divide the benefits and inconveniences for each one of the million daily passengers of the car lines and for the several hundred thousands of motorists who use the streets. The recommendations will benefit greatly the large majority of all persons using the streets and will be, if adopted, a long step forward to meet traffic conditions of the future, in the opinion of the engineers.

A summary of the recommendations follows:

STREET CAR AND BUS ROUTING

(a) A detailed rerouting plan is given later in the report. In the most congested portion of the downtown district nearly 70 per cent of the turning movements made by street cars are eliminated and in the entire area bounded by Greene, Centre, Gay and Camden Streets the reduction in turning movements is 35 per cent. All traffic movements will be benefited by the discontinuance of street car operation on Lexington, Saratoga and Sharp Streets.

(b) A "limited stop" service which will decrease the number of possible stops during the rush hours only, from ten to about eight per mile, is recommended. During the day from 9 a.m. to 4 p.m. and also during the night hours after 7 p.m. all present stops will be made. This change will not only decrease the traveling time of the vast majority of car riders but will also save considerable time for motorists.

(c) The increase in traffic in the downtown district since 1916 has been such as to require a modification in the street railway service standard and it is recommended that the 15-minute period by which violations are determined be extended to a 30-minute period.

(d) When street railway tracks are reconstructed in the downtown area realignment is recommended so as to remove a number of points of congestion by making a more equitable distribution of roadway space.

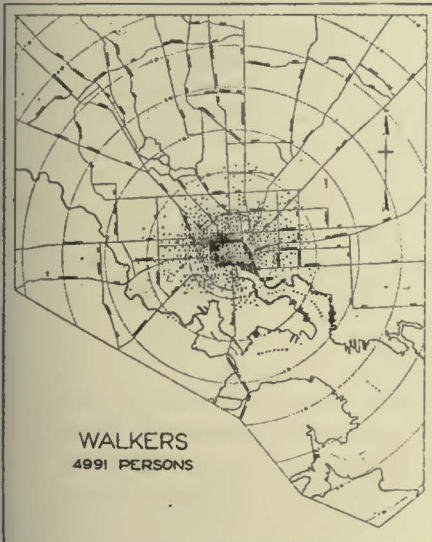
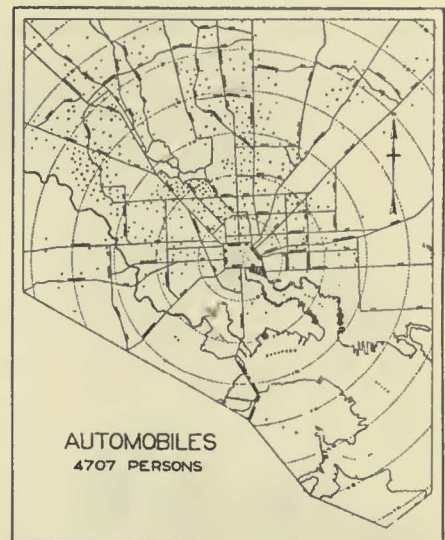
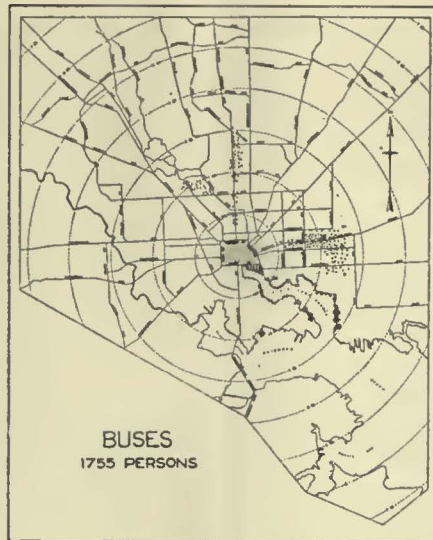
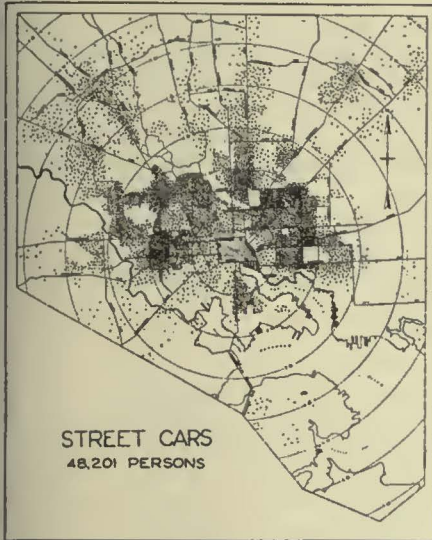
(e) The shortening of the existing loop used by all bus lines entering the downtown district on Fayette Street is recommended, as well as the installation of new bus lines in parts of the city where transportation is now lacking, such as on Washington Boulevard and on Annapolis Boulevard.

TRAFFIC CONTROL

(a) The immediate installation of automatic signals is recommended at 14 intersections in the central business district and a later installation of the same type of signals at 64 additional intersections, making a total of 78. In the outlying districts of the city the installation of automatic signals is recommended at 34 intersections and this number is to be increased to 76 by subsequent additions.

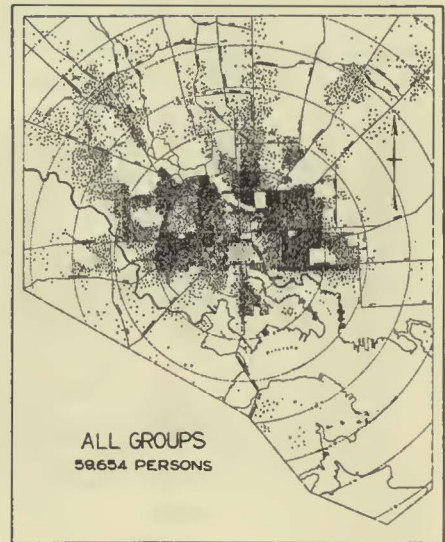
(b) With the installation of the automatic signals it is recommended that measures be taken to co-ordinate the movement of pedestrian traffic with the signals. This is one of the most effective safety measures that can be adopted and it has a further advantage in that it facilitates the movement of all classes of traffic.

(c) While there is no present need to prohibit parking throughout the day in a large portion of the downtown area, there is no doubt that traffic conditions would be improved if the present regulations were extended to cover a slightly greater area and the period of pro-



Residential Distribution of 59,654 Persons Employed in Baltimore's Central Business District

These charts, which were made from a survey of employees in leading business houses, show classification in accordance with means of transport used. The central district is the trapezoidal area in the center of each chart. Each dot represents ten persons.



hibition in the afternoon advanced from 4:45 p.m. to 4:15 p.m., and these changes are recommended.

(d) Because of delays occasioned by the delivery of coal during the periods of heavy traffic movement, it is recommended that such deliveries in the downtown district be made at times other than during the morning and evening rush hours.

(e) A change in the existing statutes and laws pertaining to traffic regulations is recommended so that all vehicles moving on street car tracks, in addition to street cars, shall be passed on the right. The change is desirable as a safety measure and also to facilitate the movement of traffic.

(f) On many of the sidewalks and roadways in the downtown area there are numerous obstructions such as cellar entrances, light wells, steps, fruit and vegetable stands, etc. Such obstructions should be removed wherever possible.

(g) The adoption of a system of through streets, in the interest of safety and improved traffic conditions, is recommended. For the initial step 18 streets have been selected and this number, by subsequent additions, should be increased to a total of 39 streets.

MAJOR TRAFFIC STREET PLAN

(a) The major street system designed by the City Plan Committee has been carefully studied in connection with many traffic counts, surveys and observations

of the physical conditions affecting the plan. As a result of this work this plan as outlined, with a few modifications, is fully indorsed.

(b) A system of inner distributor streets encircling the central business district is recommended, utilizing as far as possible existing streets of adequate widths. The essential work can be carried on by progressive steps to meet the increasing traffic of coming years.

(c) To supplement the inner system an outer distributor street system is also recommended. The downtown street system cannot care for both the local and through traffic, and a convenient system of streets must be provided for the through traffic so that it may be deflected from the streets in the downtown area.

(d) To insure adequate means of egress and ingress to the downtown district the widening, when possible, of a number of the existing arterial thoroughfares is recommended.

(e) The widening and opening of both Howard Street and Franklin Street and the construction of the Franklin Street viaduct, together with certain streets connecting with the inner distributor street system, are recommended.

(f) The opening of an east-and-west street between North Avenue and Cedar Avenue which will connect the section of the city lying east and west of Jones Falls is recommended.

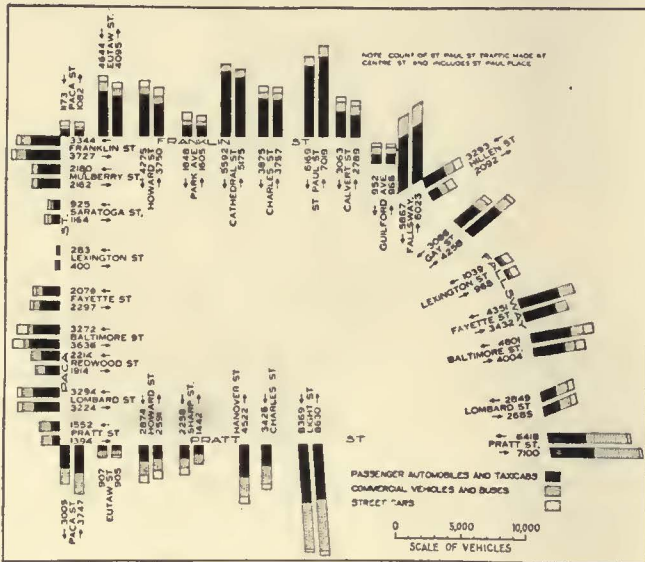
(g) In the central business district the widening of

Pratt Street between Light and Paca Streets, together with some minor improvements, is recommended.

(h) Some of the recommendations contained in the report of the Committee on Traffic (1923) are being carried out and a number are covered directly or indirectly in this report. Other important items of the 1923 report are recommended.

BALTIMORE'S POPULATION CONCENTRATED

For a city having such a large population (at present estimated 790,000) Baltimore is unique in that so great a proportion of its people reside within a comparatively short distance from the central business district.



Number of Vehicles Entering and Leaving the Central Business District of Baltimore from 6 A.M. to 12 o'Clock Midnight on Oct. 19, 1925

Approximately 625,000, or 79 per cent, reside within a radius of 3 miles from Baltimore and Charles Streets. Recently there has been considerable development in the outlying residential zones, which has caused a small reduction of the population in the inner zones and a corresponding increase in the outer zones. The density of population by mile zones is as follows:

DISTRIBUTION AND DENSITY OF POPULATION IN BALTIMORE, 1925

Zone Radius, Miles	Population Accumulated Totals	Per Cent of City Total	Persons per Acre (Land Area Only)
1	120,200	15.2	64.8
2	435,100	55.0	60.4
3	625,100	79.1	40.3
4	693,400	87.7	25.9
5	752,500	95.2	19.4
City Limits	790,600	100.0	15.7

Note: Circles centered at Charles and Baltimore Streets.

The zoning regulations limit the height of buildings in the central business district to 2½ times the width of the street on which they front. The average height of buildings in the district bounded by Franklin, Calvert, Lexington, Holliday, Pratt and Paca Streets is now four stories or about 52 ft. Under the zoning regulation enough additional high buildings could be constructed to bring this average up to 17 stories or 180 ft. Although the height regulation is as sound as in any other city a concentration of business activities four times greater than that of today is possible. The volume of traffic on sidewalks and roadways which would result unless there were a corresponding increase in their width can scarcely be visualized.

The existing street railway system comprises some 35 lines, the cars on 27 of which operate into and out of the central business district. In addition to the street railway lines there are three bus lines reaching this district, and several lines in the outlying districts where buses are used as feeders to street railway lines. In all, the United Railway & Electric Company operates 415.8 single-track miles of street railway lines (60 of which are on private right-of-way and 18.5 on reserved portions of streets), 47.7 miles of bus lines and 6.6 miles of trackless trolley.

Of the 316,428,497 revenue and transfer passengers carried during the year 1924, 260,453,100, or approximately 82 per cent, were carried on the lines which give direct service to the central business district. Of the remaining 55,975,397 passengers 2,095,223 were carried by shuttle service lines which are virtually extensions of lines operating to the central business district. The crosstown feeder lines carried 53,880,174, or approximately 17 per cent of the total passengers.

A count of the number of passengers boarding and leaving street cars in the central delivery district (the area bounded by Greene, Centre, Gay and Pratt Streets) was made during November and the early part of December, 1925. The chart on page 883 shows in diagrammatic form the total number of passengers boarding and leaving cars at each corner during the 13-hour period from 6 a.m. to 7 p.m. on a typical week day. It will be noted from this diagram that a large part of the delivery and pick up of passengers is made in a comparatively small area. As a matter of fact, of the 396,000 persons observed in the entire central district 136,000, or over one-third, got on and off the cars in the area bounded by Howard, Saratoga, Charles and Baltimore Streets, which is about one-ninth of the area of the entire district. This indicates the necessity of operating a large number of cars on the tracks in this area if the patrons of the street railway lines are to be served conveniently.

Revenue passengers increased gradually from 155,000,000 in 1910 to a peak of 254,000,000 in 1920, decreasing to 224,000,000 in 1925. This falling off in revenue passengers can be attributed partly to a decline in post-war activities, partly to the increase in the use of passenger automobiles, partly to the use of second transfers and partly to the extension of zone fares. The number of revenue rides per capita served was 272 in 1925 compared with 254 in 1910 and 321 during the peak year, 1920. This information is shown graphically in one of the charts.

The quality of service has been well maintained. As a matter of fact, the seat-miles have been increased at a more rapid rate than the car-miles, which have kept pace with the number of passengers. The street railway system is being managed efficiently, but if the passenger traffic continues to decrease new methods of reducing the operating cost, in addition to those which have been put into effect during the past few years, will have to be employed. Among the possibilities that present themselves are rerouting, "limited stop" service during the morning and evening rush hours, provision of more cars of the type that will save time by making faster interchange possible, and the adoption of a method of selling tokens and of issuing transfers that will reduce delays in loading.

Three of the railway's bus lines operate to and from the downtown district. Two of these are operated on

a seat-for-every-passenger basis at a 10-cent fare. They do not compete directly with the cars. The Fayette Street bus line, largely controlled by the United Railways, is operated in direct competition with the street cars. The latter could easily perform the service rendered by these buses.

In addition to the local street cars and buses there are several interurban and interstate bus lines which take up considerable space operating over and standing in congested streets. The majority of the interurban bus lines operate from the city limits to various suburban communities.

STREET TRAFFIC ANALYZED

In order to obtain all pertinent facts with respect to street traffic conditions in Baltimore field surveys were made including (1) a cordon count of all vehicles and passengers entering and leaving the central business district; (2) a count of vehicles at nearly all the intersections in this district; (3) a count of pedestrian traffic at principal points of sidewalk congestion; (4) a check of the speed made by automobiles on various streets; (5) a count of vehicles at principal intersections throughout the municipal area, and (6) a survey of the speeds made by the principal street railway lines.

The results of the cordon count are shown in one of the diagrams. An analysis of the count shows that out of a total of 206,653 vehicles, the division was:

Type of Vehicle	Number	Per Cent
Street cars.....	19,138	9.2
Passenger automobiles.....	123,906	60.0
Taxicabs.....	5,840	2.8
Buses.....	1,111	0.5
Commercial motor trucks.....	45,697	22.2
Horse-drawn vehicles.....	10,961	5.3

During the hours from 7 a.m. to 6 p.m., 160,120 vehicles entered and left the central business district, an average of 14,556 per hour, and during the hour from 5 to 6 p.m., the maximum traffic hour of the evening rush period, the number entering and leaving was 16,566. The count shows that the large majority of commercial and horse-drawn vehicles, the slower moving types, used the streets in the southern portion of the district. Of a total of 56,658 commercial and horse-drawn vehicles 26,677 or an average of 2,223 per checking station crossed the 12 stations on the cordon south of Baltimore Street, while 29,881 or an average of 1,428 per checking station, crossed the cordon at the remaining 21 stations north of Baltimore Street. This gives some idea of the value of the wider streets in the section along the wharves and docks and in the wholesale district.

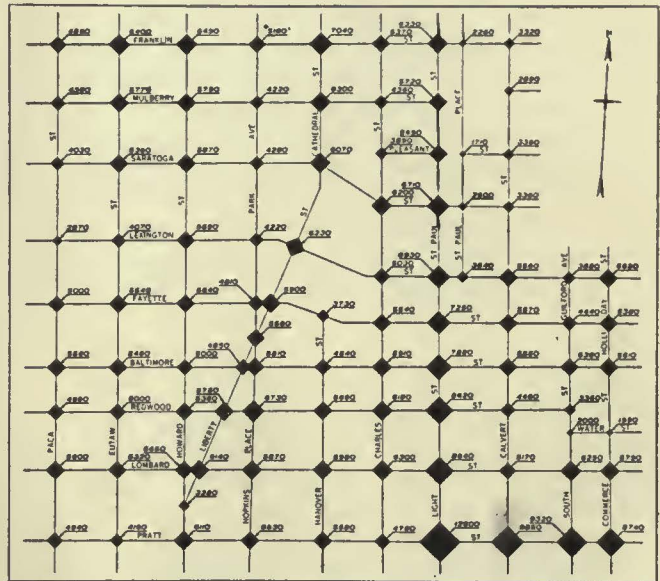
During the 18 hours from 6 a.m. to 12 midnight, there were 749,376 persons carried on the various conveyances, as follows:

Kind of Vehicle	Passengers	Per Cent
Street cars.....	511,389	68.3
Passenger automobiles.....	209,794	28.0
Buses.....	16,780	2.2
Taxicabs.....	11,413	1.5
Total.....	749,376	100.0

The public transportation facilities, street cars, buses and taxicabs, carried 72 per cent and the automobiles 28 per cent of the passengers. Comparing the number of passengers carried by street cars with the number carried by private automobiles it will be seen that the street cars carried 71 per cent and the private

automobiles 29 per cent during the 18-hour period. During the maximum traffic hour of the morning and afternoon rush periods, however, the street cars carried almost 4½ passengers for each passenger carried by automobiles in the direction of heaviest traffic. This is shown by the following summary:

Maximum Hour	Passengers		Ratio of Street Cars to Automobile
	Street Cars	Automobiles	
7 to 8 a.m., inbound.....	39,631	8,721	4.54
5 to 6 p.m., outbound.....	55,514	12,509	4.44
Total.....	95,145	21,230	4.48



Traffic Flow at Intersections in the Central Business District, 12 Noon to 6 P.M. on a Typical Week Day, October and November, 1925

Similar cordon counts have been made in other cities. For comparison the results of these counts are compared with the count in Baltimore:

City and Date	Number of Vehicles	Approximate Area of District, Square Miles
St. Louis (August, 1925).....	138,366	0.99
Baltimore (October, 1925).....	160,120	0.49
Detroit (June, 1924).....	197,967	0.58
Los Angeles (November, 1923).....	280,973	0.66

The volume of vehicular traffic at the intersections in the downtown district of Baltimore between 12 noon and 6 p.m. is shown graphically in the diagram on this page. Other charts, not reproduced, show the volume on each street between intersections and similar data for the evening rush hour. It will be observed from the diagram that the traffic at the various intersections throughout this district was very evenly divided with the exception of the intersection along Pratt Street east of Charles, which were the heaviest, and the intersection along St. Paul Street, which were heavier than those along any other north-and-south street. The volume of traffic during the hour from 5 to 6 p.m. shows practically the same conditions, except that the traffic at the intersections along Cathedral Street was much heavier proportionately than during the other five hours of the count.

Checks of pedestrians crossing the intersection of Lexington and Howard Streets and the adjacent blocks show that 50,510 pedestrians crossed the streets and that 21,802, or about 30 per cent of the 73,312 pedestrians observed, crossed the streets adjacent to the

intersections, between blocks. This argues well for pedestrian traffic control, as jaywalking is one of the chief sources of accidents.

STREET CAR SPEEDS LOW

Many checks were made of street car speeds. The results are shown in a series of charts included in the appendix of the report. The speeds of cars outside the central district range from 6 m.p.h. to 16.4 m.p.h. The speed in the central business district ranges from 3.4 m.p.h. on Charles Street between Saratoga and Lexington to 12.9 m.p.h. on Calvert Street between Franklin and Mulberry. In general the speed of street cars in Baltimore is slower than that in most large cities. This is due to several factors, chief of which are the narrowness of the streets on which most of the lines are operated and the short distances between some of the stopping places. For the purpose of comparison the schedule speeds of street cars in a number of cities are given in the accompanying table.

SCHEDULE SPEED OF STREET CARS IN VARIOUS AMERICAN CITIES

City	Average Speed, M.P.H.
Baltimore.....	9.5
Buffalo.....	10.0
Boston (surface lines only).....	10.5
Chicago.....	11.2
Cincinnati.....	10.0
Cleveland.....	10.5
Detroit.....	10.1
Milwaukee.....	10.1
Philadelphia (surface lines only).....	10.0
Pittsburgh.....	9.4
San Francisco.....	10.2
Washington.....	10.2

In Baltimore the distribution of population is such that the time required for the majority of residents to travel from residence to place of employment or business would be comparatively short if the cars made the speed which it is possible for them to make with safety. Therefore, an increase in the speed made by the street cars must be one of the salient features of any plan to improve transportation service. The "limited stop" service which is recommended in the report, it is stated, will do much to reduce the time spent on street cars. It should also be pointed out that the restriction on the speed of cars while crossing intersections in the downtown district should be made less stringent. A time saving would thus result and the higher speed would be reflected in a somewhat better movement of all classes of traffic.

With regard to the designation of one-way streets, the engineers hold that the possibilities of improving traffic conditions by creating additional one-way streets beyond the four now in use was given careful consideration and it does not appear that any particular improvement could thus be obtained.

ROADWAY OBSTRUCTIONS

Traffic is impeded and in turn causes congestion at quite a number of points in the downtown district because roadway space which should be used for moving traffic is occupied by traffic semaphores, push carts and temporary huckster and vendor stands. All of these have fulfilled a useful purpose in the past, but the increasing need for more roadway space due to the growth of the city and the constantly increasing vehicular and pedestrian traffic has brought about a condition where the space used by them would be more valuable to the city at large if it were kept free for the purpose for which it was intended. A comparatively

small stationary object in a roadway diverts traffic from its course, retards its flow and causes congestion. The congestion is more than proportionately increased when an entire traffic lane, and in some instances two lanes, is obstructed by such objects. Traffic congestion adds to the cost of operating commercial as well as pleasure vehicles and consequently increases the cost of doing business. Therefore all possible measures to prevent it should be taken, and among the first should be the utilization of roadway and sidewalk space for the purpose originally intended, by removing all obstructions to traffic therefrom. Traffic semaphores should be replaced by more modern equipment and if possible other quarters should be provided for push carts and the like. In any event they should not be permitted to utilize roadway or sidewalk space.

Sidewalks in the heart of the retail district are comparatively narrow. This is particularly true of those which carry the greatest volume of pedestrian traffic, namely, along Lexington Street. It is also true of the sidewalks along Charles Street. The complete utilization for pedestrian traffic of some of the sidewalks, narrow as they are, is made impossible by cellar openings, light wells, doorsteps, waste paper boxes and kiosks. The time has arrived when the available sidewalk space in the shopping district is being used at some time of the day up to the limit of its capacity and in some cases pedestrian traffic overflows into the roadway. Three measures can be adopted to meet this situation: (1) Set back the building line; (2) widen the sidewalk by reducing the width of the roadway, and (3) remove all obstructions from the sidewalk and utilize the full width from building line to curb for pedestrian traffic. Of the three, the last is the most practical and can be wholly or partially accomplished with comparatively little expense.

CANVASS OF RESIDENTIAL DISTRIBUTION OF WORKERS

It was decided to make a canvass of large groups of persons employed in the downtown district and several of the more important industrial districts so as to determine the modes of transportation used and whether or not the transportation facilities were so located as best to serve those using them. All members of the Baltimore Chamber of Commerce gave full co-operation in making the survey, and 112,642 persons answered a questionnaire.

The means of transportation between residence and business places used by 79,831 persons engaged in the downtown district are shown in the accompanying table:

MEANS OF TRANSPORTATION USED BY 79,831 PERSONS EMPLOYED IN THE DOWNTOWN DISTRICT OF BALTIMORE

	Central Business District		Outer Area		Total Downtown District	
	Persons	Per Cent	Persons	Per Cent	Persons	Per Cent
Street cars.....	50,012	79.5	11,895	70.2	61,907	77.5
Buses.....	1,816	2.9	165	1.0	1,981	2.5
Total.....	51,828	82.4	12,060	71.2	63,888	80.0
Steam and interurban railroads.....	595	1.0	181	1.1	776	1.0
Total.....	52,423	83.4	12,241	72.3	64,664	81.0
Passenger autos.....	5,478	8.7	1,317	7.8	6,795	8.5
Walkers.....	4,991	79.9	3,381	19.9	8,372	10.5
Grand total.....	62,892	100.0	16,939	100.0	79,831	100.0

The outstanding fact shown by the table is that over four-fifths (81 per cent) of the persons canvassed used the collective transportation agencies. Those using

automobiles and taxicabs amounted to 8.5 per cent of the total and 10.5 per cent walked. In the outer area, the proportion of walkers is 2½ times that in the central business district. This is due to the close proximity of residences to the outer edge of the downtown district.

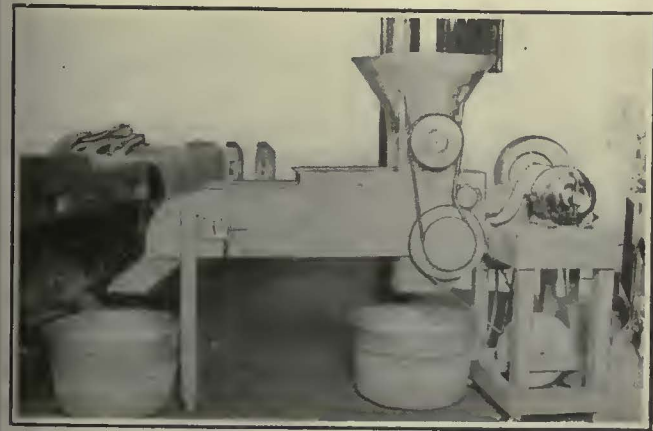
The same information is presented graphically in the set of maps of the city, with dots representing the distribution of the workers. The comparatively small numbers using individual means of transportation are quite evident.

Similar data were collected for seven principal industrial districts. In general the same conditions hold as in the central district. Out of a total of 31,034 persons counted 16,966 or 54.7 per cent used street cars; 389 or 1.2 per cent used buses; 32 or 0.1 per cent traveled by railroad; 2,264 or 7.3 per cent used automobiles, and 11,382 or 36.7 per cent were walkers. It was also found that there is to a great extent an avoidance of superimposing the rush hour traffic of the outer industrial districts on that of the central business district. Of the 31,034 persons canvassed in the seven industrial districts only 8,000 or about 25 per cent are required to travel through the central district on street cars in going to and from work.

In the second article, to appear in a subsequent issue, the car routing and plans for betterment of traffic through improved control and a major traffic street plan will be discussed.

Time for Ticket Sorting Reduced 50 per Cent

SEPARATING of tickets from coins as they are received from fare boxes is a considerable problem on most electric railways. In Erie, Pa., a shop constructed blower device has reduced the time of sorting 50 per cent. Tickets and coins as they come from the fare box are placed in the hopper of the machine



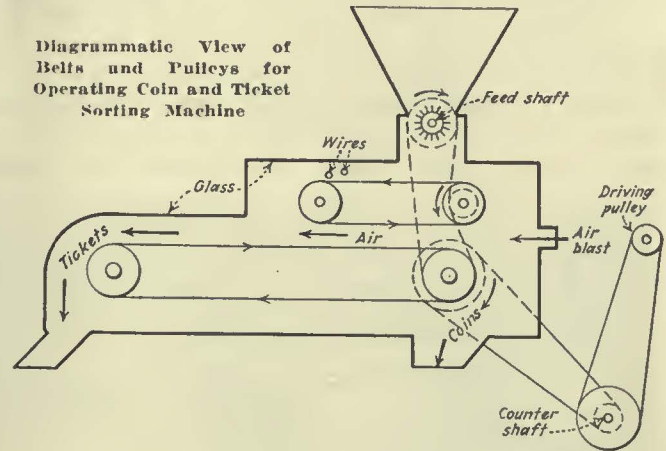
Ticket and Coin Sorting Machine Used by the Erie Railways

and a feeder shaft delivers them on top of a belt. As they drop from this belt to a lower one a blast of air blows the tickets out the far end of the machine, while the coins remain on the belt and drop down into a chute, which delivers them through an opening at the opposite end of the machine. The accompanying halftone shows the construction of the machine and the line diagram gives an idea as to its operation.

A blower from a Peter Smith heater is used to supply the air. It is driven by a ¼-hp. motor. The motor

shaft is also provided with a pulley which is belted to a countershaft directly underneath. From this countershaft a belt leads to the driving shaft of the lower coin belt, and another pulley on this shaft is connected to the feeder shaft. A pulley on the top coin belt shaft rests against this connecting belt and so is driven from it.

The hopper is 18 in. diameter at the top and slopes to 6 in. diameter at the bottom. The feeder shaft passes through the bottom of the hopper and is pro-



vided with teeth which are welded onto the shaft in eight rows. The center teeth project 2½ in. above the shaft and these slope toward the edge so as to conform to the curvature of the opening at the bottom of the hopper.

In order to prevent coins and tickets from becoming lodged at the sides of the belt, wooden blocks overlap the belt for a space of ¼ in. on each side. There are also two cross wires provided a short distance from the bottom of a hopper, which, passing across the upper feeding belt, prevent coins from rolling and insure that they lie flat on the upper belt. Otherwise, it was found that the rolling coins might continue to roll along the lower belt and so pass out of the opening intended only for the tickets. To enable the operator to see what is happening inside and also for convenience of cleaning the machine, glass slides are fitted to the top of the machine through which the coins pass.

In operation, the coins and tickets as they are fed from the hoppers are deposited on the top belt, which is 13 in. from the center of the hopper to the extreme end. The blast of air from the blower passes between the surfaces of the two belts and the tickets are blown out as they drop from the top to the lower belt, while the coins drop down to the lower belt, the top of which is 6 in. below the upper one. This lower belt passes over pulleys which have centers 27 in. apart, and its top travels in the reverse direction from that of the shorter belt. Coins as they drop from the upper to the lower belt are thus conducted back to the starting end of the machine and pass out an opening and fall into a basket underneath placed to receive the coins. The tickets, on the other hand, are blown out at an opening the opposite end of the machine and pass into a similar basket arranged underneath the opening at that end. The upper belt is made of canvas, since it is take-up bearing is provided at the far end of the lower belt to make certain this is kept tight should stretching of short length, while the lower belt is of leather. A occur. Standard Ford generator ball bearings are used throughout for all rotating parts.

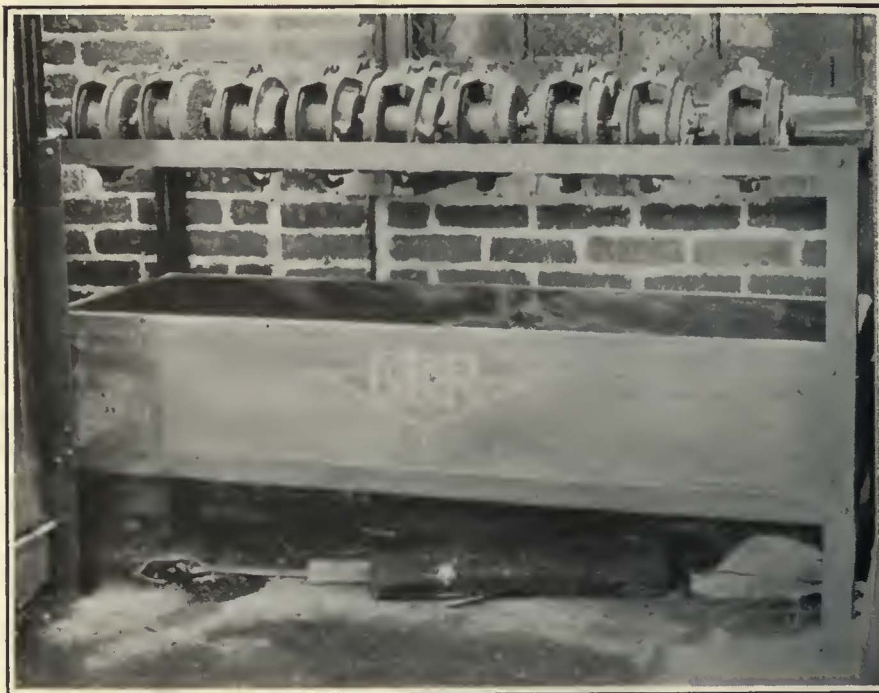
Maintenance Notes

Convenient Rack for Trolley Catchers

ORDERLY arrangement for the storage of trolley catchers being desirable, the Grand Rapids Railway, Grand Rapids, Mich., has provided each of its operating carhouses with

of the car. In order to provide additional bolster guide surface and to damp out the rocking tendency of truck bolsters, P. J. Wood, superintendent of equipment, Erie Railways, Erie, Pa., is adding two angle plates to the truck transom with two corresponding angle plates on the truck

wearing plates coming together from the truck transom and bolster. The accompanying illustration shows the installation of these additional bolster guides on a Baldwin No. 77-18 K truck. Their use has produced a great improvement in the riding qualities of the truck and also prevents the tendency of other truck bolts to work loose.



Racks Are Provided at Each of the Carhouses of the Grand Rapids Railway for Storage of Trolley Catchers

a rack to hold the trolley catchers when they are not in service. This rack is made of 2 x 2 x 1/2-in. steel angles. It has provision at the top for holding trolley catchers which are O. K. for service. A bin is installed at the bottom, in which bad order catchers are placed. These are removed from the cars and sent to the shop for repairs daily, being replaced by catchers in good condition.

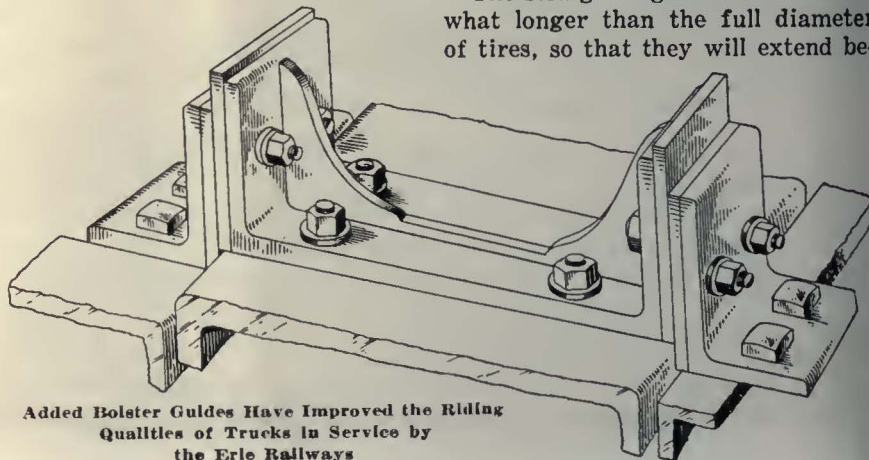
Added Bolster Guides Improve Car Riding

WHEN a car stops there is a tendency for the truck bolster to tip forward. Likewise, when the car starts, due to the acceleration of the motors, the tendency is for the bolster to tip backward. Bolster guides are therefore subjected to a considerable strain which causes wear at each stopping and starting

bolster at each side of the truck. These extend upward for a distance of 6 in. and are 8 in. wide. Hardened steel wearing plates are bolted to the faces of each of these angle supports and a clearance of 0.020 in. is allowed between the faces of the

The principle used is that of the parallel ruler, which depends on the theorem that opposite sides of a parallelogram are always parallel. The gage consists of two thin hardwood straight edges connected at equidistant points with two links of equal length. If this device is accurately made the outer edges when parallel in any one position will be parallel in any other.

The straight edges are made somewhat longer than the full diameter of tires, so that they will extend be-



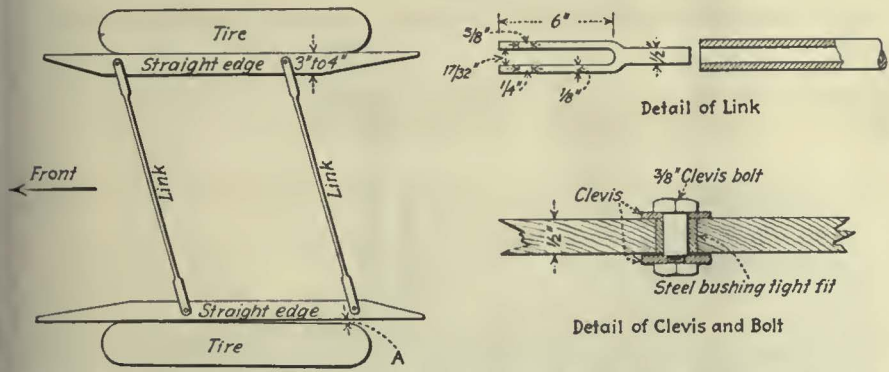
Added Bolster Guides Have Improved the Riding Qualities of Trucks in Service by the Erie Railways

Gage Checks Alignment of Bus Wheels

By F. J. FOOTE

Superintendent Motive Power and Equipment
Columbus-Dayton Transportation
Company, Springfield, Ohio

SAFETY and economy are never best served by tires that are improperly aligned. This is so by reason of the facts that difficult steering, an enemy to safety, and rapid tire wear, an enemy to economy, are caused by wheels that have too little or too much "toe-in." After trying many methods for determining wheel alignment, a gage was finally evolved in our shops that has proved satisfactory because of the accuracy and speed with which it can be used on certain models where ordinary gages cannot be used.



Wheel-Aligning Gage. Necessary "Toe-In" Is Indicated at A in Assembly Diagram. Link Is Composed of Two Clevises and Section of Pipe Riveted and Welded Together

yond the tires both ways. To use this gage one straight edge is held firmly against one tire as high up from the floor as possible (or against the rim if same projects beyond the tire), then the other straight edge is carefully moved out against the opposite tire (or rim). Unless the tires happen to be parallel this edge will touch the tire at one point only, while the other end of the straight edge will stand away from the tire a certain amount. As this measurement must necessarily be made at points below the wheel center, the amount that the straight edge stands away from the tire will be less than the amount of the toe-in. This is so because of the camber or "dish" of the wheels.

It has been found that the best method is to determine with as much

accuracy as possible just what toe-in gives the best results, then select a bus whose wheels have the exact toe-in required, apply the parallel gage to the wheels, noting down the amount that the straight edge stands away from the tire at one side. This need be done only once, as the setting will then be the same for all time unless it is desired to change the size of tires or the toe-in.

After this gage is used a few times the mechanics will be able to judge the required opening between straight edge and tire by eye with sufficient accuracy so that a scale or other measuring device is unnecessary. In practical use it is always advisable to apply the gage in at least two or preferably three places around the tires, taking as the proper "toe-in" an average of the readings

obtained to compensate for wheels or tires that do not run true.

This should be done with the full weight of the bus on the tires, and it is preferable to move the bus forward a short distance before each measurement in order to take the slack out of tie rod joints and other parts. Any good mechanic can build the gage, but great care should be exercised to get the bolt holes in the straight edges the same distance apart and the same distance from the working edges, also to get the bolt holes in the links the same distance apart. The bolts should be lathe turned with a very close fit in both links and straight edges so that there will be no lost motion.

As a final check for accuracy one straight edge should be placed on a level floor, the links held stationary in a nearly vertical position and the straight edges carefully checked for parallelism.

Drill Press Convenient for Truck Overhauling

DRILLING and grinding of various truck parts have been facilitated by a modern high-speed drill press and an emery wheel which have been installed in the truck overhauling shop of the Department of Street Railways, Detroit, Mich. This has been found of particular benefit



Drilling a Truck Hanger in the Overhauling Shops of the Department of Street Railways, Detroit

in saving workman's time, as otherwise the parts would need to be taken to the machine shop. Often the workman can finish the job completely in much less time than would be needed to have the parts carried to and returned from the machines in the machine shop.

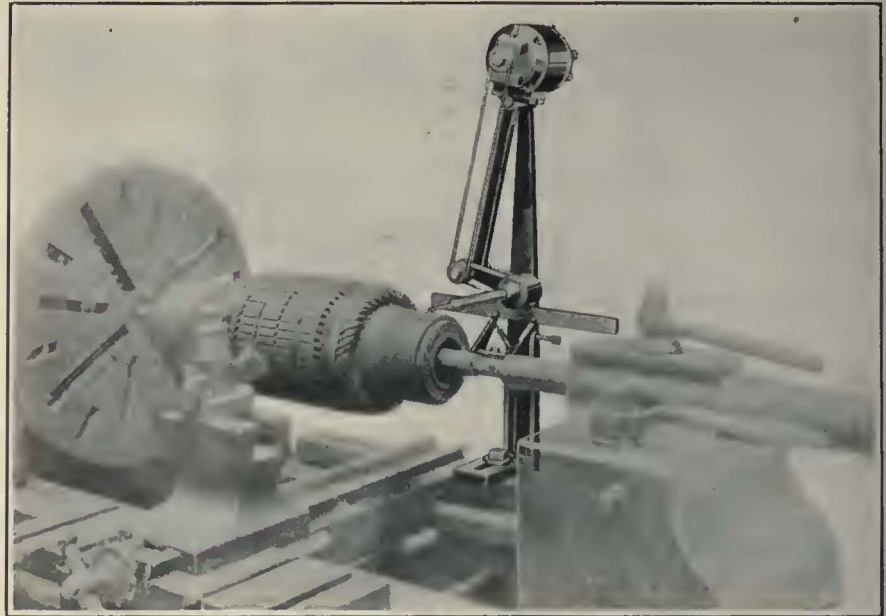
New Equipment Available

Commutator Slotting Attachment for Any Lathe

ONE of several types of commutator slotting devices recently put on the market by the Hullhorst Micro Tool Company, Toledo, Ohio, is a lathe type of particular interest to electric railway men. This is designed for attachment on any make of large lathe, and its simplicity of operation enables work of undercutting commutator mica to be done speedily and with ease. This particular type of machine, known as No. 9, is mounted on the lathe by attaching the slotted angle plate at the bottom to the lathe carriage. The main upright, which supports the mechanism, is held to this angle plate by two cap screws. Rough adjustment up and down to suit varying diameters of commutators is obtained by sliding the upright with the cap screws loosened.

For accurate adjustment of the depth to which slotting is to be done, a depth bar gage fits to the upright. The lower arm of the undercutter slides on this depth gage, which serves as a rest to insure accurate work. The slotting saw or cutter is driven by a small motor through belting. Motors are furnished for operation on either a.c., 60-cycle, 110-volt circuits or for d.c., 110-volt circuits. The motor is pivoted at the top of one swinging arm, and a pulley on the armature shaft provides for belting to a countershaft and from this to a pulley on the cutter spindle.

The cutter spindle is built into the lower arm of the machine. It has a tapering arbor $\frac{1}{8}$ in. diameter at the cutter end. The spindle and arbor are made of crucible steel lapped into bronze bearings. The disk mica cutter is placed on a screw at the end of the arbor. It is a mill-cut precision made cutter, which mills



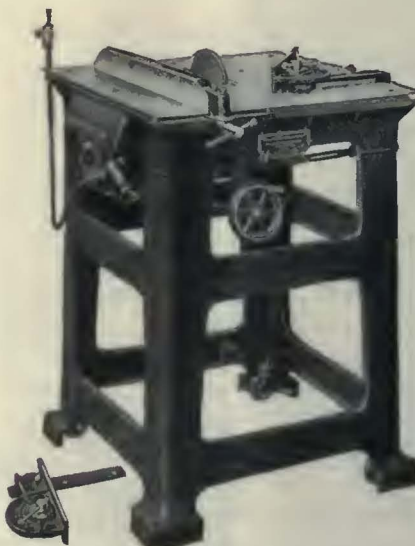
Slotting an Armature by Means of the Undercutting Machine Attached to a Lathe Carriage

out a clean smooth groove of uniform depth.

In operation, the workman sets the cutter over the mica at the back end of the commutator and then pulls the handle toward him. Very little pressure is needed for cutting. When not in use, the swinging arms can be pushed up and the construction is such that they remain in the upward position out of the way, so that the lathe can be used for other work.

Portable Circular Saw

OF A size and character suitable for use in electric railway maintenance shops is a portable floor type circular saw for woodworking which has been developed by J. D. Wallace & Company, Chicago, Ill. It may be



New Circular Saw Suitable for Railway Use

expected to relieve larger machines of considerable work so that both types can be operated to full capacity on the work for which they are best adapted.

The motor and all working parts are built into the upper portion with the table and fences. Thus the top part is a complete self-contained bench type saw when lifted off the regular stand. A constant-speed air-cooled motor is directly geared to the saw spindle, thus eliminating all belts and their attendant troubles. The electric motor operates on either the lighting or the power circuit. It is started and stopped by means of a toggle switch located on the motor itself.

A table of one-piece finished steel 25 in. x 25 in. and fitted with a removable throat piece is provided, so that special saws, dado and cope heads requiring a wider throat opening may be used. The machine is designed to handle the smallest and most delicate work with absolute accuracy and yet is sufficiently rugged to cut efficiently stock $2\frac{1}{2}$ in. in thickness.

To cut various angles the saw is tilted instead of the table and it is possible to cut at any angle up to 45 deg. with either ripping or cross-cutting saws by this tipping of the blade. Two cross-cut fences are provided so that right or left hand mitring up to 50 deg. can be done, the angle being indicated on a degree plate located on each fence. Provision is made for taking up any play, thus assuring accuracy. Both fences can be removed when not in use.

Association News & Discussions

Control of Inventories*

By W. F. MAHER

Storekeeper United Electric Railways

FUNDAMENTAL principles of store-keeping require the keeping of records in two forms, namely, the control account and the unit record. The control account, known as general stores, material and supplies or some such term, simply reflects the aggregated valuation of material on hand at the closing of each accounting period. The unit, or individual card record, shows the quantity and value of each item, constituting the basis of perpetual inventory. While both the control account and individual record are essential, they do not provide a means of quick analysis when there is a substantial fluctuation of the inventory, an increase in inventory always being disturbing from a storekeeping standpoint unless there is a known reason for such increase.

To determine the cause of fluctuations and to maintain a better control of the inventory on account of the vast sum of money represented, it is necessary to equip the stores system of accounting with controllers, slack adjusters, shock absorbers and other protective devices as follows:

1. An annual physical inventory is taken.
2. A card is kept in each bin or location showing receipts, delivery and current balance.
3. A stock record card is kept showing on one side complete data embracing requisition number and date, order number and date, quantity ordered, received and billed, amount of invoice, unit cost and firm from which purchase was made, monthly disbursement and annual inventory. The reverse side provides for disbursement showing date of issues, department furnished, quantity and perpetual balance.
4. A maximum and minimum quantity is established, where practicable, which provides for unit control.
5. An actual count, where practicable, is made at each turnover before new stock is stored, at which time bin cards and stock records are checked and adjusted. With this method several physical inventories are obtained during the year.
6. A subdivision of stores by means of a logical grouping of material by classes.

When we arranged our classification of material we endeavored, where possible, to group in a class by itself material that in the ordinary course of events would be used by one department and chargeable to one operating account. This reasoning, of course, could not be applied to all material, as items such as bolts, nuts, screws, washers, etc., are used by all departments and chargeable to sundry operating accounts, so to cover these mis-

cellaneous items a general division was incorporated. The classification consists of 42 classes divided into the following major divisions: (1) track; (2) line; (3) structures; (4) equipment; (5) power; (6) general; (7) scrap; (8) containers.

Receipts and disbursements are posted to the various classes: classes are balanced, and a stock report forwarded to the vice-president each month showing a summary of activities in each class for the month. A fluctuation in the inventory can be readily ascertained by an analysis of the various classes, and if fluctuation is due to seasonal requirements it will be evidenced in the classes affected.

The reduction of the inventory, of course, is to a large extent dependent upon the control we have of the inventory, one being very closely related to the other. In order to facilitate the reduction of our inventory by reducing our obsolete and slow moving stock, we have set up another classification which is used when the annual physical inventory is taken and material inventoried under the following captions:

Class A—New material; Class B—New material, obsolete; Class C—New material, inactive; Class D—Partly worn material; Class E—Scrap. In this manner we gather under one head all new, but obsolete material. Under another, our inactive or slow moving items. We endeavor by letter to heads of departments and by personal interview to ascertain if this material cannot be used or substituted for material which would otherwise have to be purchased and representing an additional investment. If we find that there is no place on our property where this material can be used, a report is sent to the vice-president setting forth the name of the material and book valuation and he in turn refers the matter to the purchasing agent, who endeavors to find an outside market for such material. If there is no market for this material it is then scrapped, metals salvaged and sold under the competitive bid system.

Quantity Buying for Small Railways*

By A. B. FULLER

Purchasing Agent Union Street Railway, New Bedford, Mass.

QUANTITY or seasonal buying is undoubtedly practical on large properties where the turnover is rapid and large quantities of material are used, but in the case of small companies the financial saving is offset by two factors which must be considered, namely, depreciation of material and too long a tie-up of money. In general, small roads would do better to follow the hand-to-mouth policy.

The buyer is frequently offered opportunities to order supplies which will be delivered at hand-to-mouth intervals and invoiced accordingly and still take advantage of quantity prices. However, unless he is buying on a very large scale, the saving is insufficient to counteract the cost of the clerical work involved in taking care of the several contracts.

With stock now being carried almost at our door by the large supply houses and manufacturers, who are constantly striving to give better service, it seems no longer necessary to anticipate our standard material requirements two or three months in advance. The burden of carrying large stocks has been assumed by them and has made possible a great saving in interest on money which would otherwise be invested in supplies. For instance, we no longer find it necessary to buy our entire winter's supply of armature coils in the fall.

It is the policy of our company to take advantage of all discounts, both in buying and discounting of bills. The

*Abstract of a paper presented at a meeting of the New England Street Railway Club, Boston, Mass., May 6, 1926.

COMING MEETINGS

OF

Electric Railway and Allied Associations

June 2-4—Canadian Electric Railway Association, annual convention, Quebec, Canada.

June 9-16—American Railway Association, Mechanical Division, annual convention, Atlantic City, N. J. Car matters, June 9-11; locomotive matters, June 14-16.

June 10-11—Advisory Council conference electric railway executives, Eastern region, starting 3 p.m. June 10, Engineering Societies Building, 29 West 39th Street, New York City.

June 21-25—American Society for Testing Materials, annual meeting, Haddon Hall, Atlantic City, N. J.

June 25-26—New York Electric Railway Association, annual meeting, Hotel Champlain, Bluff Point, N. Y.

June 28-July 2—Central Electric Railway Association, summer meeting, S. S. South American, Buffalo, N. Y., to Chicago, Ill.

July 8-10—Midwest Electric Railway Association, annual convention, Brown Palace Hotel, Denver, Colo.

August 12-13—Wisconsin Public Utility Association, Railway Section, La Crosse, Wis.

Oct. 4-8—American Electric Railway Association, annual convention and exhibits, Public Auditorium, Cleveland, Ohio.

only disadvantage in this practice is that goods are very frequently paid for before they have been delivered, and if they are not satisfactory it is harder to adjust the matter than if the invoices had not been paid prior to the arrival of the goods.

Quotations are requested by us on purchases involving large amounts. No definite policy is followed in awarding contracts, but they are usually awarded in accordance with the best judgment of the purchasing agent, quality usually being of the greatest importance.

It seems to me that in the case of small roads, having no adequate testing facilities or no means of getting our specifications, it is much better to rely upon the manufacturer, who, it is safe to assume, knows more about the article he is producing than the buyer, whose only guide must be the manner in which the material fills his requirements.

We have found that, with our limited facilities and comparatively small requirements, goods can be purchased more cheaply than we can manufacture them. We confine our efforts in this direction to reclamation work and some small amount of manufacturing which is done in spare time.

	Material on Hand	Gross Earnings	Per Cent Ratio
1920.....	\$83,998.68	\$1,724,902.98	4.8
1921.....	69,907.41	1,600,018.55	4.3
1922.....	52,491.40	1,606,395.66	4.2
1923.....	57,730.46	1,634,286.60	3.5
1924.....	46,355.91	1,458,888.05	3.1
1925.....	46,071.10	1,422,630.71	3.2

We are fortunate in having our stock practically all under one roof and under the constant supervision of only two men. This has a tendency to keep the amount of supplies down to the minimum requirement, which eliminates the waste and unnecessary accumulation which is likely to occur on large properties, where the supplies are distributed over a large territory and they must be handled by a large number of men.

During the last six years we have reduced the amount of money invested in supplies about 40 per cent by means of these practices. An additional reduction has also been effected by immediately disposing of any obsolete material discovered in stock instead of carrying it from year to year, thinking we may use it some day, or depending upon inventory to bring it to light. In the rush of stock taking it is very likely to be overlooked.

The accompanying table shows the comparative ratio of supplies on hand to gross earnings of the Union Street Railway for a period of six years.

Central Electric Railway Master Mechanics Meet

FIFTY-ONE delegates attended the quarterly meeting of the Central Electric Railway Master Mechanics' Association which was held in Decatur, Ill., on May 13. E. B. Gunn, Wapakoneta, Ohio, superintendent of equipment for the Western Ohio Railway, presided in the absence of Pierre V. C. See, who was kept away from the meeting by strike conditions in Akron, Ohio.

J. D. Barnhart, superintendent of shops, Illinois Traction System, Decatur, entertained the delegates at a luncheon at the Hotel Orlando, and later the guests made a trip in the new buses of the Illinois Power & Light Corporation through the territory. The ride was arranged by courtesy of M. L. Harry, general manager of the corporation for the Decatur territory.

Interesting talks were made by J. S. Y. Frelich, district manager of the Westinghouse Traction Brake Company, on "Maintenance and Safety Features of Air Brakes," and by J. D. Barnhart, who opened a round-table discussion on public safety methods. The discussion on this latter subject brought out opinions that the electric railways are rapidly recovering from the temporary slump and are successfully combating the effect of the introduction of the automobile into the transportation field. E. J. Hoefler, technical representative of the Sherwin-Williams Paint Company, Cleveland, Ohio, discussed paints and lacquer systems.

The various representations from the different states were: Illinois, 24; Ohio, 13; Indiana, 10; Missouri, 2; Pennsylvania, 1, and Michigan, 1.

Standard Track Bolts and Nuts Proposed

PREPARATION of tentative standards for track bolts and nuts have recently been completed by sub-committee No. 4 of the sectional committee on standardization of bolts, nuts and rivet proportions of the American Engineering Standards Committee. These tentative standards are now being submitted to the sectional committee for discussion and approval, after which they will be sent to the sponsor bodies for their approval. The prepared standards are thus only in tentative form and are open for discussion and criticism by electric railways. Those interested in the new standard can obtain copies by addressing C. B. Le Page, assistant secretary American Society of Mechanical Engineers, 29 West 39th Street, New York, N. Y.

The sectional committee which is dealing with the standardization of bolts, nuts and rivet proportions consists of 49 men, representing twenty national organizations, among which is the American Electric Railway Engineering Association. The committee was organized in March, 1922, by the Society of Automotive Engineers and the American Society of Mechanical Engineers acting as joint sponsors, under the procedure of the American Engineering Standards Committee. Sub-committee No. 4, which has compiled the standard, includes representatives from the largest steam railroads in the United States, electric railways and the leading manufacturers of track bolts and nuts. Clarence W. Squier, associate editor ELECTRIC RAILWAY JOURNAL, represented the American Electric Railway Engineering Association and served as chairman of the sub-committee.

Two types of track bolts are submitted. These differ only in the shape of the neck, one neck being oval, while the other is elliptic. Nominal diameters over threads have been standard-

ized so as to increase in steps of $\frac{1}{8}$ in. from $\frac{1}{2}$ to $1\frac{1}{4}$ in. A large majority of the railways and railroads now use the oval neck type, but a few of the larger systems have gone to the elliptic neck as it offers certain advantages in preventing turning of the bolts. Where a change from present types of bolts used by electric railways is necessary in order to comply with the new standard, it is considered advantageous to use the elliptic neck bolts.

The proposed standards for track bolt nuts include three types, square, hexagonal and the Ideal recessed. Dimensions are also standardized for common and treated nuts. The track bolts and nuts have either the American National Standard form or Harvey grip threads. They may be formed by cutting, drawing or rolling.

Buses Will Conserve Rail Investment, Says Reeves

DECLARING that the steam railroads and electric railways had always arisen to the occasion in providing transportation service demanded by the public, Alfred Reeves, general manager National Automobile Chamber of Commerce, in an address before the New York Electrical League luncheon, held at the Hotel Astor, April 29, gave it as his opinion that the transportation interests would take up bus operation with increasing enthusiasm.

"It is true," he said, "that the electric railways were far too late entering the bus field, just as some of the railroads have been slow in entering the truck field. However, I think we ought to consider that it is hard to get men to take up hurriedly any new form of transportation. I have the feeling that mass transportation in the big cities will be moved by trolleys and subways, but that those trolleys and subways can supplement their service by buses, and that in many cases it will be cheaper to install buses in new territories and in some places have them replace some of the non-paying trolley lines."

Mr. Reeves declared that while he had a profound respect for any statement made by L. F. Loree, president of the Delaware & Hudson Railroad, he could not wholly agree with the statement made by Mr. Loree in his address to the St. Louis Chamber of Commerce recently, when he expressed the opinion that the country could wipe off the books the \$6,000,000,000 invested in electric street and interurban railroads because the automobile bus and truck had placed them in the discard as effectively as steam railroads had killed the stagecoach during the last century. "Studies carried on by the National Automobile Chamber of Commerce," he said, "have brought no such conclusion."

"Unfortunately," Mr. Reeves declared, "too many of the trolley and railroad men have adopted buses and trucks in self-defense, rather than with enthusiasm. Many even now would apparently be glad to see this development cut off by drastic legislation. To many of them this form of transportation is a step-child and they are more interested in its death than in its development. Not all trolley or railway men have taken this attitude, however. We are, of course,

in favor of proper regulation of buses and trucks. We advocate limited weights and limited sizes, but naturally we oppose, as any would oppose who are interested in transportation, the passing of legislation that would have to throttle rather than encourage such form of service to the public. Public opinion, which is the final arbiter after all, will demand buses and trucks."

Co-operative Colleges to Convene in Cincinnati

COLLEGES and universities giving co-operative instruction in engineering, commerce, architecture and other subjects have formed an association to further this form of education. The association will hold its first annual meeting at the University of Cincinnati on June 14-15. It was here the co-operative system was originated by Dean Herman Schneider twenty years ago.

Under the co-operative plan the students spend alternate periods at the university and at work in industry. While one student is in school his alternate is receiving practical training in some factory or office, and vice versa. In this way both the school and the shop are always fully manned. The theory learned in the classroom is thus applied in industry, and the problems which arise in industry are brought to the classroom.

Practically all types of manufacturing and construction enterprises have been used successfully in the training of co-operative students during their outside work period. Transportation and commercial organizations have

proved equally useful for the same purpose, and, more recently, co-operative relations have been established between the colleges and those industries in which art is a factor, such as jewelry, ceramic and textile works.

The students profit by an opportunity to study technical problems at first hand and by access to the best modern equipment. The firms have the benefit of the enthusiasm and the analytical point of view brought into their organizations by student employees who are frequently able to contribute more than the satisfactory completion of the day's work.

International Conference at Barcelona, Oct. 10-16

DATES for the next convention of the Union Internationale de Tramways de Chemins de fer d'Intérêt Local et de Transports Publics Automobiles have been definitely fixed for Oct. 10-16, 1926. It will be held in Barcelona, Spain.

The program of the convention was published in *ELECTRIC RAILWAY JOURNAL*, Jan. 23, 1926, page 161.

Internationaler Verein Selects Copenhagen for 1927

COPENHAGEN will have the next convention of the Internationaler Strassenbahn und Kleinbahnverein, to be held in June, 1927. An invitation to meet in Copenhagen has been received from the authorities of that city and has been accepted. The last meeting of the association was in Budapest in 1925.

mately 40 street car exhibits were reported. Plans are being made to intensively circulate the industry for the purpose of stimulating car exhibits during the convention. The matter of throwing the exhibition open to the public on one night during convention week was left in the hands of the Cleveland convention committee, together with the question of charging an admission fee for such public attendance. Tentative arrangements have been made with the Cleveland Orchestra to have it available for Tuesday night during the Advisory Council meeting if that plan fits in with the general convention program.

Friday afternoon and Saturday morning were designated by the executive committee as the proper time for visiting manufacturing plants in and around Cleveland. This plan was adopted in order to avoid having such inspection trips interfere with the program of the convention.

M. B. Lambert, Mr. Storrs and President Coates reported on the recent meeting of the U. S. Chamber of Commerce at Washington. Mr. Lambert pointed out that the Chamber of Commerce is becoming a leading spirit in guiding the destinies of American industry, and emphasized the importance of the chamber's work. He urged that railway executives become active in the chambers of commerce in their respective cities.

On the subject of national relations, C. L. Henry said that electric railways have been definitely exempted from the provisions of the railroad labor bill. He also said that according to the latest information available there has been no general hearing called on the question of the application of section 15a to electric railways, although a specific hearing in the case of the Interstate Public Service Company of Indiana has been set for May 25.

TO DESIGN ASSOCIATION FLAG

T. W. Casey, C. C. Peirce and H. C. Clark were designated as members of a special committee appointed to design an association flag. C. R. Ellicott was authorized to arrange for a special association booth in the convention hall for the sale of canes with an appropriate A.E.R.A. ribbon attached. A special donation of \$1,000 to the American Engineering Standards Committee was approved. This is in addition to the regular dues, amounting to \$1,000 annually, paid by the association.

An outline of the progress of work in the Engineering Association was given by C. R. Harte, president. This included work by the purchasing agents and storekeepers on the establishment of an obsolete material exchange. He secured authorization for the committee to send out a special questionnaire to obtain the sentiment of the industry regarding the establishment of such an exchange. Mr. Harte expressed the belief that the new procedure of approving standards by letter ballot would help to eliminate the tendency toward perfunctory approval and subsequent failure on the part of member companies to adhere to standards adopted. He emphasized the importance of the co-operative work done through the American Engineering Standards Committee.

The committee approved general let-

American Association News

American Executive Committee Meeting

Progress Reported on Convention Plans—Large Street Car Exhibit Expected—Special Car Report Completed—Second Advisory Council Conference Announced

PROGRESS in the work of various committees was reported to the executive committee of the American Association at a meeting held at association headquarters on May 14. Publicity activity, national relations, plans for the coming Cleveland convention and the work of affiliated associations occupied attention during a busy morning session.

Under the heading of publicity, J. W. Welsh, executive secretary of the association, who outlined the work of the committee, reported that 70,000 booklets covering the Indiana and New York bus situation had been distributed throughout the country. In addition, more than 25,000 booklets containing the "daily dozen" recommended by Mr. Storrs and the address of Britton I. Budd delivered at the Indianapolis meeting of the Central Electric Railway Association have been distributed.

Increase in company membership from 736 to 741 was reported by J. H. Hanna, chairman of the membership committee. There also was an increase in individual membership from 1,022 to

1,060. This, according to report, represents a total increase of 204 individual members since last October. C. E. Morgan called attention to the reorganization of the Public Service Railway company section, which recently held a meeting at which approximately 200 were present.

PLANS FOR CLEVELAND CONVENTION

Progress on plans for the Cleveland convention was outlined by J. H. Alexander and F. C. J. Dell. At a meeting held in Cleveland a sub-committee of the exhibit committee approved a space diagram for the exhibit, which is being prepared for printing and distribution to the industry. The Cleveland convention committee held its first meeting recently and approved a form of contract with the association with some slight modifications. A special sub-committee consisting of C. E. Morgan, B. A. Hegeman, Jr., and C. R. Ellicott was appointed by President Coates with power to act on the contract before the next executive committee meeting. Tentative commitments for approxi-

ters to be sent out by the association giving the conditions of a speed contest and public relations contest under the auspices of *Electric Traction* and *Forbes Magazine*, respectively.

J. H. Hanna reported the consummation of arrangements with L. R. Nash to take over the work on depreciation formerly handled by Mr. Maltbie. E. F. Wickwire, speaking on the program of the committee on co-operation with manufacturers, said that the committee had decided to make its principal work for the present that of furthering interest in traffic congestion relief. Arrangements have been made to print the address of President Coates at the United States Chamber of Commerce meeting for distribution to all manufacturing members of the association.

Edward Dana, chairman of the committee on education, said that his committee is co-operating with the committee on management and operation. Arrangements are being made to hold a typical foreman conference during the Cleveland convention. Two men from each of seven widely distributed companies will take part.

REPORT ON IMPROVING CARS COMPLETED

For the committee on management and operation, G. C. Hecker of the association staff reported general activity and announced that approximately 900 copies of the book on modern methods and practices had been sold. Mr. Hecker also reported completion of its report by the special manufacturers' engineering committee which has been studying the question of improving car design and reducing the number of types of cars which are required by the industry. This report was turned over to Mr. Storrs pending appointment of a committee of manufacturers' executives to take charge of various phases of a general campaign looking to the improvement of electric railway rolling stock. In a brief abstract of its work the committee indicated that it had made a study of various recent car types submitted by manufacturers, and had reached the conclusion that the large variety of designs required in the past has prevented manufacturing economies from being accomplished. It was the opinion of the committee that agreement on the basic features of design would permit approach by manufacturers to a quantity production basis through elimination of needless variations in dimensions, weight and general arrangement.

As a basis for agreement on fundamental features the committee submitted plans of a city and an interurban car. These are intended to show that cars of the general types indicated may be adapted to meet conditions on various properties. Either car may be arranged for one-man, two-man or combination one-man two-man operation. The designs are also adaptable for single or double-end service and for various seating capacities. It was the intention of the committee to provide for increased size by lengthening the body in window sections. Only three standard sized motors, namely, 25, 35 and 40 hp., are considered necessary under average conditions. Twenty-six-

inch diameter wheels were recommended.

It was pointed out that the designs submitted may be equipped with any known specialty or safety devices and that in adhering to the recommendations, manufacturers are in no way limited in developing a distinctive product; that ingenuity may be fully exercised in the design of structural details to reduce weight and that features to add comfort and attractiveness to passengers are optional with the individual builders. The committee recommended prompt publication and distribution of the report. It also urged that a referendum of the industry on the proposed cars be made to give a definite idea of the extent to which the recommendations may be made effective on various properties.

MODERN CARS EARN 13 TO 65 PER CENT

Part 2 of the report contains experience data on eight properties where modern light-weight cars have been installed. Returns on the investment based on savings in equipment maintenance, power and platform labor range from 13 to 65 per cent. Some properties also showed a gratifying gain in gross revenue, indicating that attractive new cars are important factors in stimulating traffic. A bibliography of articles appearing in the technical press on advantages of new cars is included in the report. In Part III interesting data concerning the purchase of cars since 1907 and a summarized statement of the age of equipment in service by five-year periods as compiled by *ELECTRIC RAILWAY JOURNAL* is presented. From an analysis of these figures the committee concludes that there are 25,000 cars in the industry that are more than twenty years old.

A nominating committee for the officers of the association and five directors—two railway and three manufacturers—was named by President Coates and approved by the executive committee pending acceptance. A resolution on the death of Randall Morgan prepared by a special committee, of which Mr. Shannahan was chairman, was read by Mr. Welsh.

REGIONAL CONFERENCE ANNOUNCED

Mr. Storrs announced a regional conference under the auspices of the Advisory Council for the Eastern territory, similar to that held in Chicago. This meeting will be at the Engineering Societies Building in New York City on June 10 and 11.

An invitation from Barron Collier to hold the next executive committee meeting on board his yacht on the Hudson was accepted. The yacht will leave the dock at 79th Street and the Hudson River promptly at 10 a.m. daylight saving time on July 30.

Those present at the meeting were as follows: F. R. Coates, R. P. Stevens, Barron Collier, L. S. Storrs, C. R. Harte, J. H. Hanna, H. B. Flowers, E. F. Wickwire, W. S. Hammond representing C. S. Hawley, C. E. Morgan, E. P. Waller, B. A. Hegeman, Jr., T. A. Kenney, M. B. Lambert, S. J. Cotsworth, C. R. Ellicott, J. W. Welsh, C. L. Henry, Edward Dana, F. W. Doolittle, G. C. Hecker, L. H. Palmer and J. H. Alexander.

Advisory Council to Hold New York Meeting

FOLLOWING a meeting of the Advisory Council of the American Electric Railway Association on the morning of Thursday, June 10, a general regional conference of executives will be held. This will be similar to the one held in Chicago last February for those in the central region. Invitations are being sent out to executives of electric railways in the eastern part of the country. The conference will convene at 3 p.m. on Thursday and will continue through Friday.

Matters of great importance to the industry as a whole and to each of the individual companies will be discussed by those actively engaged in directing the affairs of these companies.

A.E.R.A. Elects Members

NINE applicants for company and associate membership and 46 for individual membership were elected at the meeting of the executive committee of the American Electric Railway Association held on May 14. Following are the new company and associate members:

OPERATING

Anglo Argentine Tramways Company, Ltd., Buenos Aires, Argentina.

ASSOCIATE

Ross W. Harris, consulting engineer, Madison, Wis.

MANUFACTURER

American Malleable Castings Association, Cleveland, Ohio.

Baltimore Copper Smelting & Rolling Company, Baltimore, Md.

DeVilbiss Company, Toledo, Ohio.

R. Roy Holden, Chicago, Ill.

Larkin Company, Inc., Buffalo, N. Y.

Martindale Electric Company, Cleveland, Ohio.

Railway Materials Corporation, Toledo, Ohio.

Bus Operation

ELIMINATION of a number of subjects from the list which the committee on bus operation will present in its final report marked a meeting held at association headquarters, New York, on May 20. Customer ownership of stock in bus companies and methods of buying tires were among the subjects dropped.

Advantages of establishing differential rates for chartered bus service, depending on the need for the equipment in regular service at that time, were outlined. Types of equipment with reference to their suitability for various classes of service were discussed. Gas-electrics received particular consideration. Possibilities of carrying packages, trunks, mail, etc., by bus were commented upon.

Determination of fares and the problem of non-paying lines were discussed at considerable length. The advantages of having the bus operating company carry its own insurance were brought out.

Members present were J. B. Stewart, Jr., chairman; V. W. Berry, E. D. Dreyfus, Adrian Hughes, Jr., R. N. Graham, S. W. Greenland, Alexander Shapiro, C. D. Smith and R. H. Smith.

The News of the Industry

Governor Against New Haven Control Bill

Governor Fuller returned to the Massachusetts Legislature on May 13 a bill petitioning the right of the New Haven road to acquire the securities and property of the New England Investment & Security Company. In so doing the Governor has halted, at least for the time being, the plan announced recently by the New Haven company for rehabilitating the Springfield Street Railway and the Worcester Consolidated Street Railway, properties which the New Haven planned to reconstruct if acquired under the provisions of the bill.

In returning the bill the Governor authorized the statement that it seemed best for the public welfare to keep these two large street transportation systems free from railroad control. He further recommended that an amendment be added to the bill providing that all towns and cities served by these two transportation companies shall vote on the project of consolidation with the New Haven interests.

If these amendments were adopted, it was pointed out, not only the New Haven Railroad, but the cities of Springfield and Worcester as well would be at the mercy of the smallest town now served by either the Springfield or Worcester company. If the Board of Selectmen in any town, for political or other purposes, decided to force the railroad company to build an unprofitable extension, it would have the power, under the proposed amendments, to prevent the carrying out of the railroad's plan to spend more than \$1,000,000 in improving street railway transportation in Springfield and a similar amount in Worcester.

In the form in which the measure went before the Governor the bill represented the result of more than three months of study on the part of the railroad committee of the Legislature. It embodied an agreement on the part of every interest, including the stockholders and bondholders of the railroad and of each of its subsidiary companies, and also of the officials of both Springfield and Worcester.

Notwithstanding these apparently very unfavorable developments, events took a turn at the last moment that may result in saving the legislation. After the bill had been held up by Governor Fuller and returned to the State Senate with suggestions and amendments that approval of the bill be subject not only to the city councils of Springfield and Worcester but also all other municipalities sharing the service of the two trolley companies, conferences concerning this change were held and were attended by Charles H. Beckwith, City Solicitor of Springfield; Senator George J. Chamberlain, Springfield; Mayor O'Hara and Senator Nelson, Worcester;

Senator Look for the railroad committee, and George L. Barnes for the New York, New Haven & Hartford Railroad. Compromise was sought regarding the amendment. It was suggested that a majority of the other municipalities should suffice. Governor Fuller was willing to let it go if four-fifths of the cities and towns agreed. Later it was agreed by both parties that three-fourths of the municipalities served by the companies must accept the provisions before the railroad can proceed with its development plans.

It would appear now that this amendment is quite certain to pass both houses of the Legislature. It is found that the Worcester and the Springfield trolley lines serve 49 cities and towns, which means that the plan will become operative unless vetoed by thirteen of these municipalities.

Mayor Fordis C. Parker of Springfield did not favor the amendment to the bill. He let it be known that the superlative interest in the development lay with Springfield and Worcester. To him it did not seem right to make it possible for a group of small towns to hold the matter up.

Bills for Track Removal in New York Approved

A bill approved on April 16 authorizes the city of New York, with the approval of the Transit Commission, to acquire by condemnation the right to remove the street railway tracks from Central Park West and Eighth Avenue, between 59th Street and 116th Street, the cost of such removal to be divided between the city and the owners of the property benefited thereby. The removal of these tracks would cut the Eighth Avenue Railway in two, but it is expected that the large damages which would be awarded the company in the courts will discourage the city from undertaking this plan. Moreover, the difficulties of determining the extent of the benefits to be derived by adjoining realty would be great. The act is permissive only and the best informed do not believe the city will take advantage of the powers conferred by it. A somewhat similar act authorizes the city of New York to remove the street surface railway tracks from East 59th Street between westerly lines of Second and First Avenues, Manhattan.

One-Man Cars in Downtown Milwaukee

State Commission Permits Test for Six Months—Cars to Be Painted Different from Others—More Cars Recommended for Use in Regular Service

THE long-heralded order permitting the installation of one-man cars by the Milwaukee Electric Railway & Light Company, Milwaukee, Wis., on its Walnut Street line has finally been issued in favor of the company by the Wisconsin Railroad Commission. The new service will start on May 23. Instead of being permanent in character there will be a six months trial or test period, inasmuch as it will be the first one-man car line to run through the downtown section. All the other similar lines serve outlying sections.

The operation of one-man cars will result in more frequent service. The twelve cars now operated in the morning will be increased to sixteen and the sixteen now operated in the afternoon will be increased to 21. The same number of extra trains in rush periods will be provided as heretofore on this line. Because of their sole use in the downtown section the new cars will be painted a brilliant orange with a white band of cream around them in order that they may be easily distinguished from the yellow two-man cars. They will be the first city cars to be equipped with imitation gray suede seats.

The commission's order was the climax of many months of argument, in which city officials, civic organizations and patrons of the line opposed

the extension of this type of car through the downtown area.

Coupled with its one-man car order, the commission also made public the results of its extensive report covering a general survey of railway service conditions in Milwaukee. It is one of the most comprehensive reports ever issued by the commission and represents a study of service conditions throughout the city for the past several months. This report will be made the basis of another hearing. Some of the commission's recommendations for providing more dependable and frequent service throughout the city were:

That 70 or 75 additional cars be purchased and placed in service, 21 to take care of inadequacies shown in the check of service, 24 to fill in because two-car trains fail to carry the loads at which they are estimated in the specifications, fourteen to provide additional service beyond turnback points on nine or ten lines, five to allow for cars in shops for repairs and a margin of six to ten cars to allow for readjustments in schedules which the dispatcher foresees will be necessary to allow greater running time on some lines. The report further recommended the double-tracking or extension of the Mitchell, Burnham, Eighth Street and Oakland Avenue lines.

The commission found that single cars handled the crowds faster and moved more rapidly than the two-car trains.

Other recommendations made by the commission were that safety zones be lengthened to permit several cars to load, particularly where traffic is regulated by automatic signals, and that action be taken to stop the practice of automobiles parking so close to street car intersections as to interfere with the loading and unloading of passengers.

Coffin Award for Another Insull Property

The largest metropolitan electric lighting and power system in America received the 1926 Coffin award for meritorious public service when at the N.E.L.A. convention at Atlantic City during the week ended May 22, this distinction was bestowed upon the Commonwealth Edison Company, Chicago. Customer ownership, public relations, commercial activities, engineering developments and industry co-operation were some aspects of service in which the company was held to excel.

The Commonwealth Edison Company has more than 850,000 customers, a generating capacity of nearly 900,000 kva. and during 1925 produced more than 3,000,000,000 kw.-hr. of energy.

One Big Union at Winnipeg Seeks Government Aid

The one big union unit of street car men at Winnipeg, Man., has applied to the Dominion government for a board of conciliation, under the industrial disputes act, to investigate the situation which has arisen due to the actions of the Winnipeg Electric Company in refusing to negotiate an agreement with the one big union unit.

The company has signed an agreement with the Amalgamated Association, Division 99, granting an increase in pay of 1½ cents an hour to one-man car operators and an increase of 6½ cents an hour to bus operators, putting both these employees on the same wage basis.

The previous agreement of the company with its men was signed in 1922 between the company and a committee representing the motormen and conductors, but during the past twelve months the "One Big Union," which is a communistic organization, has obtained control of this committee. When the agreement expired on April 30 the company took the stand that it would not negotiate an agreement with any body of men whose affairs were controlled or whose actions were influenced by the one big union. If the men will eliminate O. B. U. influence the company will grant them the same agreement the Amalgamated has obtained.

This, in brief, was the situation on May 18. Up to May 21 there had been no further developments, but there appeared to be a possibility of the government appointing a board of conciliation during the week commencing May 24.

The company employs about 900 men on 115 miles of road.

Month's Delay in Albany Fare Case

A hearing was held by the Public Service Commission on May 14 at which the United Traction Company submitted valuation figures in the matter of its application for a 10-cent fare or thirteen tokens for \$1 as an increase over the present 7-cent fare. A delay of one month has been granted by the Public Service Commission to enable the city of Albany, N. Y., to study the figures submitted by the company. In the interval a separate hearing will be granted on the Troy situation and the commission will pass on the arguments made by Troy that the commission is powerless to grant increases in fare on the company's lines in Troy because of

a law passed by the Legislature designed to limit Troy fares to that specified in franchises granted by the city.

James B. McMartin, chief engineer of the Delaware & Hudson Railroad, who supervised the making of the United Traction Company inventory, testified that the values indicated were of Dec. 31, 1925. He gave the final value of the entire United Traction plant, the cost to reproduce it as of Dec. 31, 1925, as \$18,350,374. The cost of the company's Albany plant is estimated at \$5,035,352. Figures for some of the other communities follow: Rensselaer, \$261,188; Menands, \$231,946; Colonie, \$71,510; Watervliet, \$1,103,867; Waterford (town), \$164,978; Waterford (village), \$93,919; Cohoes, \$706,261; Green Island, \$280,885; Troy, \$3,597,404.

Municipal Men Seek Wage Change

Employees Want Scale Calling for 7 Cents an Hour More than that Now in Force—Full Statement of Demands as Presented

EMPLOYEES of the local Department of Street Railways at Detroit, Mich., have requested a conference with department officials on a proposed new wage schedule calling for a general increase of 7 cents an hour for platform employees. The new wage schedules include for the first time carhouse employees, embracing car sweepers, washers and pit repair men. The demands were presented by a committee representing Local No. 26 of the Amalgamated Association. The present wage agreement expires on June 1.

Exceptions to the flat increase of 7 cents an hour are made in the cases of the platform employees for the first six months of service, who are scheduled to receive an increase of 5 cents an hour; for the second six months, an increase of 6 cents an hour is provided, and for one-man car and motor coach operators and owl car and snowplow platform operators an increase of 5 cents an hour is proposed. The new schedules provide the following rates:

	Cents an Hour
First six months.....	70
Second six months.....	75
Thereafter.....	80
One-man car and motor coach operators.....	85
Owl car men.....	88
Overtime.....	\$1.00
Overtime for one-man car and motor coach operators.....	\$1.05
Snow plow service.....	\$1.00
Minimum platform men's wage... Instructors, 50 cents a day in addition to regular wages.	\$80.00 a month

The schedules for the new services covered by the union scale were announced as follows:

	Cents an Hour
Construction car platform men....	80
Laborer in construction yard....	62
Yardmen, carhouse men sweepers..	62
Pitmen.....	82
Pitmen's helpers, first six months..	67
Thereafter.....	72
Controller men.....	87
General repair men.....	82
Fare box men.....	\$185.00 a month
Pump men.....	\$185.00 a month
Janitors.....	62
Watchmen.....	62
Station cashiers.....	\$155.00 a month
Garage repair men.....	87
Garage helpers.....	80
Coach cleaners.....	62

The schedule committee wants a revision of schedules which would shorten the working day by the time between runs when the men are idle. Schedules are desired giving the men as nearly as possible straight working hours without split runs. It is suggested that on scheduled runs where the time is in excess of eleven hours, platform men shall be paid 25 per cent more than the regular wage for the first hour and 50 per cent more for the second and third hours. No run is to exceed fourteen hours.

TRIPPER RUNS A PROBLEM

Runs less than six hours in duration are to be considered tripper runs and are to be paid at actual platform time except that no tripper run shall be less than two hours. The number of tripper runs is limited to 5 per cent of each given schedule.

It is provided that in case any electric line is motorized, the men employed on the line shall be placed on other lines without loss of seniority rights.

Regular men whose runs terminate after midnight are not to be asked to report the next day before 10 a.m.

The regular rate for an eight-hour day is to be deducted for absence. Other provisions include a seven-day vacation with pay every year after the first six months' service, and a ten-day vacation every year for fare box men, with every second Sunday off. Station cashiers are to be allowed ten days' vacation a year with every third Sunday off.

A statement attributed to officials of the local division of the union says D.S.R. platform men are 99 per cent unionized. Car sweepers, pitmen, car washers and carhouse employees have been invited to meet a committee appointed to discuss wages and working conditions intended to apply to the platform employees.

Aside from fixing wages the agreement provides that in case of grievances and disputes platform men are to be permitted to be represented in hearings by the representative or representatives of the employees chosen by the associated employees. This term "associated employees" is used by the men to designate their union.

Richmond Franchise Adopted

Without a dissenting vote and with no material amendments which affect the future operation of the Virginia Electric & Power Company, the proposed blanket traction franchise has been adopted by the Richmond Common Council just as it came from the streets committee with the approval of that body. It is probable a special meeting of the Board of Aldermen will be called to dispose of the measure.

The franchise is acceptable to the Virginia Electric & Power Company. That company's "surrender instrument" was read and approved by the Council. The instrument recites the manner in which the company's property is to be transferred to any other company that may obtain the franchise when it is offered for sale. It is to surrender all existing franchises and is required to sell to the purchaser its property at a valuation fixed at \$9,491,084, slightly less than the amount allowed by the State Corporation Commission when that body fixed the present rate of fare.

The company, under the provisions of the franchise, is to pay upon its gross receipts as a tax, a certain sum, beginning with 5 per cent and gradually dropping annually until within ten years such tax shall amount to 3 per cent, at which figure it is to remain until the expiration of the franchise. It is also to pay for paving between its tracks and 2 ft., on each side, and agrees to turn over to the city any of its viaducts within a period of five years at no cost to the city. Permission is given the company to extend its service in several directions by the laying of new tracks and to augment its present fleet of passenger buses. The company may at some future date be required to install an underground system on Board Street, and it was provided that the city might, whenever the necessity arises, require the removal of the one-man cars.

A \$1,500,000 improvement program is planned for this city by the Virginia Electric & Power Company. Fifteen passenger buses will be added to the present fleet and fifteen new street cars, representing an outlay of \$200,000, have arrived in Richmond to augment those already in operation.

Akron Interurban Service Under Way

Interurban cars are now running between Akron and Massillon on the Northern Ohio Power & Light Company system. The first interurban car started between Canton and Massillon on May 18. Massillon officials dug up a twenty-year-old ordinance which provided that interurban men must have nine days training in the city before they could operate cars in the city. Some crews operating cars were arrested, but the company kept on operating.

The first serious strike disorders in Akron occurred on May 20, when the Northern Ohio Power & Light Company began interurban operation between Canton and Akron. Strikers smashed windows in nine Canton city cars and tried to wreck an interurban mail train near North Canton. The

company obtained a temporary injunction in the federal court of Cleveland against Patrick J. O'Brien, vice-president of the Amalgamated Local. Federal officials are also planning to take action against men involved in the attempted wreck of the mail train. Despite disturbances, the interurban cars kept fairly well on hourly schedules during the day. At night the interurbans are shut down.

The union men admit their cause is lost in Akron and Canton, but pin their hope to the Akron-Cleveland interurban. They declare that is the division upon which they hope to win. Just when the company plans to open its Akron-Cleveland line has not been fully determined. No early attempts will be made to operate cars in Massillon. The company had applied to the city before the strike for permission to abandon its city system. The company is in no hurry to operate its interurban line south of Massillon for the reason that the line has been losing money for years. Arrangements have been made with other operators for the establishment of a bus line in that territory.

Edward McMorro, who has been handling the strike situation for the Amalgamated, has been replaced by P. J. O'Brien, another vice-president.

Franchise Agreement Defeated in Omaha

Citizens of Omaha, Neb., by a vote of about 5,000 at the election held on May 13 defeated the proposed franchise agreement between the city of Omaha and the Omaha & Council Bluffs Street Railway. The ordinance covering the new agreement was passed by the City Council on March 30. It provided for neither an exclusive nor perpetual grant as to buses or street railway system or both. Right was reserved to the city to acquire the property and take over its operation.

For a number of years there has existed between the city of Omaha and the Omaha & Council Bluffs Street Railway a difference of opinion as to the duration of the company's principal franchise in Omaha. The city contended that this franchise expired in 1928, while the company was advised by its attorney that the franchise was perpetual. The city further held that the company's right to make extensions had already expired. With this uncertainty regarding the matter everything was at a standstill and would have to remain so until there was an adjudication by the courts or until the question was disposed of in some other way. After careful consideration the company decided that it would be far better, both from the standpoint of the city and from the standpoint of the company, to negotiate for a new franchise rather than to litigate the matter.

Rates Reduced on Massachusetts Line

The Atlantic Improvement Association, Atlantic, Mass., has won its fight for reduced fare rates in the Squantum-Atlantic section from the Eastern Massachusetts Street Railway.

The Improvement association, representing citizens of the town and headed

by Joseph M. Goode, Jr., objected to the 10-cent fare rate in Atlantic. The railway did issue a commutation fifteen-ride ticket for \$1, or 0.0667 cents per ride. This ticket, however, could not be used in the Atlantic-Squantum district.

The board of trustees voted to make fares on the Squantum line from the end of the line at Squantum to Atlantic depot, 10 cents cash or one punch on the Quincy fifteen for \$1 ticket. From the end of the Squantum line to Quincy Square 15 cents cash with a free transfer privilege at Atlantic Depot, or two punches on the fifteen for \$1 ticket, one punch to be made between Squantum and Atlantic Depot and another punch between Atlantic Depot and Quincy Square. The cash fare between the end of the line at Squantum and Neponset will be still 19 cents, with a free transfer at Atlantic Depot.

Suggestions by Chicago Railways to Be Received

Chicago is about ready to listen to the proposals for a franchise settlement made by Surface Lines officials and the seven committees representing the security holders. The ordinance which has been under consideration by the committee on local transportation of the City Council reflects the attitude of the city alone.

It is understood that when all the differences are ironed out, a new ordinance will be drafted and submitted to the voters next November.

The report of the Citizens' Advisory Subway Committee, which was appointed to induce downtown property owners to agree to voluntary assessments to pay the cost of a proposed subway, is expected in the next few days. Practically 80 per cent of the property owners in the Loop district, it is stated, have already signified their willingness to stand assessment for this purpose.

Assurance has been received from Major R. F. Kelker, Jr., the committee's engineer, that the technical parts of the separate ordinance for the subway lines will be completed in about four months. The question of unification of elevated, surface and subway lines will be taken up after the terms of the surface and elevated ordinances have been arranged.

Rather than accept the \$152,500,000 which was represented as the valuation of the Surface Lines in the traction ordinance defeated last year, or any other previous estimate, the committee has decided to leave the question open until officials of the company can present their position. The committee approved and inserted in the tentative ordinance, however, the present requirement that the companies set aside 8 per cent of their gross income for a depreciation and renewal fund.

Objection has been expressed in committee sessions to the suggestion that the companies be relieved from the obligation to pave and clean the part of the streets occupied by their tracks, but no definite agreement has been reached on this.

Talk of subways has been revived by the incorporation of the Chicago Tube Transit Company by W. J. Newman and associates.

New York's Governor Approves Thayer Bill

Governor Smith of New York has signed the Thayer bill as chapter 846 of the laws of 1926 amending subdivision two of section 54 of the public service commission law, in relation to the purchase and holding by a corporation, organized under and pursuant to the provisions of the transportation corporations law, of the capital stock of another corporation so organized.

The public service commission law now provides that no railroad corporation, street railroad corporation or electrical corporation, domestic or foreign, shall hereafter purchase or acquire, take or hold any part of the capital stock of any railroad corporation or street railroad corporation or other common carrier organized or existing under or by virtue of the laws of this state, unless authorized so to do by the commission empowered by this chapter to give such consent.

It further provides that no stock corporation of any description, domestic or foreign, other than a railroad corporation, or a street railroad corporation, shall purchase or acquire, take or hold more than 10 per cent of the total capital stock issued by any railroad corporation or street railroad corporation or other common carrier, organized or existing under or by virtue of the laws of New York state.

In his memorandum approving the bill Governor Smith said:

This bill proposes to include corporations which own or operate a stage, omnibus or other vehicle line or route which is now under the jurisdiction of either the Public Service Commission or the Transit Commission.

When the original public service commission law was enacted, motor-driven stages and buses were not in common use. Today they are gradually being accepted as the modern means of transportation both inside and outside of our large cities, and should, therefore, be brought under the control and regulation of the Public Service Commission.

For the above reasons the bill is approved.

Survey and Bus Extensions in Sacramento Planned

The Pacific Gas & Electric Company recently began a survey of its Sacramento, Cal., railway service for the purpose of submitting a definite plan of bus line extensions based on a 7-cent fare. This action was agreed upon between Councilmen and heads of the company. It is said that the company officials, even if they are successful in securing fares, are unwilling to consider railway extensions.

Wigginton E. Cress, president of the company, said he blamed the automobiles for the failure of the company to make the street railway business a paying venture. He said his company was losing money, but it was willing, as an experiment, to try the buses further, provided it could obtain additional revenue. He said he was not at all certain that an increase in fares would solve the problem.

The car and bus miles operated in 1925 were less than in 1920, being 3,233,015 in 1925 and 3,320,454 in 1920. The company had charts to show that revenues were \$13,000 less last year than in 1924, but gross expenses were cut about \$47,000. If the company's

plans meet with the approval of the city authorities they say they will back the company before the Railroad Commission in an attempt to secure higher fares.

Franchise in St. Louis About Ready to Be Discussed

The service-at-cost ordinance for the St. Louis Public Service Company, which will succeed the United Railways, St. Louis, Mo., when the property of the latter company is sold under foreclosure proceedings, will be presented by Mayor Victor J. Miller for public discussion within the next few weeks. A vote of the people on the grant will be brought about through the initiative provisions of the city charter.

Mayor Miller and the railway men have agreed on a plan which will give the city arbitrary authority to order extensions and to specify the character of the service so long as a fare is provided which will enable the company to pay operating expenses and earn a fair return upon the property valuation. The valuation and rate of the return will be fixed in the ordinance.

Substitution Bill Signed by Governor Smith

Governor Smith of New York on May 18 approved the Messer bill as chapter 840 of the laws of 1926 amending the public service commission law by adding a new section 50-a, authorizing the commission after a hearing to permit the substitution of buses for cars on tracks on street surface or other railroad route.

Railway-Bus Proposal for Washington Cities

The City Commission of Chehalis, Wash., has received application from Earl B. Mills, Chehalis, and W. E. Bingham, Centralia, for a franchise for a railway bus system, with gasoline-propelled cars, to be operated on designated Chehalis streets, providing a fifteen-minute round-trip service in that city. The two applicants have also filed a petition with the State Department of Public Works, asking for a franchise in Centralia and also to connect this proposed service between Chehalis and Centralia, the whole making a one-hour round-trip service. Should all franchises be secured, Messrs. Mills and Bingham plan to put four twenty-passenger buses into service, which would give a fifteen-minute service between the Twin Cities. Local fare in Chehalis and Centralia would be 5 cents, with a 15-cent fare from any point in either city to any point on the regular traveled route in the other city. Fare between city limits would be 10 cents. Term of franchises for Chehalis and Centralia is proposed to be twenty years. Pay-as-you-enter cars will be operated.

Mayor West of Chehalis does not favor granting such a franchise. He calls attention to the fact that there is now a half-hour electric interurban service between the two cities, with railroad service at various times during the day, and that the interurban cars rarely carry any great number of passengers on a single trip.

Wage Negotiations to Be Taken Up at Toledo

Negotiations between the Community Traction Company, Toledo, Ohio, and the street car men's union over a new wage scale and revised working conditions will be taken up in the next fortnight. The present contract expires on May 13.

The present scale is 55 cents for all workers in service more than a year, 52 cents for those in service nine months and 50 cents for beginners. Bus drivers and operators of one-man equipment receive an additional 5 cents an hour.

No official announcement has been made but it is understood the men will ask an increase of 10 cents an hour.

Another Wage Proposal to Be Presented to New York State Men

Negotiations are to be reopened between representatives of the New York State Railways and the union with another proposal to be presented to the employees operating in Rochester, Syracuse and Utica. This is the next step following the joint vote on May 11 in which the men rejected the offer by the company for a wage and working agreement retroactive to May 1. This action on the part of the men was referred to in the *ELECTRIC RAILWAY JOURNAL*, issue of May 15, page 861. Polls were conducted simultaneously in the three cities. Walter F. Norton, business agent at Rochester, where the vote was tabulated, would not reveal the vote figures. The terms which the workers voted down failed to provide for any increase in wages, but made some concessions to the men in working conditions.

The present scale which the company wishes to renew calls for 55 cents an hour for members of city crews, 57 cents for interurban operators and 60 cents for bus and one-man car employees. The Rochester union members were out strongest for the wage increase, primarily because the railway put a 1-cent fare advance into effect there on Jan. 1.

It is hoped that the matter may be settled without resorting to arbitration. Magnus Sinclair, international organizer, said there was absolutely no possibility of strike action.

Census of Chicago Loop

People in the downtown district of Chicago, Ill., were waylaid at every turn on May 12 by representatives of the Chicago Association of Commerce and asked to indicate what form of transportation they used in covering the distance from their homes that day. In banks, restaurants and office buildings similar questions were tabulated on cards. Of those persons arriving in automobiles, the tally markers wished to know whether the machine was driven by a chauffeur and where it was parked. The census is a part of the metropolitan street traffic survey now being conducted by the Association of Commerce with a view to showing how many persons come into the "Loop" district daily and how street congestion may be reduced.

Extension of Time Under New York Electrification Bill

Governor Smith of New York on May 18 signed the Senate rules committee bill amending the Public Service Commission law by authorizing the commission after a hearing to extend for not more than five years from Jan. 1, 1926, the time of any railroad or terminal corporation to comply with the provision for electrification of roads in New York City.

Supreme Court Upholds Validity of Duluth Case

The Minnesota Supreme Court in a decision on May 14 upheld the state law of 1921 covering the regulation of street railways. The court affirmed the District Court in St. Louis County in the case of the city of Duluth against the Minnesota Railroad and Warehouse Commission. After an order by the commission establishing street car rates in Duluth the Duluth Street Railway made further application for increased rate of fare and asked for determination of the valuation of its properties. The city sought a restraining order in the District Court to prevent the commission from holding more hearings and attacked the validity of the law itself. The railway contended that the 6-cent fare then in effect yielded only 70 per cent of a fair return on the capital investment. District Judges C. R. Magney, H. J. Grannis and E. J. Kenney, sitting together, held the law valid, and the Supreme Court has now affirmed their opinion.

News Notes

Amalgamated Issue Under Adversity.—A motion to dismiss the complaint filed by the Amalgamated Association against the city of Indianapolis, chief of police and others for a restraining order against interference with officers and employees of the association in their efforts to organize a branch in Indianapolis was taken under advisement by Judge Robert C. Baltzell of the United States District Court on May 15. The motion to dismiss was filed by the city and set out fourteen points attacking the jurisdiction of the federal court and denying that rights of the officials of the association were violated by local police as alleged in the complaint. The complaint was filed following the arrest of Robert Armstrong, a vice-president of the association, and other employees.

Railway Transports in Taxis.—Taxicabs were used recently by the Chicago, North Shore & Milwaukee Railroad in Milwaukee, Wis., to maintain service when a fire adjoining the Sixth Street viaduct, over which its cars operate, paralyzed all service between Milwaukee and Chicago. When the fire broke out many persons southbound for Racine, Kenosha, Chicago and intermediate cities were waiting at the main depot. They were loaded into taxicabs and taken over another viaduct to a temporary station established at First and

National Avenues, where they boarded an emergency southbound train. On the return trip the same cabs took the waiting northbound passengers to the main station.

Recommends Relief from Paving Costs.—Two committees of the Danville, Va., City Council recently heard arguments from C. G. Holland, president of the Danville Traction & Power Company, in behalf of the modification of the company's franchise and relief from the obligation of paying the costs of street paving between the tracks. The two committees joined in a recommendation to the Council for this relief. As a two-thirds majority concurred in this action, the railway may be said to have won its point.

Wage Contract Renewed.—The Aurora, Elgin & Fox River Electric Company, Aurora, Ill., has renewed its contract with its employees for the ensuing year at the same scale. The employees voted two to one to accept the existing wage. Some changes in working conditions were agreed upon.

Summer Rates in California.—A new schedule has been arranged which provides residents of the territory served by the San Francisco-Sacramento Railroad and the Sacramento Northern Railroad with attractive excursion rates. Under the provisions, tickets good for sixteen days will be sold daily at the rate of one and one-third single fares for the round trip from all points on the two roads and the Sierra Nevada Stage Company and Pierce-Arrow Stage Company to Oakland and San Francisco. The new rates became effective April 30.

Tragic Accident at Atlantic City.—Mrs. Fannie L. Denman, wife of B. J. Denman, vice-president and general manager of the United Light & Power Company, resident at Davenport, Iowa, was killed on May 18 while riding a horse along the beach at Atlantic City. Mrs. Denman was thrown from her horse and suffered a broken neck. She died almost immediately. Mr. and Mrs. Denman were attending the annual convention of the National Electric Light Association.

Another Name Wanted.—An organization newspaper written for and by the employees of the Worcester Consolidated Street Railway, Worcester, Mass., has made its appearance and will be published in the future on the first payroll day of every month. The inter-district news organ is still nameless, being captioned with an interrogation point, but a contest is under way among employees for the selection of a name. The publication contains news of the road, shops and offices, interspersed with bits of humor and anecdotes contributed by employees.

Work Started at St. Petersburg End.—Ground was broken in St. Petersburg on May 8 for the first gas-electric interurban railway, the Florida Interurban Rapid Transit Railroad, that will connect Tampa and St. Petersburg. Actual construction work on the roadbed has already been started. A survey for the route has been completed and 96 per cent of the right-of-way for the route has been acquired. Reference was made to the progress of this project in the ELECTRIC RAILWAY JOURNAL previously.

Railway Plays Its Part.—In honor of "International Boys' Week" the Tacoma Railway & Power Company, Tacoma, Wash., issued special rate tickets on May 8 good all day for grammar and high school students. The company co-operated with Harold R. Pirret, chairman of Boys' Week in Tacoma, in an effort to make the celebration of that week a successful one.

Wage Contract Renewed.—Trainmen of the Wheeling Traction Company, Wheeling, W. Va., have renewed their contract with the company for three years at the old scale. This provides 49 cents an hour for the first three months of service, 52 cents for the next nine months and 57 cents thereafter. Operators of one-man cars receive 5 cents an hour additional.

New Fare Schedule Approved.—The Public Service Commission has approved a new tariff of the Southern New York Railway, Inc., providing for the sale of books containing 30 single tickets, good for transportation of purchaser and member of purchasers' family within 30 days from and including date of sale. The stations included in the tariff are as follows: West Oneonta and Junction, \$2; Laurens and Junction, \$5.85; Index and Cooperstown, \$2.90; Cooperstown and Fly Creek, \$5.85; Cooperstown and Toddsville, \$3.85. The new fares are effective on June 14, and will continue in effect until June 14, 1927.

"Stop" Signs Ordered.—Several thousand new "stop" signs have been ordered by the Georgia Railway & Power Company, following an order of the Public Service Commission changing approximately 500 car stops on the Atlanta lines. While the commission's order calls for only 500 stops, the company has decided to place new "stop" signs at every stop in the city. The new signs are orange in color, with black lettering, making them more attractive than the old "stop" signs and giving them greater visibility. Within ten days work of rearranging and locating signs will be started.

Baltimore Attends to Complaints.—The United Railways & Electric Company, Baltimore, Md., received a total of 1,953 complaints during 1925, all of which were given the required attention. With a traffic of 330,000,000 revenue passengers this means there was about one complaint from every 163,850 people. The company states that not a single complaint is ignored, every one being subjected to investigation and scrutiny. In its "Service" bulletin the company states that it knows "it has a public that is critical but not sullen, watchful and articulate, but not hopeless of the company's sincerity."

Fares Reduced to Encourage Land Settlers.—To encourage settlement in the attractive new residential districts along Lake Michigan to the north of Chicago, the Chicago, North Shore & Milwaukee Railroad has recently announced a reduction of nearly 53 per cent in the rates for commutation tickets from all suburban communities on the main line and new Skokie Valley division, as far north as the Wisconsin state line. The new schedule, which applies to 10, 25 and 60-ride tickets to Chicago, is effective June 1.

Recent Bus Developments

Michigan Bus Operators Included in Agreement

The dispute between the Michigan Electric Railway, Jackson, Mich., and the Amalgamated Association over the inclusion of bus operators in the Amalgamated agreement with the railway was recently settled by arbitration. An amendment was introduced in the present contract which provides for the inclusion in the existing contract of all motor vehicle employees in the service of the company. This change is intended to bring within the protective terms of the agreement bus operators employed directly by the Michigan Electric in cities and also employed in bus operation between the cities of Lansing and St. Johns, but it especially excludes all others employed in interurban service. The amendment will not cover interurban bus drivers who are in the service of the Southern Michigan Transportation Company, a subsidiary of the Michigan Electric Railway operating between Jefferson, Battle Creek and Kalamazoo, known as the Southern Division, and between Jefferson and Lansing, known as the Northern Division. The agreement was signed by George A. Kelly and Norman E. Leslie. Richard Price, the third arbitrator, plans to submit a minority finding.

Buses Operated at Loss in Tampa

Operation of buses in connection with the railway lines in Tampa, Fla., by the Tampa Electric Company is being carried on at a loss, according to a reported statement of Peter O. Knight, president of the company. Although the bus fare is 10 cents—twice as much as the railway fare—the company has been unable to make any net returns from the operation of buses, which was started in September, 1925. The company now has 23 buses in operation, and the results to date show total gross receipts insufficient to pay operating expenses. In order to keep up with increased population, the railway has ordered fifteen more cars for operation and eight more buses.

Bus Rights Granted in Westfield

The effort of the Springfield Street Railway to obtain additional licenses to operate other bus lines in Westfield, Mass., was successful on May 6 when the City Council of Westfield agreed to grant the necessary authority to operate. With the placing of these additional bus lines in service will come the abandoning of practically all the trolley lines in Westfield. Only one cross line trolley route will be operated in addition to the suburban line to Springfield.

The railway was granted licenses to operate two bus lines last fall, and at that time it discontinued railway service on Mill and Union Streets. Permission to add new bus routes will

eliminate trolleys on Broad, West Silver, East Silver and Franklin Streets and on the Huntington line.

The only remaining intercity railway line will be operated from the Highlands to North Elm Street, at Clay Hill. The Westfield-Holyoke line will be abandoned. The company has agreed

to operate buses to St. Mary's Cemetery, which heretofore was served by the Holyoke trolley.

Westfield has been decidedly against the abandoning of any of the trolley lines. The question has come up many times over a period of a year until it was finally stated that the railway would not continue to operate any of the railway lines at a loss. Thus the City Council was confronted with giving the required bus licenses or running the chance of seeing the railway withdraw service. The railway has promised an efficient service with buses.

Buses Meet Emergency in Akron

Vehicles Turned to Advantage to Meet Strike Conditions—Full Story of What Was Done to Transport People in City and Interurban Service

THIS is a bus story—the story of how buses met an emergency in Akron city service and in interurban service from Canton to Cleveland when 750 platform men employed by the Northern Ohio Power & Light Company struck on May 1.

It was not until 9 o'clock Saturday night, May 1, that the company learned trainmen would not take the cars out Sunday morning. That meant Sunday churchgoers would have no service except that supplied by buses and the few cars manned by employees who remained loyal. Twenty-eight street cars left the Kenmore carhouse Sunday morning on the main Akron city lines. Buses supplied the rest of the service.

On the Canton-Akron-Cleveland line not a car left the carhouse. It was up to the buses to stand alone. At 4 o'clock Sunday morning, seven hours after the Amalgamated Association had issued the order to strike, the first bus left the Terminal Building in Akron for Cleveland.

Right there this story starts. Commencing at this early hour—4 o'clock—on May 2, a bus entered or left the Terminal Building with a load of passengers every nine minutes until midnight—twenty hours later. And all of these trips were operated between Cleveland, Akron and Canton. A total of 140 trips was operated between Cleveland and Akron and 40 between Akron and Canton, a grand total of 180. Assuming that an average of 25 passengers was handled each trip, the buses moved 4,500 persons.

All of this operation was accomplished with a fleet of 25 buses—an average haul of 180 persons per bus. If all of the bus trips made during the day—180—were combined in one line, they would have made a bus caravan a mile long, with 120 ft. to spare for good measure.

What the bus company did on this day it has been repeating virtually every day since. Morning, noon and night the buses, like Tennyson's famous brook, go on and on, that transportation needs of the public may be efficiently satisfied.

To perform this tremendous service the bus company, on these 180 daily trips, operates approximately 6,500 miles, as compared with 3,000 miles before the strike. The 180 trips repre-

sent an increase of 96; the daily average previous to the strike was 84.

True, 22 buses were added to the total fleet and every bus owned by the company was pushed into service during the first week. Buses that were in the shops for repairs were rushed through and in service in two days. Ten new buses came from Cincinnati and twelve from various other sources. The close of the third week will find twenty more in service over the system.

When the strike came, the company was operating 114 buses in Akron city. Two days later the company had 130 in operation and two days more 140 were in use, with 58 interurban buses running. Most of these buses were drawn from the reserve supply.

Did they furnish the city service? The people say they did. Of course, there was much crowding. The buses were loaded, but the equipment stood up well. Of course the condition that existed could not be continued indefinitely, but the buses served satisfactorily until normal railway service was restored in Akron and suburban districts.

It is true that the public welcomed the car service back. This only goes to furnish additional evidence that coordinated bus and rail transportation is what they want.

The interurban situation was different. Patrons paid approximately 40 per cent higher fares on the interurban buses than they formerly did on the cars. They did this willingly and there have been few complaints. The interurban buses have been crowded, and it was necessary at times to switch city buses into interurban and suburban service. The complaints that came in were from the Akron-Canton division, where the service was not so good as between Akron and Cleveland. Between Canton and Massillon, where four big buses furnished a fifteen-minute service, there was not a single complaint. Fares by bus and by rail in the city of Akron were the same.

Although service was more than doubled, the efforts made merely represented what a loyal organization can do in an emergency. In brief, it is the "acid test" of bus service in northeastern Ohio. Every man in the company's bus system just put his shoulder to the wheel and worked faithfully. As one

of the interurban bus drivers expressed it, by quoting Elbert Hubbard: "If you work for a man, in Heaven's name work for him. If he pays you wages that supply your bread and butter, work for him, speak well of him, stand by him and stand by the institution he represents. If put to a pinch, an ounce of loyalty is worth a pound of cleverness." That's the secret of the operation.

Credit for this successful bus operation is shared by all departments of the company. The garage force, like the bus drivers, has battled 100 per cent. The men that compose it have kept the equipment serviced, day and night. In fact, the records show that the fleet of buses has operated 97.5 per cent perfect. And when that per cent in operation is reached, it is a job pretty well done.

When it is taken into account that the majority of the buses are on the road twenty hours a day, an adequate idea is conveyed of the maintenance problem. It's a four-hour job; that is, the mechanics have four hours in which to work to keep the buses running twenty. Then, too, it must be remembered that five different kinds of equipment are used—Yellow Coaches, Whites, Pierce-Arrows, Studebakers and Fageols. This means that both the operating force and the mechanical force must be more or less versatile. Necessity often requires that a driver or a mechanic be shifted from one make of bus to another, so that service may not be interrupted. But it was done, and buses have demonstrated what they could do in an emergency when operated by a company that knows the transportation business. At no time was there the slightest confusion. Schedules were kept almost to the minute.

The buses performed a real service—a service that pleased the public, kept transportation going and proved a blow to the Amalgamated Association.

Partial Bus Substitution Proposed in Westchester County

The Westchester Electric Railroad has petitioned the Public Service Commission for permission to abandon a portion of its route in the town of Eastchester and the village of Tuckahoe, Westchester County, N. Y., and substitute bus service to be supplied by the Eastchester Transportation Corporation. It is claimed that this part of the route does not pay the operating expenses. Main Street, Tuckahoe, is to be paved, the petition says, and the village desires to have the tracks removed when the new pavement is laid.

Consents to bus operation have been given by the village and town authorities. It is proposed to operate buses between 6 a.m. and 1 a.m. on not more than a fifteen-minute headway. A 10-cent fare is proposed, with free transfer from the buses to the intersecting electric railway lines. Transfers will be given from the electric railway lines to buses for an additional fare of 5 cents. For passengers traveling only between the Tuckahoe Railroad station and Waverly Square or between the Tuckahoe station and Bronx River it is proposed to charge a 5-cent fare. Where the 5-cent fare is effective no transfers will be given according to the petition.

Bus Routes in Northern Illinois Proposed

The Western Motor Coach Company, headed by Britton I. Budd, associate of Samuel Insull and president of the Chicago, Aurora & Elgin third rail line, has applied to the Illinois Commerce Commission for authority to operate a network of bus lines through northern Illinois, which would serve that section, the southern Wisconsin territory and connect with other lines reaching through Iowa, central and southern Illinois and Indiana. Elgin will be the hub of the proposed system. The four principal routes are between Wheaton and Westmore, Elgin and Bellwood, Oak Park and St. Charles and LaGrange and Aurora.

Buses Leased for Use in Toledo

Seven buses have been leased by the Community Traction Company, Toledo, Ohio, for use on Front Street while tracks are being taken up from that street and repaving is in progress. The City Council last year voted to tear up the tracks on that street.

Plans for a permanent bus service are not complete, but in the Riggs survey it was recommended that bus lines supplant car lines on all except the downtown loop, which could be cared for by several other east side lines through transfer.

The buses are owned by the Union Motor Truck Company, Bay City, and have been in use before in Detroit.

The new equipment is operated by employees of the Community Traction Company. The new plan of leasing equipment and operation by company employees has been found much more satisfactory than the "farming out" plan tried in Toledo for more than a year on some feeder lines.

Seven Cents on Buses.—Permission to increase bus fares immediately from 5 to 7 cents on all lines in the city of Evanston, Ill., was recently granted to the Evanston Bus Company, a subsidiary of the Evanston Railway, by the Illinois Commerce Commission. A rate of \$2.25 for a 50-ride ticket, however, will be maintained for the benefit of students of a new high school at the western limits of the city.

Bus to Be Given a Trial.—The Menominee & Marinette Light & Traction Company is considering the purchase of a 21-passenger bus with a view to experimenting with bus service in outlying territory to determine whether patrons, city officials and the company would prefer bus to railway operation on outlying lines. The company hopes to give the plan a trial in Marinette, Wis., and Menominee, Mich., during the summer months.

New Route Authorized.—The Public Service Commission on May 17 granted a certificate to the Rochester Railways Co-ordinated Bus Lines, Inc., for the operation of a bus line in the city of Rochester, N. Y., and town of Irondequoit. The route will connect with the Rochester Street car lines at St. Paul Street and Ridge Road and will make a belt through the town of Irondequoit, connecting again with the street car lines at Clifford Avenue and Culver Road. The route is divided into three

zones with a 10-cent fare in each zone. There was no opposition at the hearing to the granting of the petition.

Bus Company in Nashua.—Buses operated in the interest of the Nashua Street Railway, Nashua, N. H., will be run by the recently organized Nashua Transportation Company, incorporated under the state laws with the following officers: President, Josiah E. Fernald; secretary, Chester W. Clark, both of whom are directors with Englehardt W. Holst, manager of the railway.

Problems of Miami Beach to Be Discussed.—Citizens of Miami Beach, Fla., and officials of the Miami Beach Electric Company will consider, it is reported, the advisability of a double-deck bus system to replace the present railway system in Miami Beach. The decision came about as a result of a written communication from the Miami Beach Realty Board to members of the City Council. City Manager Renshaw will make a report after consultation with citizens and railway officials.

Permit Authorized Between East Chicago and Hammond.—The Gary Railways has received a permit from the Public Service Commission to run a bus line from Cline and Block Avenues, in East Chicago, to Sheffield and Gostlin Avenues, Hammond, Ind. The commission denied a petition of the Midwest Motor Coach Company to operate a bus line between Gary and Hammond and refused to grant the right to the Gary Railways to operate a new line between Gary and Hammond. In the two denials the commission ruled that public convenience and necessity did not require the proposed bus service.

Would Extend Bus Services.—The Pacific Electric Railway has applied to the California Railway Commission for authority to operate motor coach service in the city of Pasadena, covering lines now operated under the name of the Pacific Electric Land Company.

Buses Authorized to Replace Cars.—The City Council of Salem, Ore., on May 3 granted permission to the Salem Street Railway to discontinue railway service on its South Commercial Street Fair Grounds line and to substitute buses. The Council also reduced from \$50 to \$25 a year the license fee which the railway paid on buses. This leaves only two lines in Salem now served by the railway.

Authorization for Service Between Boston and Worcester.—The Boston & Worcester Street Railway has been granted a certificate of public convenience and necessity to operate motor coaches between Boston and Worcester, Mass.

Bus Reorganization Under Consideration.—The Jamestown Street Railway, Jamestown, N. Y., is planning a reorganization and rerouting of its buses. If the plan does not produce revenue sufficient to warrant the needed replacement of buses now in operation, service will be abandoned. Some time ago the Jamestown Motor Bus Transportation Company, a subsidiary of the Jamestown Street Railway, notified the City Council that it contemplated the abandonment of its bus lines in the city, but no date was set for the discontinuance of service.

Financial and Corporate

Court Upholds \$7,000,000 Easement Allowance at Baltimore

An opinion handed down by Judge Eli Frank in the Circuit Court of Baltimore upholds the Maryland Public Service Commission in placing a valuation of \$7,000,000 on the easements of the United Railways & Electric Company, Baltimore, and also upholds the commission in allowing \$8,560,210 as "going value" of the railway property. Both these items were included in a recent valuation of the United property fixed by the commission. The total value was \$77,000,000.

Clarence W. Miles, formerly people's counsel, took the case into court following the commission's action. The opposition to the "going value" was from William S. Norris, president of the People's Corporation. Judge Frank said:

The easements of the railway are property in the sense that they cannot be taken even for public use without full compensation being paid for them. I have been referred to, and have found no case in which the allowance of a value to easements by the state authorities has been declared improper by the federal courts. It is only where such allowance has been refused and such refusal has been claimed to be confiscatory that its property has been passed upon.

After citing numerous authorities on the various points involved, Judge Frank said that an analogous argument might be made in the case of the United.

"It was the result in 1899 of the consolidation of several corporations, under the provisions of the general corporation law of this state," he said. "The easements of its constituent companies became vested in it. It issued many million dollars of securities, bonds and stocks, upon the faith of its ownership of its tangible property, franchises and easements. These securities have been largely dealt in for more than 26 years on the basis of such ownership."

The court then said:

I cannot reach the conclusion that easements which are real property subject to taxation, of which the owner cannot be deprived without just compensation, which became subject to the liens of its mortgages prior to the enactment of the public service law, upon the ownership of which it has obtained credit and upon the faith of which it sold its securities to the public, is not to be regarded as property upon which it is entitled to earn a fair return. As the valuation made by the commission is *prima facie* evidence of the value of said property in all proceedings before the commission, the importance of the valuation herein involved is apparent.

The valuation of \$7,000,000 made by the commission which is now the subject of attack was reached without reference to the earning capacity of the easements so valued. The objection to valuing an easement in a rate base in terms of earnings is self-evident. The greater the earnings, the larger the value of the easement. The greater the value of the easement, the larger the fair return that must be allowed upon such value. While certain authorities regard this situation as conclusive against the inclusion of easements for rate valuation purposes, that result should be reached only where the value of the easement can be determined solely from the earnings of its owner. . . . The special recognition of the easement as taxable property in Maryland, coupled with its assessability without reference to earning capacity, seems to me to justify its treatment by the commission as property for rate-making purposes. I,

therefore, approve the order of the commission on this point.

In discussing the petition opposing the \$8,560,210 "going value" item, the court says:

It claims as matter of law that no award for going value can be made, that this element of value is already taken care of in the valuation of the tangible property of the company. On the other hand, the railway insists that the allowance made is, as a matter of fact, inadequate. Both of these contentions involve matters of fact. If in fact allowance for going value has been included in the valuation of tangible property, then obviously to value it separately would be a mere duplication which is not permissible. I do not find such to be the fact.

That going value is allowable as a part of the rate basis is determined by ample authority.

Constitutional protection against confiscation does not depend on the source of the money used to purchase the property. That it has been paid for out of past earnings is no ground for refusing a fair return on it.

The fact, therefore, that going value was built up by the expenditure of past earnings furnishes no reason for denying it its reasonable value. In this regard, also, I approve the unanimous conclusion of the commission.

Announcement has been made that the case will be taken to the Court of Appeals of Maryland.

\$1,000,000 Price for Alton Properties

An "upset" price of \$1,000,000 has been set by United States District Judge Lindley for the sale next month of the physical properties of the Alton Gas & Electric Company and the Alton, Granite & St. Louis Traction Company, referred to in the ELECTRIC RAILWAY JOURNAL, issue of May 15, page 867. The sale was authorized by Judge Lindley to satisfy a mortgage covering the property of the two companies. The total indebtedness of the concerns amounts to about \$4,000,000. The price set by Judge Lindley is the lowest bidders will be allowed to offer at the sale to be held in Edwardsville. It is likely that the property will be sold in groups rather than in its entirety.

The lowest prices Judge Lindley authorized on the groups were: \$180,000 for interurban electric lines, \$270,000 for the Alton city lines, \$150,000 for the gas property and \$400,000 for the electric property. Thomas Gregory, vice-president of the East St. Louis & Suburban Company, is receiver for both companies.

More Moves in Cincinnati Changes

Frederick W. Hertenstein, president of the Western Bank & Trust Company, and William F. Wiley, general manager of the Cincinnati *Enquirer*, have resigned as directors of the Ohio Traction Company, Cincinnati, Ohio, which formerly operated the electric railway system of Cincinnati under a lease from the Cincinnati Street Railway. The system reverted to the original owners under an agreement reached last November. Messrs Hertenstein and Wiley have been succeeded on the board by Theodore H. Schoepf, brother of

W. Kesley Schoepf, president of the Ohio Traction Company, and Gustav Weil, a member of the brokerage firm of Weil, Roth & Irving. Committees representing the preferred and common stock holders will meet shortly to decide on a plan of distribution of the assets of the Ohio Traction Company, which ceases to exist as an operating company in view of the recent changes of the traction situation in Cincinnati.

Committee Formed to Protect Auburn-Syracuse Holders

Affairs of the Auburn & Syracuse Electric Railroad, Syracuse, N. Y., are reviewed in a statement made by a committee representing the holders of the bonds of the company. The railway was unable to provide funds for the payment of the interest due on April 1, 1926, on its bonds. The committee says that constant effort has been made to offset decreases in earnings through the introduction of economies of every nature in the operation of the road, but that net earnings have gradually been reduced to a point where they are insufficient to pay the annual interest requirements of the bonds. The committee says:

The problems which have been encountered are fundamental. The rapid construction of hard surface roads and the increasing favor with which the bus and the privately owned automobile are regarded as a mode of transportation have combined to make for a falling off of about 15 per cent of the number of passengers carried in the five years ended Dec. 31, 1925. The rates of fare have been increased to 7 cents in Auburn and to 3 cents a mile on the interurban line. Further increases in rates are deemed inadvisable by the management in that they would, in their opinion, work to produce a decrease in traffic which would offset the increased income. Notwithstanding the increase in rates, the establishment of a bus system and the efforts of the management to bring operating expenses to an irreducible minimum, there are constant decreases in passenger traffic and earnings. This is due to the competition from motor vehicles. Furthermore, the constant increase in the mileage of hard surface roads and in the number of automobiles in use in the company's territory would seem to indicate that the present unsatisfactory situation will become more acute in the future.

The gross earnings, net earnings (after operating expenses, maintenance and taxes, but before provision for depreciation), and revenue passengers carried for each of the calendar years 1921 to 1925 follow:

	Gross Earnings	Net Earnings	Revenue Passengers
1921	\$636,472	\$118,925	3,904,572
1922	583,701	121,139	3,884,721
1923	625,862	116,524	4,137,734
1924	555,440	99,229	3,665,318
1925	509,837	59,575	3,343,573

The annual interest requirement on the bonds, of which there are \$1,752,000 outstanding, is \$87,600.

The company renders electric railway service in Auburn, N. Y., and between that city and Syracuse, N. Y. The property includes 56.45 miles of track (single-track equivalent) and 44 passenger cars. In addition the company owns an amusement park at Owasca Lake, south of Auburn. Franchises where necessary are satisfactory from a business standpoint. The line between Auburn and Syracuse, a distance of 27 miles, is located for the most part on private right-of-way.

Deficit in Toledo in April

Operations of the Community Traction Company, Toledo, Ohio, during April resulted in a net deficit of \$7,230, it was reported by Commissioner E. L. Graumlich to the street railway board of control at its monthly meeting on May 15. Total revenue was about the same as a year ago, but expenses of additional service, more power and refunds for overcharges to interurbans renting tracks produced an unfavorable result. Passenger revenue showed a gain of \$5,449 over April 1925 and totaled \$299,575. Revenue passengers totalled 4,275,732 in April, which showed a gain of 1,040 a day over March this year. This is the first time in several years that April has shown better results than March.

The commissioner's report also indicated that the Oak Street bus feeder line, the pioneer in its field, for the first time had shown a surplus over operating expense. The company took over the operation of the line last month with leased equipment and its own operators. Maintenance costs were practically nothing due to the new equipment. Other bus operations showed a loss. A total of 58,101 passengers on feeder buses was carried in April.

\$1,301 Balance for Cincinnati Street Railway in April

Operations of buses by the Cincinnati Street Railway, Cincinnati, Ohio, reduced the company's revenue, in so far as the electric railway system was concerned, in April, according to a report filed with Edgar Dow Gilman, Director of Street Railroads and Motor Buses, by Walter A. Draper, president of the railway. The report covers operations for April and shows a decrease over the previous two months. Mr. Draper explained that the loss was not a loss in a direct sense to the company in that the bus operations likely would show sufficient revenue to offset the loss in electric transportation.

The railway has been endeavoring to link up its electric transportation system with its bus lines, and in this rearrangement naturally has incurred expenditures which undoubtedly will be eliminated when the readjustment is completely worked out. The revenue and expenses during April follow:

Operating revenue	\$645,464
Operating expenses	465,615
Net operating revenue	\$179,848
Taxes	58,221
Operating income	\$121,627
Non-operating income	\$4,857
Gross income	\$126,484
Rental, interest, sinking fund and return on captial	125,182
Balance	\$1,301
Revenue passengers	7,559,593
Transfer passengers	2,500,032
Free passengers	117,168
Total passengers carried	10,176,793

Will Operate Line in Ocean City

Upon application of the city of Ocean City, N. J., Chancellor Walker has appointed Robert E. Chew of that place as trustee to operate the Ocean City Electric Railroad, which previous to

1919 operated as a traction corporation at the shore resort. The company, as in the past few years, indicated to the authorities that it would not run its cars, which would mean that the city would be without trolley service. Mr. Chew will be paid \$1,500 for his services as trustee in the operation of the line until Dec. 1 next. Twenty-five per cent of the gross receipts may be ex-

pendent toward the purchase of new equipment. When the trustee concludes the operation of the line he will be required to pay to the company \$3,750 for the use of the property. The proceedings were started under the act of 1919, which authorizes fourth class communities to take over the property of traction corporations which have abandoned their railway lines.

Earnings Reported in Grand Rapids

Results for 1925 Considerably Below Allowable Return, but Outlook Very Promising—Interesting Review of the Progress of the Company

BASED on the rates of fare which prevailed throughout the year 1925, viz., 10 cents cash or six tickets for 50 cents, the Grand Rapids Railway, Grand Rapids, Mich., was entitled under its service-at-cost franchise to earn a return of 7½ per cent on the value of its property, after deduction of operating expenses and taxes and making provision for property retirement. Due largely to the need for operating leased equipment and to delay on the part of the city in carrying out certain work the company's earnings were \$172,203 less than the allowable return.

In trying to keep pace with the city's growth, meet present day needs by improvements to its property that were imperative and make additions to conform to the public demands the company expended \$321,036 during the year. These capital outlays have not only improved the physical condition of the property but, as part of a broad general program, they will enable the company to give a quality of service which will attract added patronage. Mr. DeLamarter says that the cumulative benefit of the expenditures which have been made since Jan. 1, 1922, and which total \$1,099,608 over the period 1922-1925 inclusive, is evidenced by the improved condition of the property and in the fact that there is a public appreciation of the company's activities in this respect.

COMPARATIVE STATEMENT OF INCOME AND EXPENSES OF GRAND RAPIDS RAILWAY

	1925	1924
Gross Earnings:		
Passenger revenue	\$1,697,310	\$1,719,562
Revenue from special cars, etc.	4,273	2,132
Rent of equipment, tracks, etc.	23,994	38,794
Non-operating revenue	13,200	10,843
Total	\$1,738,779	\$1,771,332
Operating Expenses and Taxes:		
Operating expenses	1,172,157	1,099,175
Taxes	144,122	137,542
Total	\$1,316,279	\$1,236,717
Gross income available for fixed charges, retirements and dividends	422,499	534,615
Interest on funded debt	268,248	261,959
Other fixed charges, including amortization of debt discount	55,828	82,768
Provision for retirements	165,963	144,459
Total interest, other fixed charges and retirements	\$490,041	\$489,187
Net income	67,541*	45,427
Ratio of operating expenses to gross earnings, per cent	67.93	62.43
Ratio of operating expenses and taxes to gross earnings, per cent	75.70	69.82

* Deficit.

L. J. DeLamarter, vice-president and general manager of the company, explains that the high cost of operating rented cars and their general unfavorable appearance and riding qualities quite naturally affected both passenger riding and operating expenses during the year. Another factor which affected earnings in 1925 was the inability of the city authorities to adopt a definite plan for the widening of Division Avenue, over which several of the main lines of the system operate. This caused delay in laying new rail on this street. In consequence the company was burdened with track maintenance which required an unusual amount of labor and material to keep in operating condition. It is expected that this matter will be settled in the near future, thereby enabling the company to carry out its track renewal plans and so relieve it of the extra maintenance expense caused by present conditions.

As referred to in the report for the year 1924, the company suffered a heavy loss of equipment in the Hall Street carhouse fire, all of which was covered by insurance. Recognizing the existence of changed conditions in the transportation field, the management decided that rather than proceed immediately with the replacing of its lost cars by others of similar character, the time had come to experiment with an entirely new street car designed better to serve and satisfy the riding public and to encourage increased car riding. As a result, the company carried on during the past year practical tests of three new types of electric rail coaches, embodying advanced ideas. Based on the results of these tests, the company has ordered for delivery in the spring of 1926 27 additional cars, which incorporate the best features of the three test cars. Mr. DeLamarter says:

Coincident with these tests, a number of improvements were effected in present equipment. Recognizing the general attractiveness of bright color schemes, the company started an extensive car painting and renovating program and has received a great deal of commendation not only locally but nationally because of this work. Interest was further stimulated by naming each car after some local pioneer or person prominent in the development of the city of Grand Rapids. Another development has been the rebuilding of a "Birney" safety car with spring-filled leather upholstered seats and cushions and a smoking compartment. This experiment, if it proves out, will be followed by the rebuilding of additional "Birney" cars.

As a result of a plan of co-operating with the drivers of commercial vehicles, which has cost the company a negligible amount, there is being developed a spirit of helpfulness which is reducing delays due to blocking of tracks and lessening vehicle collisions. A reduction of approximately 23 per cent has been made in the number of col-

lisions between commercial vehicles and street cars. Accident expense has reduced to less than 2 per cent of the transportation revenue. The company operated 3,674,633 car-miles in 1925 without a fatal accident to passengers or employees.

Despite the fact that the new electric rail coaches are not yet in service and that because of the fire, the company was forced to resort to the use of a number of rented cars, the program as worked out thus far gives promise that the results anticipated will be realized. In this connection it is pointed out that revenue passengers carried during the last quarter of 1925 show an increase over those carried during the corresponding period of the previous year.

A personal solicitation campaign of self-interest among store proprietors along street car routes has been started, and the relation of street car patronage to merchandise sales and the "cash register value" of supporting and talking in favor of the electric railway is being presented. This creates a realization that the use of the merchant's corner by riders waiting for cars brings more business than automobiles passing by or parking blocks away. Time-tables showing the passing time of street cars at particular points are placed on show cases in corner drug stores or other places of business near busy street intersections.

The motor bus service established by the company was improved during the past year. As needs justify, plans will be developed for further adequate bus service. In this connection the buses are operated on a straight 10-cent fare with transfers.

No public financing was done by the company during the year. Of the \$368,112.27 insurance money received plus interest on the unexpended balance, there remained on deposit with the trustee as of Dec. 31, 1925, a total of \$168,050, the difference having been expended for additions and improvements, including new buildings and car storage facilities on the old Hall Street carhouse site and the purchase of the three experimental electric coaches described in a former paragraph. The purchase of the 27 new coaches was arranged on a satisfactory payment basis.

New High Record for Passengers Carried in Chicago

Traffic on the Chicago Surface Lines is steadily gaining in volume. During April a new high record for the number of passengers carried was established, when the daily average number of rides equaled 4,381,763. The nearest previous approach to this number was reported for February, this year, when 4,331,531 rode daily. The total number of rides during April was 131,542,899, an increase of 5,400,422 over April, 1925.

In connection with the monthly report it is pointed out that during the first four months of this year, there have been 16,621,334 more rides on the surface lines than during the corresponding four months of 1925.

Gross earnings for April were \$5,059,784, compared with \$5,127,372 in the previous month and \$4,838,293 in April of last year. Expenses were substantially reduced in comparison

with those for March, but represented increases over the amounts spent in April of last year. Divisible receipts of \$308,417 gave the city \$169,629 for its 55 per cent interest in earnings and permitted a balance of \$138,788 to the companies.

A comparison of the April statement with that for the similar month last year follows:

	1926	1925
Passenger cars, including motor cars.....	\$5,059,784	\$4,838,293
Other income.....	55,799	54,276
Gross earnings.....	\$5,115,583	\$4,892,569
Expenses:		
Way and structures and equipment.....	676,731	591,633
Renewals.....	409,247	391,405
Power.....	339,033	315,285
Conducting transportation.....	2,041,655	1,983,929
Damages.....	373,843	357,013
Taxes.....	275,000	255,000
Total operating expenses.....	\$4,115,509	\$3,894,266
Residue receipts.....	\$1,000,073	\$998,303
Less joint account expenses..	20,000	10,000
5 per cent on purchase price..	671,656	670,032
Divisible receipts.....	308,417	318,271
City's 55 per cent.....	169,629	175,049
Company's 45 per cent.....	138,788	143,222

Net Income Higher.—For the ten months period ended April 30, 1926, the total operating revenues of the Brooklyn-Manhattan Transit Corporation, Brooklyn, N. Y., was \$37,084,474, against \$35,775,680 for the ten months period ended April 30, 1925. Operating expenses increased from \$23,494,442 to \$24,158,645. The net income for the ten months of the 1926 period was \$4,631,470, against \$4,119,290 for the ten months period ended April 30, 1925.

Improvements to Be Capitalized.—The Chicago, North Shore & Milwaukee Railroad, Highwood, Ill., has applied to the Illinois Commerce Commission for authority to issue \$1,000,000 of prior lien preferred stock and \$1,250,000 of first and refunding bonds. The proceeds will be largely used to reimburse the treasury for expenditures on the new Skokie Valley line, costing about \$8,750,000. The extension is about ready to be placed in operation.

Gross Earnings Increase.—For the three months period ended March 31, 1926, the gross earnings of the Indianapolis Street Railway, Indianapolis, Ind., were \$1,469,877, compared with \$1,431,535 for a similar period ended March 31, 1925. For the month of March, 1926, the gross earnings of \$510,006 were approximately \$22,000 in excess of the gross for March, 1925. The net earnings showed a decrease of \$5,625.

Seeks to Abandon Line.—The Sacramento Northern Railway has applied to the California Railroad Commission for authority to abandon its line of track extending from Park Avenue and Sixteenth Street, in the City of Chico, thence extending into Fifteenth Street, Mulberry Street and to the end of the line. It is stated that the patronage of the line does not warrant the expense of maintaining and operating it. An average of 125 passengers per day only is carried on the line.

Net Income Increases.—The Middlesex & Boston Street Railway, Newtonville, Mass., reports for the quarter ended March 31, 1926, a net of \$19,318, after interest and taxes, compared with \$17,819 in the corresponding quarter of

1925. Passenger revenues increased from \$289,460 to \$299,831 and operating expenses from \$232,836 to \$243,397.

\$26,110 for Surplus.—The Stockton Electric Railroad, Stockton, reports to the California Railroad Commission its 1925 operating revenue at \$311,761 compared with \$311,930 for 1924. The operating expenses, excluding taxes, for 1925 are reported at \$267,318 and at \$262,282 for 1924, leaving net operating revenue of \$44,443 for 1925 and \$49,648 for 1924. During 1925 taxes charged to operation amounted to \$21,336 and for 1924 to \$23,278. Deducting the taxes leaves operating income of \$23,107 for 1925 and \$26,369 for 1924. Adding to the operating income the non-operating income of the company results in a gross corporate income, which represents the amount available for interest, amortization of debt discount, other fixed charges, non-operating expenses, dividends and surplus, of \$26,110 for 1925 and \$30,744 for 1924.

Total Earnings in Madison Improve.—Earnings of the railway department of the Madison Railways, Madison, Wis., for the months of March and April were below the average of the corresponding months for the last four years, but the total earnings continue to improve since the institution of city bus service. During March 626,074 railway and bus passengers were carried, against 575,121 in 1925; for the last four-year period the average was 680,487. Gross car and bus revenues in March was \$41,808, against \$37,548 in 1925; average for the four-year period was \$39,744. During April 551,417 bus and railway passengers were carried, compared with 490,017 in April; average for four-year period, 609,802; total earnings during this month were \$37,109, against \$31,914 last year; average for the four-year period, \$35,628.

\$1,654,767 Available for Surplus.—The Los Angeles Railway Corporation, operating in Los Angeles, Cal., reported to the Railroad Commission its 1925 operating revenue at \$12,852,118, compared with \$13,097,425 for 1924. The operating expenses, excluding taxes for 1925 are reported at \$10,507,389, and at \$9,854,447 for 1924, leaving net operating revenue of \$2,344,729 for 1925 and \$3,242,978 for 1924. During 1925 taxes charged to operation amounted to \$820,315, and for 1924 to \$868,054. Deducting the taxes leaves operating income of \$1,524,414 for 1925 and \$2,374,924 for 1924. Adding to the operating income the non-operating income of the company resulted in a gross corporate income, which represents the amount available for interest, amortization of debt discount, other fixed charges, non-operating expenses, dividends and surplus, of \$1,654,767 for 1925 and \$2,501,969 for 1924.

Court Sanctions Expenditures.—Judge E. D. Shurtleff in the Winnebago County Circuit Court, Rockford, Ill., has signed an order authorizing Adam Gschwindt, receiver for the Rockford City Traction Company, to sign contracts for material and labor to the extent of \$75,000 to complete the work of double-tracking the Seventh Street line. It is considered that the court's action may be the forerunner of authorization to sell real estate to provide the necessary funds.

Personal Items

E. M. Lunda Is Doing Big Job in Grand Rapids

Introducing a comprehensive system for recording defects in rolling stock and determining individual maintenance costs for each class of equipment are some of the principal tasks before E. M. Lunda, superintendent of shops and equipment of the Grand Rapids Railway, Grand Rapids, Mich. Mr. Lunda, whose appointment to this post was referred to in the *ELECTRIC RAILWAY JOURNAL* late last year, believes that a comprehensive recording system will assist materially in preventing defects in equipment and in promptly correcting them when they do occur. It is Mr. Lunda's policy to make the Grand Rapids system one of the most modern in the country. In this all-important work he succeeded William Goldner, who was in the employ of the company for approximately 37 years.

Mr. Lunda entered railway work in 1922 in the employ of the Wisconsin Public Service Corporation as engineer of equipment, at which time the inter-urban lines were changed over to one-man operation. A year later he was appointed master mechanic of the Green Bay Division in charge of equipment and substations. Having proved his worth in this capacity he was appointed general master mechanic of the Wisconsin Public Service Corporation's railway properties in 1924. He resigned on Sept 1, 1925, to accept the position of engineer of equipment with the Grand Rapids Railway.

Mr. Lunda was born in New Glarus, Wis., in 1898. He was graduated from the Janesville High School, and then did three years of general college work at Milton College. Later he entered the University of Wisconsin Engineering College and was graduated in electrical engineering in 1922, specializing in electric railways and central stations.

Change in Personnel in Grand Junction

The new officers of the Grand River Valley Railway, operating between Grand Junction and Fruita, Col., are Clare N. Stannard, president; Guy W. Fallor, vice-president; Charles Rump, manager; John E. Loiseau, secretary, and Harry Hughes, treasurer. The company was recently sold by the Penrose-Carlton interests to Henry L. Doherty.

Carl H. Allen, formerly superintendent of the Illinois Traction, Inc., at Ottawa, Ill., was named temporary general manager of the company with headquarters at Joliet. He succeeds F. E. Fisher, who will take several months leave of absence.

A. B. Coryell, general superintendent and purchasing agent of the Windsor, Essex & Lake Shore Rapid Railway, Kingsville, Ont., has also taken over the duties performed heretofore

by the superintendent of way and structures. That office has been abolished.

New General Superintendent of Chicago "L"

Harry G. Hardin has been appointed general superintendent of transportation of the Chicago Rapid Transit Lines, succeeding the late John H. Malton. Mr. Hardin's promotion to this post comes after 25 years of service with the "L" lines, during the last two of which he has been acting general superintendent.

He joined the "L" organization in 1901 as an extra trainman on the Metropolitan West Side Elevated Railway and worked his way up through



H. G. Hardin

various stages of promotion until, at the time of consolidation of the Elevated lines in 1911, he was serving as despatcher at Laramie Avenue on the Garfield Park branch of the Metropolitan.

The same year he was appointed superintendent of transportation of the Chicago & Oak Park Elevated Railroad. He retained this position until 1920, when he was made assistant to the general superintendent of transportation. During 1921 Mr. Hardin served as general superintendent of the Chicago & Interurban Traction Company, retaining his connections with the Elevated lines.

In 1922 he was made superintendent of transportation of the Chicago Northwestern Elevated Railroad, and the following year assumed similar duties with the South Side Elevated Railroad, holding the two positions simultaneously. He was appointed acting general superintendent of the Chicago Rapid Transit lines in November, 1924.

Mr. Hardin was born in Little Rock, Ill., in 1883. He came to Chicago with his parents in 1887. Previously to joining the "L" organization, Mr. Hardin was connected with the Kellogg Switchboard & Supply Company in Chicago.

Safety Director in New Post

John J. Connors, Who Made Remarkable Record at Nashville, Appointed to Atlanta Post

John J. Connors, safety director of Nashville Railway & Light Company, Nashville, Tenn., since 1923, has been appointed to a similar position with the Georgia Railway & Power Company, Atlanta, Ga. Mr. Connors has been speaking daily for several months before employees of industrial plants in Nashville in the interest of safety and last fall started the Safety Drivers' school at the Chamber of Commerce. He is chairman of the membership committee, electric railway section of the National Safety Council.

Mr. Connors is widely known among electric railway men, but few, perhaps, realize the extent of the experience which he has behind him. No better summary of this experience could perhaps be found than that contained in one of the Nashville papers. Here is the account:

Horatio Alger would have written about "Johnny" Connors and never strayed from fact. The literal romance of this safety expert, who set out at the age of fifteen as a conductor to support a widowed mother and six children, and who rose through the ranks to lead his associate employees to the safety championship of the world, was disclosed by H. A. Davis, superintendent of railway.

Fifteen-year-old Johnny Connors asked the Nashville Railway & Light Company for a job in May, 1903. He was just out of short pants and the conductor's uniform issued to him almost hid him from view. He mounted the rear end of an old Wharf Avenue street car, and one week later took his first pay envelope to his mother and her children. Later he "ran" on the High Street and the West End lines. Years passed, and he became foreman of the carhouse in 1920.

This limited success gave him the idea that he could not be kept down if he could only overcome the handicap of lack of education. He was then working twelve hours a day, but, seized with ambition and determination, he bought books and enrolled in Watkins night school. Five nights of every week he burned oil there. Also he studied his job and the railway industry at large.

In 1923 Mr. Davis called him to the main office and made him safety director. At once he started a school for safety and courtesy, in which all motormen, conductors and other railway and electric power operators enrolled. Regularly, under the tutorage of Mr. Connors, these employees met—to study methods of protecting human life and property and to establish a better relationship between railway men and their riders. Attendance and interest were pronounced. Results were awaited.

In the first year, 1923, street cars operated only two days without any semblance of an accident. They managed to travel 3,750 miles per accident. School "kept," and in 1925 Mr. Connors led his associate operators to the safety record of the world, operating 66 absolutely perfect days and travel-

ing more than 1,000,000 miles without an accident. The feat has since been heralded throughout the world. In 1926, to date, street cars in Nashville have equaled last year's record for the equivalent period.

W. C. Sparks Leaves Operating Post

W. C. Sparks, for sixteen years vice-president and general manager of the Rockford & Interurban Railway, Rockford, Ill., has resigned as general manager, but will continue with the company as vice-president and a director. It is expected that Adam Gschwindt, receiver for the company, will assume duties of the managership.

Mr. Sparks was graduated from the civil engineering school of the University of Indiana in 1900 and later entered the government service in the Philippines, where he remained for nearly two years. On his return he entered the engineering department of the Union Traction Company of Indiana as chief engineer, but he resigned in 1910 to become general manager of the Rockford & Interurban Railway. In 1916 he was made vice-president.

In 1919 Mr. Sparks was elected president of the Illinois Electric Railway Association. He was also active in the affairs of the Central Electric Railway Association.

George L. Hanscom, for the last 25 years employed by the York Utilities Company, Sanford, Me., in various capacities, has been promoted from assistant superintendent to superintendent.

William Greenwood has become affiliated with the York Utilities Company, Sanford, Me., as master mechanic in charge of shops and power houses. He was formerly with the Westinghouse Electric & Manufacturing Company.

V. Watlington, who acted as managing director of the English Electric Company, during the absence of P. J. Pybus on sick leave, has been appointed managing director of the company.

Obituary

Frank G. Hart, superintendent of transportation for the Bloomington & Normal division of the Illinois Power & Light Company, died on April 21. Mr. Hart entered the service of the old Bloomington & Normal horse car system in 1894. He served with that company continually until 1903. In that year he resigned, but in 1907 he re-entered the service under M. G. Linn, then manager of the Bloomington-Normal property, and served under the succeeding managers, D. W. Snyder and E. O. Brown. He was made superintendent of transportation in 1922, following the death of Charles L. Richards, and served in that capacity since then. Mr. Hart was well known throughout the company organization.

William J. Moody, a director of the Corning & Painted Post Street Railway, Corning, N. Y., and the Elmira, Corning & Waverly Railroad, Waverly, N. Y., died on April 26.

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

Chicago Surface Lines Places Orders for 100 New Cars

The bodies of the 100 new multiple-unit cars being purchased by the Chicago Surface Lines will be built by three companies, deliveries to begin in September. Contract for 34 of them was awarded to the Cummings Car & Coach Company of Paris, Ill., 33 to the J. G. Brill Company of Philadelphia and 33 to the St. Louis Car Company of St. Louis.

The cars are of practically the same design throughout as the 100 multiple-unit cars purchased in 1924 and described in the ELECTRIC RAILWAY JOURNAL, issue of Nov. 15, 1924, page 837. They are designed for multiple-unit operation, giving them the maximum flexibility for train service or single unit two-man or one-man operation. Double-end equipment permits them to be operated on lines having stub terminals. National Pneumatic doors and the interlocking door and car control, automatic exit doors and Safety Car Devices apparatus are used. Their weight complete is 41,000 lb. The contract for motors is divided between General Electric No. 275 and Westinghouse 535, two motors being provided per car. Contracts for principal items of equipment awarded other than those mentioned above are as follows:

- Trucks (Stucki side bearings) . . . J. G. Brill
- Wheels Illinois Steel Company
- Axles Carnegie Steel Company
- Control equipment General Electric
- Motors:
- 67 cars General Electric
- 33 cars Westinghouse
- Door mechanism National Pneumatic
- Air compressor General Electric

- Rattan seat equipment St. Louis Car
- Couplers Ohio Brass Company
- Heater equipment Consolidated Car Heating Company
- Ventilators Railway Utility
- Signs Electric Service Supplies Company
- Single-stroke bell and buzzer equipment . . . Consolidated Car Heating Company
- Curtains Railway Curtain Company
- Registers International Register
- Thermostat equipment . . . Railway Utility
- Trolley catchers . . . Trolley Supply Company
- Headlights Trolley Supply Company
- Sand traps Electric Service Supplies

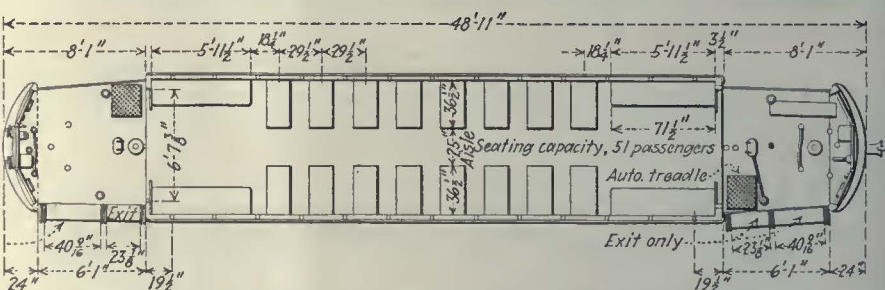
With the delivery of these cars Chicago Surface Lines will have added 445 new cars to its equipment in the past three years. Including this equipment the system will have 3,639 cars, with a total seating capacity of 160,000.

Alliance Specifies Haskellite

Haskellite has been specified for the interior trim on eight passenger interurban cars ordered by the Stark Electric Company, Alliance, Ohio, on March 13 from the Cincinnati Car Company. Specifications on these cars were published in the issue of ELECTRIC RAILWAY JOURNAL for April 17, 1926.

English Electric Anticipates Good Year

No dividends were declared on the ordinary shares of the English Electric Corporation, although profits for the year were £194,953. A reduction of £68,827 out of the earnings of the previous year occurred, this falling off being said by the directors to be occasioned by acute world competition in electrical and mechanical machinery. Unsettled conditions in certain foreign



Type of 100 New Cars Just Ordered for Chicago Will Be Similar to Those Now in Service on the Surface Lines

markets reduced the volume of foreign orders of the English company.

An improvement has been noticeable in the last few months and the company has booked a much larger volume of business than at any time in the immediate past. The unexecuted orders on its books already exceed the entire output of 1925, it is reported.

Electrification in Italy

Railway electrification in Italy took another step forward with the opening of the newly electrified railway between Sestri Levante and Spesia. The total length of this improvement is 27 miles, and it marks the final step in the electrification of the line from Modane on the French frontier to Sestri Levante, a distance of 225 miles. It is reported that within a few months electric operation will be extended to Leghorn by the conversion of another section 58 miles in length. At present the total length of electrified line in Italy is 552 miles.

New Gasoline Produced by Texas Company

A "new and better" gasoline has just been announced by the Texas Company. It has been made possible in commercial quantities through the Holmes-Manley process, which is a patented method of refining controlled by the manufacturers. Among the advantages claimed for it are the fact that it vaporizes instead of merely atomizing, because of its higher volatility and freedom from heavy ends, that it is a dry rather than a wet gas and that it provides a quicker start and pickup, more miles per gallon, relief from carbon knock and better lubrication. All Texaco tanks and pumps are now supplied with the new gasoline.

Tucson Gets New Buses

Delivery has just been made of two pay-enter city type buses to the Tucson Rapid Transit Company, Tucson, Ariz. The buses, which were constructed by the Garford Motor Truck Company, Lima, Ohio, are designed to enhance the streamline effect, as practically all body lines have been carried across the doors, as shown in the accompanying illustration. The buses will seat 21 passengers and will augment the coordinated transportation service at present provided in the city of Tucson.

\$14,122,000 Profit for Westinghouse

Sales of \$166,008,800 Largest in History of the Company—Five-Year Comparison

The volume of sales billed by the Westinghouse Electric & Manufacturing Company last year shows an increase over the previous year, notwithstanding that the South Philadelphia Works, devoted to the manufacture of large apparatus such as land turbines, condensers, equipment for merchant ships, battleships, cruisers and other naval vessels, was insufficiently loaded with business and operated at a loss for the year. The value of new orders booked during the year also shows a substantial increase over the previous year. After adjustments, the value of unfilled orders at the end of the fiscal year was \$55,163,247. A condensed comparative statement of operations for the past five years follows:

	Year Ended March 31				
	1926	1925	1924	1923	1922
Gross earnings—sales billed.....	\$166,006,800	\$157,880,292	\$154,412,918	\$125,166,115	\$99,722,026
Cost of sales.....	151,711,929	144,242,065	137,006,280	111,694,832	93,461,846
Net manufacturing profit.....	\$14,294,861	\$13,638,227	\$17,406,638	\$13,471,283	\$6,260,180
Other income.....	2,295,363	4,203,179	1,336,438	1,296,601	2,673,809
Gross income from all sources.....	\$16,590,224	\$17,841,406	\$18,743,076	\$14,767,884	\$8,933,989
Interest charges, etc.....	2,468,223	2,517,042	2,617,773	2,504,398	3,096,600
Net income available for dividends and other purposes.....	\$14,122,001	\$15,324,364	\$16,125,303	\$12,263,486	\$5,837,389

The statement of the profit and loss account follows:

Surplus as of March 31, 1925.....	\$51,199,324
Surplus—George Cutter Company, July 1, 1925.....	82,764
Net income for the year.....	14,122,000
Total.....	\$65,404,090
Deductions:	
Dividends:	
On preferred stock.....	\$319,896
On common stock.....	9,154,615
Total dividends.....	\$9,474,511
Additional reserve for federal taxes—1917-1921.....	4,000,000
Miscellaneous—Net.....	214,182
Total deductions.....	13,688,693
Surplus March 31, 1926.....	\$51,715,396

Property and plant account were increased during the year mainly due to the equipment of new buildings erected during the previous year. An increase in investments over the previous year is almost wholly accounted for by the

additional capital paid into the Westinghouse Commercial Investment Company and Westinghouse Acceptance Corporation. All of the outstanding capital stocks of these companies are owned by the Westinghouse Electric & Manufacturing Company, but because of the nature of their business, their operations are not included in the Westinghouse report.

The Westinghouse Commercial Investment Company was incorporated for the purpose of increasing the distribution of Westinghouse products by supplementing its system of distributing agents with its own jobbing houses advantageously located throughout the United States. The Investment company declared a dividend of 6 per cent on its capital stock as of Dec. 31, 1925.

The Westinghouse Acceptance Corporation was created to assist Westinghouse distributing agents and users of Westinghouse products, by financing sales on the installment plan. The Acceptance Corporation operates on a

basis similar to that of other financing corporations and has already proved of valuable assistance in securing business. It has been in operation less than a year and satisfactory profits are anticipated.

The export business of the Westinghouse company, excepting for Canada, is conducted through the Westinghouse Electric International Company. Final settlement was received during the year on the contract for the electrification of the Chilean State Railways from Santiago to Valparaiso. According to Chairman Tripp competition in foreign markets continues to be keen and the outlook for the ensuing year shows no marked change.

The average number of employees during the year was 46,427. The total of all payrolls for the year was \$74,144,607, equal to about 49 per cent of the cost of sales billed.

Metal, Coal and Material Prices

Metals—New York		May 18, 1926
Copper, electrolytic, cents per lb.....		13.875
Copper wire, cents per lb.....		16.00
Lead, cents per lb.....		7.75
Zinc, cents per lb.....		7.22
Tin, Straits, cents per lb.....		61.50
Bituminous Coal, f.o.b. Mines		
Snakeless mine run, f.o.b. vessel, Hampton Roads, gross tons.....	\$4.875	
Somerset mine run, Boston, net tons.....	1.975	
Pittsburgh mine run, Pittsburgh, net tons.....	1.825	
Franklin, Ill., screenings, Chicago, net tons.....	1.925	
Central, Ill., screenings, Chicago, net tons.....	1.70	
Kansas screenings, Kansas City, net tons.....	2.50	
Materials		
Rubber-covered wire, N. Y., No. 14, per 1,000 ft.....	\$6.25	
Weatherproof wire base, N. Y., cents per lb.....	18.00	
Cement, Chicago, net prices, without bags.....	2.10	
Linseed oil (5-bbl. lots), N. Y., cents per lb.....	11.20	
White lead in oil (100-lb. keg), N. Y., cents per lb.....	15.00	
Turpentine (bbl. lots), N. Y., per gal.....	\$0.86	



Two 21-Passenger Buses Purchased by Tucson

Rolling Stock

Milwaukee Electric Railway & Light Company, Milwaukee, Wis., has been recommended by the Railroad Commission to purchase 70 or 75 additional cars for use in that city to augment present service.

Wilkes-Barre Railway, Wilkes-Barre, Pa., has placed an order with the J. G. Brill Company, Philadelphia, Pa., for ten 30-ft. 11½-in. closed motor cars mounted on Brill 177-E-1 trucks.

Dallas Railway, Dallas, Tex., has placed an order with the American Car Company for 30 45-ft. 8-in. double-end motor cars mounted on Brill 177-E-1 trucks.

Aurora, Elgin & Fox River Electric Company, Aurora, Ill., expects delivery in August of eight double-end, single-truck, safety cars ordered from the St. Louis Car Company on April 23. These cars are to be of steel construction and will seat 32 passengers. Some of the principal specifications are given here:

Weight:	
Car body	8,200 lb.
Trucks	4,500 lb.
Equipment	5,250 lb.
Total	18,050 lb.
Length over all	28 ft. 0 in.
Truck wheelbase	8 ft. 0 in.
Width over all	7 ft. 9½ in.
Height, rail to trolley base	9 ft. 10½ in.
Body	Steel
Interior trim	Cherry
Headlining	Agasote
Roof	Arch
Air Brakes	Westinghouse
Axles	Heat-treated
Bumpers	Channel, 5 in.
Car signal system	Faraday
Car trimmings	Polished bronze
Compressors	Westinghouse
Control	K-63 double end
Couplers	St. Louis Car Company draw bar
Curtain fixtures	Curtain Supply Company
Curtain material	Pantasote
Destination signs	Hunter
Door-operating mechanism	St. Louis Car Company
Fare boxes	Cleveland No. 5
Fenders	St. Louis Car Company
Gears and pinions	General Electric
Hand brakes	St. Louis Car Company drop handle
Heater equipment, Consolidated Car Heating	
Headlights	Golden Glow S. M. 95
Journal boxes	St. Louis Car Company
Lightning arresters	G. E. aluminum cell
Motors	Two-G.E. 265-A, 35 hp., inside hung
Sanders	St. Louis Car Company "Weather-proof"
Sash fixtures	St. Louis Car Company
Seats	St. Louis Car Company R-50, reversible
Seating material	Genuine leather
Slack adjuster	St. Louis Car Company screw type
Springs	St. Louis compound hell-elliptic
Step treads	Feralun
Trolley catchers	Keystone
Trolley base	General Electric
Trolley wheels	General Electric
Trucks	St. Louis Car Company No. 7
Ventilators	St. Louis Car Company, "Peerless"
Wheels	26-in. diameter rolled steel
Special devices, etc.	Root track scrapers

British Columbia Electric Railway, Vancouver, B. C., has ordered two four-cylinder parlor car chassis from the Fageol Motors Company of California.

Southern Indiana Gas & Electric Company, Evansville, Ind., will spend \$175,000 for thirteen new large high-speed cars which will be delivered and ready for use by Oct. 1. The new units will be of the latest type safety cars. Six are designated as light-weight double-end double-truck cars. To defray the expense of the new equipment the company has been granted permission by the Indiana Public Service Com-

mission to issue \$750,000 of 6.6 per cent preferred stock.

Los Angeles Motor Bus Company, a subsidiary of the Los Angeles Railway and the Pacific Electric Railway, has placed an order for six double-deck buses with the Fageol Motors Company, Oakland, Cal. Delivery of the new unit is expected to be made shortly.

Birmingham Electric Company, Birmingham, Ala., has just purchased sixteen new electric street cars of the most modern design for its lines in Birmingham, at a total cost of \$250,000. The cars are expected to be delivered about Oct. 1, 1926. Each of these cars has a seating capacity of 62 passengers. According to General Manager Pevear new cars will be practically the same as those now in use on the East Lake and South East Lake lines, having the large side-door entrance and front exit, and many new features including standard safety devices. Heavy upholstered seats and full spring cushions have been specified. Noiseless gears and motors will be in use and rubber-tiled floors are included in the detailed specifications.

Northern Ohio Traction & Light Company, Akron, Ohio, has just received one Differential car from the Differential Steet Car Company of Findlay, Ohio. This is a trail car and will be used on trackwork and for cinder service.

Municipal Railway of St. Petersburg, St. Petersburg, Fla., has included in an improvement program eight new double-truck cars at a cost of \$100,000. The new cars are to be of the same size as the largest of those now in use. This is a further expenditure of bond moneys provided for betterments in public utilities by the electors who sanctioned an issue of more than \$200,000 last November.

Track and Line

Sioux City Service Company, Sioux City, Iowa, has started to relay new street car rails on Dubuque Street between Seventh and Eleventh Street. Work is being done at this season because the city has decided to pave the street. The new rails will be laid in a concrete monolithic base.

Pacific Northwest Traction Company, Everett, Wash., plans the construction of an overhead crossing on the North Trunk road, a link in the new Pacific Highway between Ronald and Foy Stations. The company will ask for alternative bids on a steel girder span and frame truss. The new trestle will be 125 ft. long and have a clearance of 14 ft. over interurban rails. Plans also include concrete abutments.

Power Houses, Shops and Buildings

New York Rapid Transit Corporation, Brooklyn, N. Y., operating subsidiary of the Brooklyn-Manhattan Transit Corporation, is inquiring for 25 cranes for its Coney Island shops.

Georgia Railway & Power Company, Atlanta, Ga., has obtained a permit for the construction of a new carhouse in

Atlanta, at a cost of \$90,000. The building will be of brick and concrete with metal roof. Construction will start immediately.

Trade Notes

Graybar Electric Company, New York, N. Y., has announced the opening of three additional distributing branches to be located in the following cities: Reading, Pa.; Dayton, Ohio, and Hartford, Conn. It is expected that these new branches will be in operation this spring.

Timken Roller Bearing Service & Sales Company, has announced the closing of its Baltimore, Md., office, formerly located at 33 Cathedral Street. The service requirements of Timken customers in this territory will be supplied through the Richmond, Pittsburgh and Philadelphia branches hereafter.

E. Hamilton Berry, manager of the electric railway department of the Philip Carey Manufacturing Company, Cincinnati, Ohio, has resigned from that office. He has held this position since November, 1925, and prior to that time was engineer of maintenance of way Cincinnati Traction Company for many years.

Fred T. Rumball, formerly manager of the Kansas City branch of Timken Roller Bearing Service & Sales Company, has been promoted to the position of sales engineer, automotive division, of the Timken Roller Bearing Company. Mr. Rumball will have his headquarters in Cleveland, with Edgley W. Austin, assistant manager of sales. The position of branch manager at Kansas City will be filled by J. M. Carey, who has been promoted from the position of salesman under Mr. Rumball.

Charles E. Parsons has recently been made general sales manager of the Auto Body Company, Lansing, Mich. Mr. Parsons has had long experience in the automotive industry, having served for many years with the Fisher Body Corporation and later becoming vice-president of the Ternstedt Manufacturing Company.

Henry Eggelhos was recently appointed exclusive representative for the eastern half of Texas by the Uehling Instrument Company of Paterson, N. J. Mr. Eggelhos' address is P. O. Box 945, Dallas, Tex.

New Advertising Literature

Nichols-Lintern Universal Lanterns is the title of a booklet recently issued by the Nichols-Lintern Company, Cleveland, Ohio. This booklet contains a complete description of the N-L industrial lanterns and illuminated signs, rapidly coming into wide use in steel mills, factories and electric railways.

Carnegie Steel Company, Pittsburgh, Pa., has issued a booklet which contains complete information, life and cost data and illustrations of Carnegie steel cross ties. The booklet states that these ties are suitable for electric and steam railways, mines, quarries, plantations and portable tracks.



**25
Modern Cars
for
Providence,
R. I.**

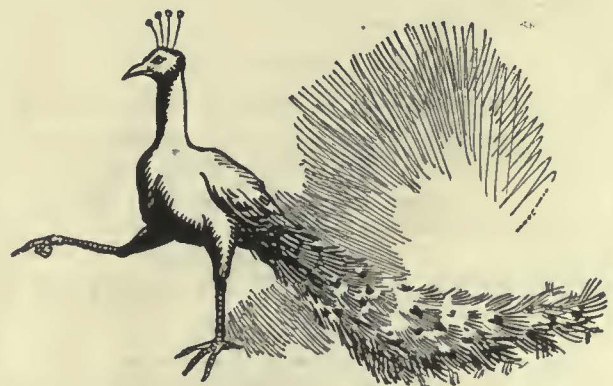


Peacock Brakes *Specified*—

Long accustomed to the power and reliability of Peacock Brakes, the United Electric Railways of Providence, R. I., naturally makes the specifications explicit on this subject, when ordering modern double-truck one-man, two-man cars of the type illustrated. These cars are being delivered this Spring.

**“Peacock Type G-14”
is their hand-brake choice!**

Hand Brakes for modern cars, city or interurban, light-weight or heavy-weight, are all provided for in the Peacock line. Consult us on your braking problems.



National Brake Co., Inc.

890 Ellicott Sq., Buffalo, N. Y.

Canadian Representative:

Lyman Tube & Supply Company, Limited, Montreal, Canada

Bankers and Engineers

Ford, Bacon & Davis Incorporated Engineers

115 Broadway, New York
PHILADELPHIA CHICAGO SAN FRANCISCO

The J. G. White Engineering Corporation

Engineers—Constructors

Oil Refineries and Pipe Lines, Steam and Water Power Plants, Transmission Systems, Hotels, Apartments, Office and Industrial Buildings, Railroads.

43 Exchange Place

New York

STONE & WEBSTER

Incorporated

EXAMINATIONS REPORTS APPRAISALS
ON
INDUSTRIAL AND PUBLIC SERVICE PROPERTIES

New York

Boston

Chicago

THE BEELER ORGANIZATION

ENGINEERS AND CONSULTANTS

Traction - Traffic - Equipment - Power Investigations

TRANSPORTATION, TRAFFIC, AND OPERATING SURVEYS
COORDINATING SERVICE—FINANCIAL REPORTS
APPRAISALS—MANAGEMENT

52 Vanderbilt Ave.

New York

SANDERSON & PORTER ENGINEERS

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Design Construction Management
Examinations Reports Valuations

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SAN FRANCISCO

ENGELHARDT W. HOLST

Consulting Engineer

Appraisals Reports Rates Service Investigation
Studies on Financial and Physical Rehabilitation
Reorganization Operation Management

683 Atlantic Ave., BOSTON, MASS.

ALBERT S. RICHEY

ELECTRIC RAILWAY ENGINEER

WORCESTER, MASSACHUSETTS

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KELKER, DELEUW & CO.

CONSULTING ENGINEERS

REPORTS ON

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Rates

Operating Problems

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President

W. H. PRICE, JR.
Sec'y-Treas.

JOHN F. LAYNG
Vice-President

BUCHANAN & LAYNG CORPORATION

Engineering and Management, Construction,
Financial Reports, Traffic Surveys
and Equipment Maintenance

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1904 Citizens National
Bank Bldg.

Phone:
Hanover: 2142

NEW YORK
49 Wall Street

DAY & ZIMMERMANN, INC. ENGINEERS

DESIGN - CONSTRUCTION - REPORTS
VALUATIONS - MANAGEMENT

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HEMPHILL & WELLS

CONSULTING ENGINEERS

Gardner F. Wells

Albert W. Hemphill

APPRAISALS

INVESTIGATIONS COVERING

Reorganization Management Operation Construction

43 Cedar Street, New York City

STEVENS & WOOD

INCORPORATED

ENGINEERS AND CONSTRUCTORS

120 BROADWAY, NEW YORK

ENGINEERING
CONSTRUCTION

YOUNGSTOWN, O.

FINANCING
MANAGEMENT

WALTER JACKSON

Consultant on Fares and Motor Buses

The Weekly and Sunday Pass—Differential
Fares—Ride Selling

143 Crary Ave., Mt. Vernon, N. Y.

Transmission Line and Special Crossing Structures, Catenary Bridges

WRITE FOR OUR NEW DESCRIPTIVE CATALOG

ARCHBOLD-BRADY CO.

Engineers and Contractors

SYRACUSE, N. Y.

KELLY, COOKE & COMPANY

ENGINEERS

Operation and Management
Traffic and Transportation Surveys

424 CHESTNUT STREET

PHILADELPHIA

McCLELLAN & JUNKERSFELD

Incorporated

ENGINEERING AND CONSTRUCTION

Examinations—Reports—Valuations
Transportation Problems—Power Developments

68 Trinity Place, New York

CHICAGO

ST. LOUIS

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

J. ROWLAND BIBBINS
 Engineer—2301 Connecticut Ave., N.W., Washington, D. C.
TRANSPORTATION SURVEYS
 Organized Traffic Relief and Transit Development
 Co-ordinating Motor Transport, Railroad and City
 Plans, Service, Routing, Valuation, Economic Studies
 EXPERIENCE IN 20 CITIES

THE P. EDWARD WISH SERVICE
 50 Church St. NEW YORK Street Railway Inspection DETECTIVES 131 State St. BOSTON

When writing the advertiser for information or prices, a mention of the Electric Railway Journal would be appreciated.

NAUGLE POLES
 WESTERN & NORTHERN CEDAR
NAUGLE POLE & TIE CO.
 59 E. MADISON ST. CHICAGO ILL.
 New York • Columbus • Kansas City • Spokane • Vancouver • Boston

ROEBLING

WELDING CABLE
ELECTRICAL WIRES and CABLES
 John A. Roebling's Sons Company, Tranton, N. J.

A Single Segment or a Complete Commutator

is turned out with equal care in our shops. The orders we fill differ only in magnitude; small orders command out utmost care and skill just as do large orders. CAMERON quality applies to every coil or segment that we can make, as well as to every commutator we built. That's why so many electric railway men rely absolutely on our name.

Cameron Electrical Mfg. Co., Ansonia, Connecticut

BRAZED Rail Bonds **ARC WELD**
 Portable Arc Welding Outfits
The Electric Railway Improvement Co.
 Cleveland, Ohio

Northern **CEDAR POLES** Western
 We guarantee
 all grades of poles; also any butt-treating specifications
BELL LUMBER COMPANY
 Minneapolis, Minn.

Shuler

Front Axles



For:

- TRUCKS
- MOTOR BUSES
- TAXIS
- TRACTORS
- TRAILERS

Not a
Side Issue

We manufacture FRONT AXLES only. By specializing on this major unit---our customers and users know that we make a superior FRONT AXLE.

Shuler Axle Co.

INCORPORATED

LOUISVILLE, KY.

Member of Motor Truck Industries, Inc., of America



Can an Appraisal Be "Too Good?"

Occasionally a property owner raises the question of whether an appraisal can be "too good." The question arises because provable appraisal service costs more than that in which there is an element of opinion or guesswork.

The American Appraisal Company operates on the principle that an appraisal cannot be "too good"—that the making of an appraisal entails a moral responsibility which cannot be overestimated.

The record of The American Appraisal Company for the past thirty years offers abundant testimony of the soundness of this principle. For whatever purpose, rate making, accounting, finance, purchase or sale, and many others, an appraisal cannot be too good.

The American Appraisal Co.

MILWAUKEE

PUBLIC UTILITIES • INDUSTRIALS • REAL ESTATE PROPERTIES • NATURAL RESOURCES

A NATIONAL ORGANIZATION



Protection Against Obsolescence

A reserve for replacement should be available when the advancing art of design makes a passenger vehicle obsolete. It is essential to anticipate this need because transportation can be sold successfully only with a vehicle that is up-to-date.

The low initial cost of Graham Brothers coaches enables the operator to protect himself against obso-

lescence at a low cost per mile and in the shortest possible time. With costlier and larger coaches both the rate per mile and the time required become so great that they may fail to accomplish this purpose.

Street Car Type
Motor Coach,
Complete,
\$3815
F. O. B. Detroit

Furthermore, Graham Brothers Motor Coaches are: Attractive, safe, dependable and economical in operation.

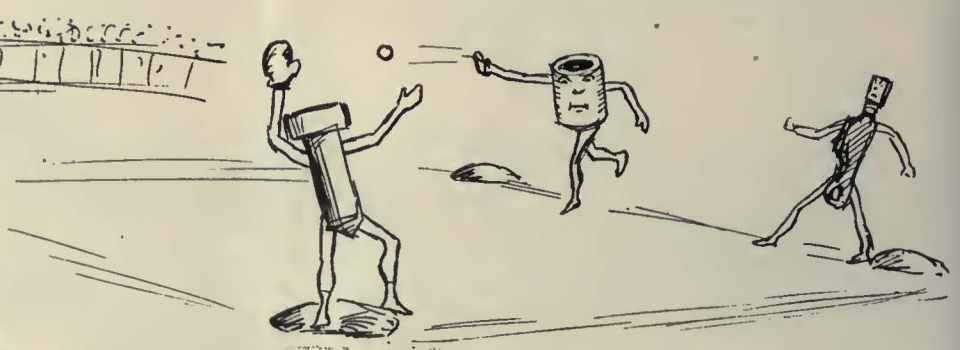
GRAHAM BROTHERS
Evansville - DETROIT - Stockton
A DIVISION OF DODGE BROTHERS, INC.
GRAHAM BROTHERS (CANADA) LIMITED - TORONTO, ONTARIO

GRAHAM BROTHERS MOTOR COACHES

SOLD BY DODGE BROTHERS DEALERS EVERYWHERE



**“Boyerize
to
Economize”**



Setting a record for endurance—

When one of baseball's famous shortstops played well over a thousand consecutive games, he set a record for endurance on the baseball field. He far surpassed the efforts of other so-called “iron men.”

When Boyerized Car Parts stand the gaff of service day after day, they also set a record that outdistances ordinary steel parts three to four times.

The long-wearing qualities of Boyerized Parts have made them standard equipment on many prominent railways. To find out why—test them out in your hardest service.

Brake Pins
Brake Hangers
Brake Levers
Pedestal Gibs
Brake Fulcrums
Center Bearings
Side Bearings

Spring Post Bushings
Spring Posts
Bolster and Transom Chafing Plates
Manganese Brake Heads
Manganese Truck Parts
Bushings
Bronze Bearings

BEMIS CAR TRUCK COMPANY

Electric Railway Supplies
SPRINGFIELD, MASS.

REPRESENTATIVES:

Economy Electric Devices Co., Old Colony Bldg., Chicago, Ill.
F. F. Bodler, 903 Monadnock Bldg., San Francisco, Cal.
W. F. McKenney, 54 First Street, Portland, Ore.
J. H. Denton, 1328 Broadway, New York City, N. Y.
A. W. Arlin, 722 Pacific Electric Bldg., Los Angeles, Cal.

**The
McArthur
Turnbuckle**





A few of the Cleveland Railway Company's magnificent fleet of SAFEWAY Six-Wheel Double Deckers which handle 70 per cent of its city bus business.

The Verdict of the Cities

When the Detroit Motor Bus Company replaced its 4-wheel equipment with 37 Double Deck and 98 Single Deck SAFEWAY Six-Wheelers—

- And Cleveland, with an unusually difficult downtown transportation problem, followed with 40 Double Deckers—
- And Kansas City, of mountainous hauls demanding miracles of performance, took 18 Double Deckers and 5 Parlor Cars—
- And New York, Boston, St. Louis, Cincinnati, Washington, Pittsburgh, Montreal and Akron were added to the list—

American cities of the first-class gave an impressive verdict, stamped with the seal of public approval of performance, for the SAFEWAY Six-Wheel principles of construction and design.

These great municipalities demanded in common that the equipment selected would give—

- Maximum load—ease of handling for quick getaway to move with traffic—economy of operation and maintenance—comfort to the public—and *Safety Always*. These were the paramount factors to be considered.

Their expert traffic engineers, after the most gruelling tests it was possible to devise selected the SAFEWAY Six-Wheeler.

The exclusive features of these sturdy, powerfully motored, absolutely safe and luxuriously comfortable 63-passenger Double Deckers and 29-passenger City Type SAFEWAY Six-Wheelers met every requirement, the year around, of modern city transportation.

The cities have given their verdict. The SAFEWAY Six-Wheeler has solved their problem. It is the answer to yours.

Specifications all types and delivery dates on request. See our exhibit at the A. R. A. convention, Atlantic City, June 9-16.

THE SAFEWAY SIX-WHEELER

THE SIX WHEEL COMPANY, 1800 W. LEHIGH AVENUE, PHILADELPHIA, PA.

Manufacturers of Intercity, De Luxe, Single, and Double Deck City Type Six-Wheel Coaches

In the final analysis, the success of a wheel in electric railway service is governed by the manner in which it measures up to three requirements: [1] Safety [2] Dependability [3] Economical Mileage Cost.

Gary Wheels, being *homogeneous* in nature, *wrought steel* in construction and of the *multiplied mileage* type, meet these essentials in a particularly effective way.

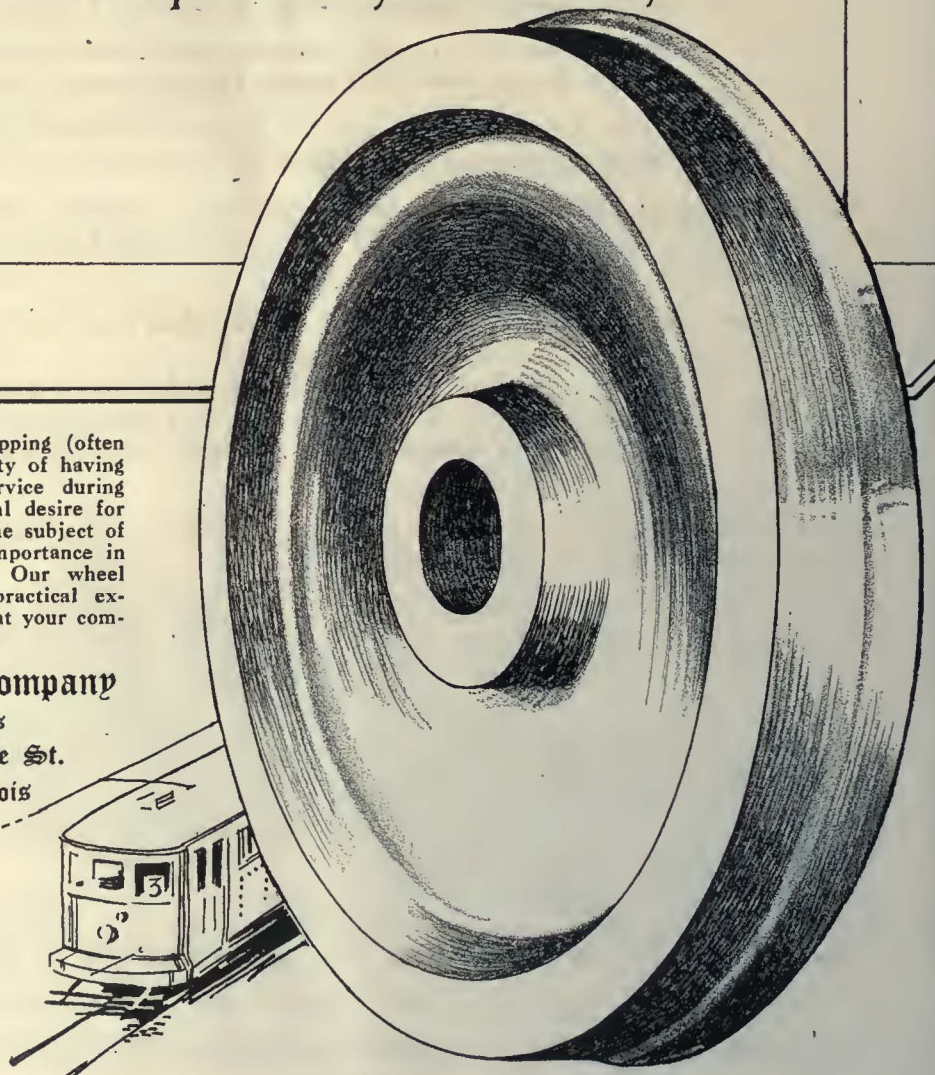
Frequent starting, quick stopping (often in emergencies), the necessity of having maximum equipment in service during rush periods, and the natural desire for low operating costs, make the subject of Wheels one of particular importance in the electric railway field. Our wheel specialists, with years of practical experience to guide them, are at your command.

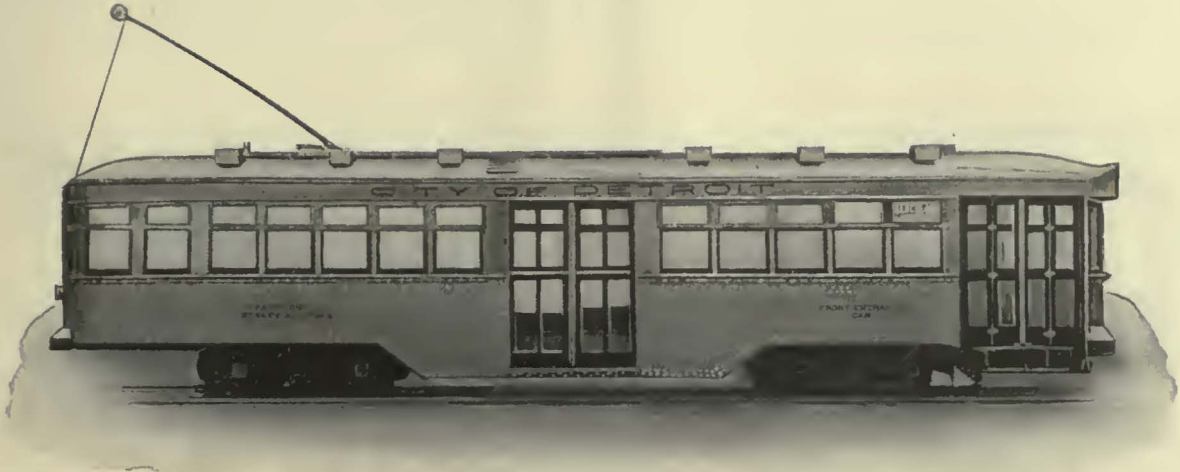
Illinois Steel Company

General Offices

208 So. La Salle St.

Chicago, Illinois



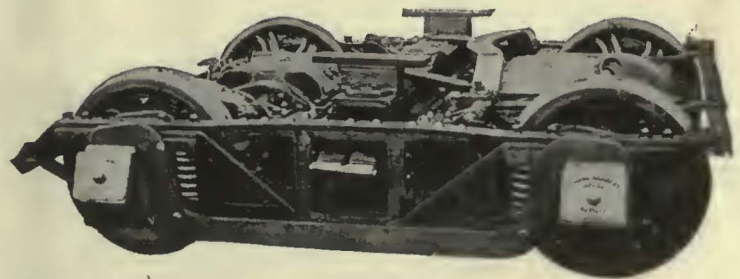


One hundred and twenty-five cars of this type furnished the Department of Street Railways, City of Detroit

Modern Cars

Light weight cars of all types for city and interurban service

TWENTY-FIVE YEARS' experience in building fine cars, and twenty-five years' continual contact with the needs of progressive railways enables this company to meet every need of today's conditions. Our engineering department will co-operate with you in working out designs and submitting proposals, or we will gladly quote on your plans and specifications.



MC62 Light weight truck for low car bodies, city or interurban service. Inside hung equalizer bars.

CUMMINGS CAR AND COACH COMPANY

Successor to McGuire-Cummings Mfg. Co.

111 W. Monroe Street
CHICAGO



Create an air of progressiveness



New cars! Better service! Something to show that the town's "getting ahead." Naturally local papers are only too eager for news like that. It's "popular stuff,"—and the best kind of business building publicity any electric railway could possibly desire.

~~can be done~~

with new cars

Clearly progress is the keynote today. It sounds in industry, it sounds in business and it sounds in the private life of the individual.

Furthermore it has sounded lustily in the field of transportation. Faster service, more comfort, a real effort to please and attract passengers—this recipe has never failed to produce results.

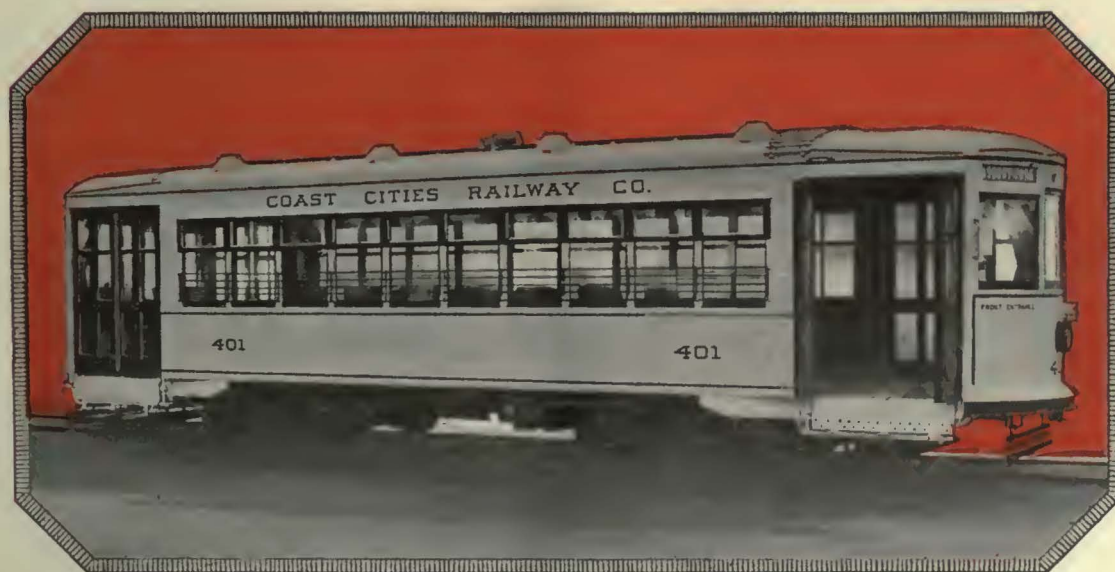
To create this air of progressiveness, to keep step with community and national development as a whole, is the necessity facing the electric railway industry today.

It can be done, and it has been done with new, modern, passenger-attractive cars.

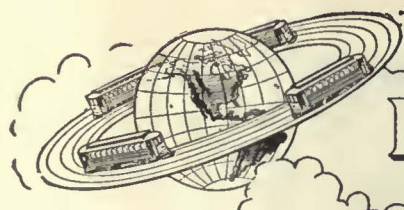
A sufficient number of well established and successful properties have already "taken the medicine" to prove its efficiency beyond doubt.

And in every instance where this air of progressiveness has been created through the installation of speedy, comfortable and handsome modern cars, the results have been far reaching in their promotion of healthy business conditions for the railway, a better spirit among its employees, and a friendly feeling of goodwill on the part of the public. At the same time because of the greater efficiency of modern equipment, operating expenses have been materially decreased, and the resulting gain in net income more than pays for the cars.

 **THE J. G. BRILL COMPANY** 
PHILADELPHIA, PA.
AMERICAN CAR CO. — C. C. KUHLMAN CAR CO. — WASON MANFG CO.
ST. LOUIS, MO. — CLEVELAND, OHIO. — SPRINGFIELD, MASS.



The creation and maintenance of car advertising space values requires the same degree of highly specialized knowledge as the construction and maintenance of railroads. Such tasks should be delegated only to those of widest experience and longest record of success.



Barron G. Collier

INCORPORATED

CANDLER BLDG. NEW YORK

Nuttall

Standard Helical Gears Save the Motors



That shock of acceleration that is inevitable with spur gearing springs bolts, strains bearings, loosens insulation, cuts gear life and motor life, and piles up maintenance.

The motors suffer; body work suffers and soon begins to creak.

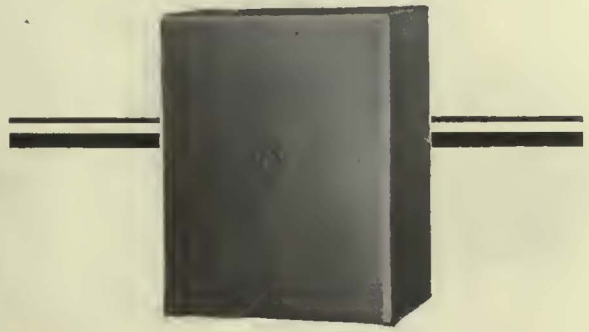
Nuttall BP Helical Gears will stop this profit leak. The meshing of the teeth is like the turning of a screw—smooth, vibrationless, noiseless, shockless. There is no grinding and no chattering.

We'll be glad to cooperate in proving their economy on your cars. Consult us.

Write for our
Helical Gear Book

R.D. NUTTALL COMPANY
PITTSBURGH  PENNSYLVANIA

All Westinghouse Electric & Mfg. Co. District Offices are Sales Representatives in the United States for the Nuttall Electric Railway and Mine Haulage Products. In Canada: Lyman Tube & Supply Co., Ltd., Montreal and Toronto.



ESPECIALLY CHOSEN FOR YOUR EQUIPMENT

U.S.G. BRUSHES are never "generally recommended"; your operating conditions, type and condition of equipment, kind of service and all other details are first carefully considered by trained brush engineers *before* the grade of U.S.G. brush to be applied is decided upon.

This results in many benefits for you. You get better commutation, longer life of your motors, longer brush life and in general, better all-around service. Perfectly operating brushes reduce costs of application, replacement and repairs to motors. Therefore, it is to your advantage to choose those which give the longest and most satisfactory life and this can only be accomplished by having your individual needs carefully studied before the brushes are applied.



Brushes fill the bill

Manufactured by

The United States Graphite Co.
Saginaw, Michigan

New York
Chicago

Philadelphia
St. Louis

Pittsburgh
San Francisco



HASKELITE

for Headlining
and Interior Trim
in Old Cars

THE Milwaukee Electric Railway & Light Company has long been a regular user of HASKELITE for the reconstruction of old cars. A large recent order is evidence of the satisfaction which this material has given. It provides an unequalled finish for headlinings and interior trim.

When re-building or repairing old cars, why not take advantage of this ideal plywood and its steel faced companion PLYMETL? In addition to interior trim HASKELITE is being widely adopted for roofs, floors, ad racks, etc., while PLYMETL is the accepted standard for side panels, dashes, etc. These materials insure light weight and maximum strength, two of the most important factors in the modern car.

May we send you our blueprint booklet covering the uses of HASKELITE and PLYMETL in street car and bus construction?

HASKELITE MANUFACTURING CORPORATION
133 W Washington Street, CHICAGO, ILLINOIS

PLYMETL

ERJ5-22Gray

88% use "Tool Steel" gears

Questionnaire Replies

THE 1925 A. E. R. A. Equipment Committee sent out a questionnaire on spur and helical gearing. To this questionnaire there were 18 companies replied who controlled a total of 14,910 cars. The lineup of these companies on "Tool Steel" is as follows:

Exclusive Users—9 companies controlling 7943 cars.....	53%	} 88%
Part Users—6 companies controlling 5138 cars.....	35%	
Non-Users—3 companies controlling 1829 cars.....	12%	

As you analyze the 1925 Equipment Committee report on the gear subject bear in mind that the basis information was obtained from companies where 88% of the cars were controlled by those who used "Tool Steel" gears and pinions, either exclusively or regularly.



The Tool Steel Gear & Pinion Co.,
Cincinnati, Ohio

TOOL-STEEL QUALITY
GEARS AND PINIONS
The Standard of Quality



Don't Overlook Opportunities

Men who regularly keep in touch with the market through other channels often overlook the many opportunities that are to be found in the

SEARCHLIGHT SECTION

For Every Business Want
"Think SEARCHLIGHT First"

0156



Cold Dinners

for your passengers?

Not if you use

AJAX

BABBITT for ARMATURES

keeps the rolling stock rolling



The Ajax Metal Company

Established 1880

PHILADELPHIA

NEW YORK

CHICAGO

BOSTON

CLEVELAND

PANTASOTE

Trade Mark

Seat and Curtain Materials

There is no substitute for Pantasote

AGASOTE

Trade Mark

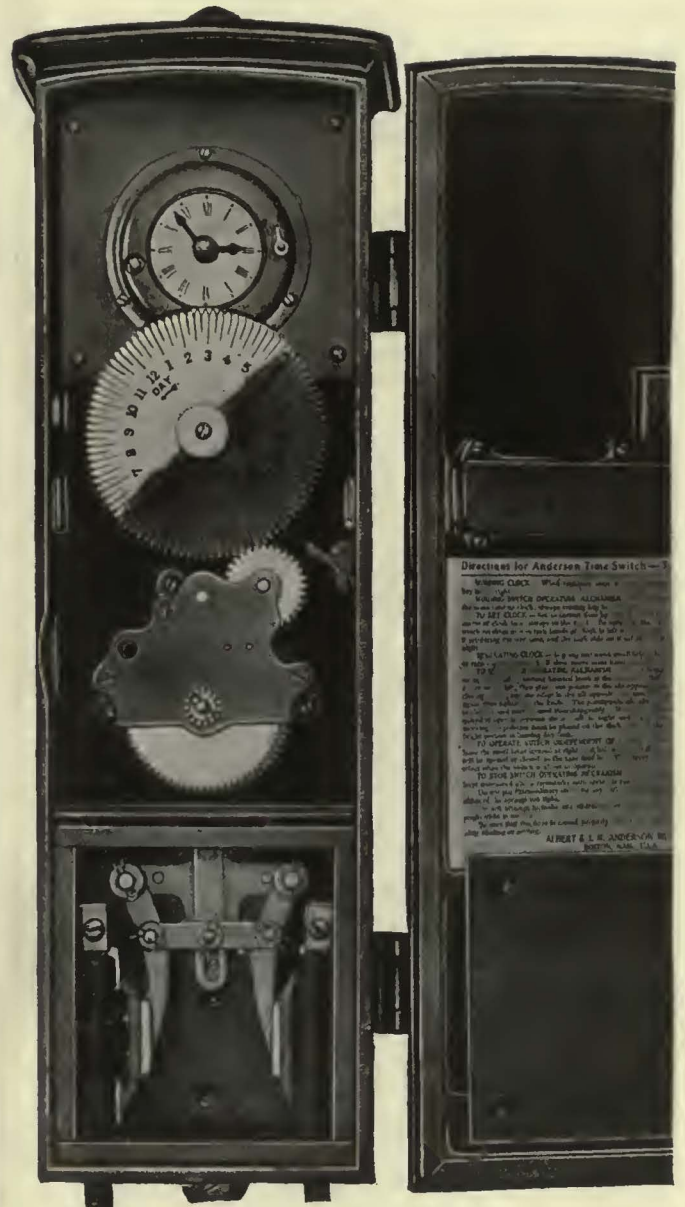
Roofing—Headlining—Wainscoting

The only homogeneous panel board

*standard
for electric railway cars
and motor buses*

The PANTASOTE COMPANY Inc.

At 46th, 250 Park Avenue Street
NEW YORK



Automatic Time Switches

If you are relying upon a Time Switch to do its work faithfully and continuously, if you must be absolutely sure that the Time Switch functions when and how you want it to, if you must be certain—then install an Anderson.

Every part of this Time Switch, including the clock is constructed under the same roof—and dependability is built in every part.

Hundreds of electric signs are controlled by Anderson's; Central Stations use them for street lighting, two-meter service and Automatic Sub-stations. There are many other uses for these dependable Time Switches.

Bulletin No. 37 may suggest how you can profitably install an Anderson Time Switch.

Albert & J. M. Anderson Mfg. Co.
289-305 A St., Boston, Mass.

New York

Philadelphia

Chicago

London, England

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
Hoboken Factory Terminal,
Building F, Fifteenth Street, Hoboken, N. J.

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

M-J Armature Babbitt



No less than twenty-five different grades of Babbitt have been successfully perfected in the More-Jones line, designed for various services and at varying prices. "Armature" for electric railways is the recognized standard. *Let us quote you.*

More-Jones Brass & Metal Co.
St. Louis, Mo.

MORE-JONES QUALITY PRODUCTS

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

*The
Hardware makes the line
Hubbard makes the
Hardware*



Hubbard and COMPANY
PITTSBURGH • OAKLAND, CAL. • CHICAGO

Rail Grinders

a type for every need

Atlas Arc Welder

Welding Supplies
Abrasives

(Wheels and Bricks)

Railway Track-work Co., Philadelphia

WHARTON

Special Trackwork
Switches - Mates - Frogs - Crossings
incorporating the famous
Tisco Manganese Steel

Wm. Wharton Jr. & Co., Inc.
Easton, Pa.
Offices

Boston Chicago El Paso Montreal New York Philadelphia
Pittsburgh Salt Lake City San Francisco Scranton

Lorain Special Trackwork Girder Rails

Electrically Welded Joints

THE LORAIN STEEL COMPANY
Johnstown, Pa.

Sales Offices:
Atlanta Chicago Cleveland New York
Philadelphia Pittsburgh Dallas
Pacific Coast Representative:
United States Steel Products Company
Los Angeles Portland San Francisco Seattle
Export Representatives:
United States Steel Products Company, New York, N. Y.

SPECIALISTS

in the
Design and Manufacture
of
Standard—Insulated—and
Compromise Rail Joints

The Rail Joint Company
61 Broadway, New York City



'CARNEGIE'
for
WHEELS
AXLES
RAILS
CROSS TIES
Carnegie Steel Company
PITTSBURGH, PENNA.

Bethlehem Products for Electric Railways

Tee and Girder Rails; Machine Fitted Joints;
Splice Bars; Hard Center Frogs; Hard Center
Mates; Rolled Alloy Steel Crossings; Abbott and
Center Rib Base Plates; Rolled Steel Wheels and
Forged Axles; Tie Rods; Bolts; Tie Plates and
Pole Line Material.

Catalog Sent on Request

BETHLEHEM STEEL COMPANY, Bethlehem, Pa.

BETHLEHEM

The DIFFERENTIAL CAR



Standard on
60 Railways for

Track Maintenance
Track Construction
Ash Disposal
Coal Hauling
Concrete Materials
Waste Handling
Excavated Materials
Hauling Cross Ties
Snow Disposal

Use These Labor Savers

Differential Crane Car
Clark Concrete Breaker
Differential Bottom Dump Ballast Car
Differential Car Wheel Truck and Tractor

THE DIFFERENTIAL STEEL CAR CO., Findlay, O.

Arc Weld Rail Bonds

AND ALL OTHER TYPES

Descriptive Catalogue Furnished

American Steel & Wire Company

Chicago Boston Pittsburgh
New York Cleveland Denver
San Francisco U. S. Steel Products Co. Portland Seattle
Los Angeles

B. A. HEGEMAN, Jr., President H. A. HEGEMAN, First Vice-Pres. and Treas.
F. T. SARGENT, Secretary W. C. PETERS, Vice-Pres. Sales and Engineering

National Railway Appliance Co.

Grand Central Terminal, 452 Lexington Ave., Cor. 45th St., New York.

BRANCH OFFICES

Munsey Building, Washington, D. C. 100 Boylston Street, Boston, Mass.
Hegeman-Castle Corporation, Railway Exchange Building, Chicago, Ill.
Tool Steel Gears and Pinions Fort Pitt Spring and Mfg. Co.,
Anglo-American Varnish Co., Springa
Varnishes, Enamels, Etc. Cutler Hammer Electric Heaters
National Hand Holds Flaxlinum Insulation
Genesco Paint Oils Anderson Slack Adjusters
Dunham Hopper Door Device Yellow Coach Mfg. Company—
Garland Ventilators Single and Double-deck Buses
Economy Electric Devices Co., Walter Tractor Snow Plows
Power Saving and Inspection
Meters

THE BABCOCK & WILCOX COMPANY

85 LIBERTY STREET, NEW YORK

Builders since 1868 of
Water Tube Boilers
of continuing reliability

Makers of Steam Superheaters
since 1898 and of Chain Grate
Stokers since 1893



BRANCH OFFICES
BOSTON, 49 Federal Street
PHILADELPHIA, Packard Building
PITTSBURGH, Farmers Deposit Bank Building
CLEVELAND, Guardian Building
CHICAGO, Marquette Building
CINCINNATI, Traction Building
ATLANTA, Candler Building
PHOENIX, ARIZ., Heard Building
DALLAS, TEX., 2001 Magnolia Building
HONOLULU, H. T., Castle & Cooke Building
PORTLAND, ORE., 805 Gasco Building

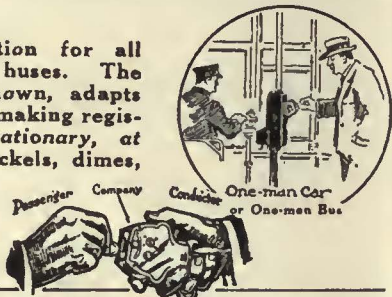
WORKS
Bayonne, N. J.
Barberton, Ohio

BRANCH OFFICES
DETROIT, Ford Building
NEW ORLEANS, 344 Camp Street
HOUSTON, TEXAS, 1011-13 Electric Building
DENVER, 435 Seventeenth Street
SALT LAKE CITY, 405-6 Kearns Building
SAN FRANCISCO, Sheldon Building
LOS ANGELES, 404-6 Central Building
SEATTLE, L. C. Smith Building
HAVANA, CUBA, Calle de Aguiar 104
SAN JUAN, Porto Rico, Royal Bank Building

Instantaneous Registration by the Passenger

ROOKE of fare collection SYSTEM

Meets every condition for all types of cars and buses. The stand device, as shown, adapts it to one-man uses—making register portable or stationary, at option. Handles nickels, dimes, quarters, or metal tickets, in any combination, FLEXIBILITY with CERTAINTY.



Rooke Automatic Register Company Providence, R. I.

Just what do you look for in the paint you buy?

Protection? Longevity? Appearance? Price? There are paints made for every kind of surface—some good, some not so good—but, where you want real protection—long term of service—economy—paint that will stand up under conditions which rapidly break down ordinary paint, use VALDURA.

It is REAL paint that will give you dollar for dollar service.

AMERICAN ASPHALT PAINT CO.
844 Rush Street CHICAGO



We make a specialty of
ELECTRIC RAILWAY LUBRICATION

We solicit a test of TULC on your equipment

The Universal Lubricating Co.
Cleveland, Ohio
Chicago Representatives: James-Ross Company,
Straus Bldg.



Type R-11
Double Register

International Registers

Made in single and double types to meet requirements of service. For hand or foot, mechanical or electric operation. Counters, car fittings, conductors' punches.

The International Register Co.
15 South Throop Street, Chicago, Illinois



FARE BOXES for BUSES

Let us tell you of this especially designed box for this class of service.

The Cleveland Fare Box Co.
4900 Lexington Ave., Cleveland, O.
Canadian Cleveland Fare Box Co., Ltd.
Preston, Ontario

COIN COUNTING And Sorting Machines CHANGES CARRIERS Tokens

Kalamazoo Trolley Wheels

The value of Kalamazoo Trolley Wheels and Harps has been demonstrated by large and small electric railway systems for a period of thirty years. Being exclusive manufacturers, with no other lines to maintain, it is through the high quality of our product that we merit the large patronage we now enjoy. With the assurance that you pay no premium for quality we will appreciate your inquiries.



THE STAR BRASS WORKS
KALAMAZOO, MICH., U. S. A.

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, 3 cents a word, minimum charge \$2.00.
 Proposals, 40 cents a line an insertion.

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

DISPLAYED—RATE PER INCH:
 1 to 3 inches.....\$4.50 an inch
 4 to 7 inches..... 4.30 an inch
 8 to 14 inches..... 4.10 an inch
 Rates for larger spaces, or yearly rates, on request.
 An advertising inch is measured vertically on one column, 3 columns—30 inches—to a page.

E. R. J.

**WE OWN AND OFFER—
 FOR SALE
 ALL EQUIPMENT OF FORMER**

NEW YORK & LONG ISLAND TRACTION CO.

which includes:

Birney Cars
 Brill Cars
 Southern Cars

Sweepers
 Snow Plows
 Work Cars

Materials and Supplies
 Machine Shop Equipment
 Track Tools and Machinery

Electric Welder
 Electric Grinder
 Concrete Mixer

RAILWAY MOTORS G. E.—58, 80, 202, 800
 Westinghouse—56, 307, 508-A

Approximately 40 Miles of Track and Overhead Material, Etc.

FOR INFORMATION REGARDING THE ABOVE, WRITE OR WIRE

H. E. Salzberg Co., Inc., 50 Church Street, New York City
Railway Division

POSITIONS WANTED

AUDITOR with eleven years' continuous public utility experience railway, bus, gas and electric departments, desires position where promotion depends on ability. Now employed; can obtain release with reasonable notice. PW-904, Electric Railway Journal, Star Building, St. Louis, Mo.

CO-ORDINATION may mean an addition to your staff as well as to your equipment. Young man, engineering training having six years' experience in both operation and maintenance of buses, desires change. Qualified to take complete charge of bus department or subsidiary. Experienced in traffic, public relations, personnel, and costs. Midwestern location preferred. P.W.-908, Electric Railway Journal, Tenth Ave. at 36th St., New York.

PURCHASING AGENT: Positions wanted by man with over twelve years' experience purchasing supplies for street and interurban railways, electric, gas and water utilities, has also had several years department experience as storekeeper, thoroughly familiar with materials and sources of supply. Desires change for personal reasons, best references, correspondence invited. PW-909, Electric Railway Journal, Tenth Ave. at 36th St., New York.

POSITION VACANT

To Public Utility Publicity Men

Leading Public Utility Company wants to add to its Publicity Department a man who has had experience in this line of work with public utilities. Must be able to write newspaper articles, general descriptive matter and produce booklets, window cards, display ads, etc., about public utility services. State experience, salary expected, and send samples which will be taken care of and returned. Everything treated in strictest confidence. This is a good opening for a good young publicity man who knows something about public utilities. Address

P-007 Electric Railway Journal
 1600 Arch St., Philadelphia, Pa.

POSITIONS WANTED

RAILWAY superintendent in charge of operation and maintenance of rolling stock track and overhead, an outstanding success in operating co-ordinated railway and coach service, desires change for personal reasons. Correspondence invited. PW-887, Electric Railway Journal, 7 So. Dearborn St., Chicago, Ill.

SUPERINTENDENT transportation. With a wide experience and successful record on city and interurban properties also co-ordination of rail and bus service, successful in handling labor, public relations, etc. Recognized as a transportation official of exceptional ability fully capable of getting results on any property. At present engaged. Personal reasons for desiring change. Best of references. Correspondence invited. Address PW-903, Electric Railway Journal, Guardian Building, Cleveland, Ohio.

FOR SALE

STEEL TRAIL CARS

10—Light Weight 26 in. wheels, Seating capacity—62.

15—Birney Safety Cars, complete.

Detailed Specifications on Request

ELECTRIC TRACTION & BUS CO.

Times Bldg., New York.

Rotary Converters

1—500 kw., 600-v., 833 amp., 900 r.p.m., 6-ph., compound wound Westinghouse Rotary Converter, with 3—165 kva., 60-cy., single ph., 13200 v. primary transformers with A.C. and D.C. panels.

1—300 kw., 600-v., 500 amp., 1200 r.p.m., 6-ph., compound wound interpole Westinghouse Rotary Converter, with 3—110 kva., 60-cy., single ph., 13200-v. primary transformers with A.C. and D.C. panels.

GEO. SACHSENMAIER CO.

926 N. Third St., Philadelphia, Pa.

FOR SALE

30 Birney Safety Cars

Brill Built

West. 508 or G. E. 264 Motors. Cars Complete—Low Price—Fine Condition.

ELECTRIC EQUIPMENT CO.

Commonwealth Bldg., Philadelphia, Pa.

WANTED

WANTED

20—General Electric 216 Motors.
 28—General Electric 205 Motors.
 62—Westinghouse 532-B Motors.
 16—Railway Motors, 75 to 150 hp. each.

W-010, Electric Railway Journal
 Tenth Ave. at 36th St., New York City

SAVE 30% TO 50% ON RAILS-LOCOMOTIVES-CARS

**Economy—Service
 Quality—Reliability**

HYMAN-MICHAELS COMPANY'S

Peoples Gas Bldg., Chicago

ST. LOUIS — DALLAS — LOS ANGELES
 SAN FRANCISCO — PORTLAND — SEATTLE

WHAT AND WHERE TO BUY

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

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

Air Brakes
Christensen Air Brake Co.
Westinghouse Air Brake Co.

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

Appraisals
American Appraisal Co.

Armature Shop Tools
Elec. Service Supplies Co.

Asphalt Paint
American Asphalt Paint 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.
Illinois Steel Co.
Johnson & Co., J. R.
National Ry. Appliance Co.
Westinghouse E. & M. Co.

Axles, Carbon Vanadium
Johnson & Co., J. R.

Axles, Front
Shuler Axle Co.

Axles (Front and Rear)
Motor Truck and Passenger Car
Timken-Detroit Axle Co.

Axles, Steel
Bethlehem Steel Co.
Carnegie Steel Co.
Johnson & Co., J. R.

Axles, Trailer, Motor Bus
Timken-Detroit Axle Co.

Babbitt Metal
Ajax Metal Co.
Johnson & Co., J. R.
More-Jones Brass & Metal Co.

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

Batteries, Dry
Nichols Lantern Co.

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

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

Bells & Buzzers
Consolidated Car Heating Co.

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

Benders, Rail
Railway Trackwork Co.

Bodies, Bus
Cummings Car & Coach Co.
Graham Bros.

Body Material, Haskelite and Plymet
Haskelite Mfg. Corp.

Boilers
Babcock & Wilcox Co.

Bolts & Nuts
Track
Illinois Steel Co.

Bond Testers
American Steel & Wire Co.
Electric Service Supplies Co.

Bonding Apparatus
American Steel & Wire Co.
Electric Railway Improvement Co.
Elec. Service Supplies Co.
Ohio Brass Co.
Railway Trackwork Co.
Una Welding & Bonding Co.

Bonds, Rail
Amer. Steel & Wire Co.
Electric Railway Improvement Co.
Elec. Service Supplies Co.
General Electric Co.
Ohio Brass Co.
Railway Trackwork Co.
Una Welding & Bonding Co.
Westinghouse E. & M. 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
Bemis Car Truck Co.
Brill Co., The J. G.

Brakes, Brake Systems and Brake Parts
Bemis Car Truck Co.
Brill Co., The J. G.
General Electric Co.
National Brake Co.
Westinghouse Tr. Br. Co.

Brushes, Carbon
General Electric Co.
Jeandron, W. J.
Le Carbone Co.
United States Graphite Co.
Westinghouse E. & M. Co.

Brushes Graphite
United States Graphite Co.

Bulkheads
Haskelite Mfg. Corp.

Bus Seats
Hale-Kilburn Co.

Buses, Motor
Brill Co., The J. G.
Cummings Car & Coach Co.
Graham Brothers
International Motor Co.
Mack Trucks, Inc.
Six Wheel Co., The

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

Cables, (See Wires and Cables)

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

Carbon Brushes (See Brushes, Carbon)

Car Lighting Fixtures
Elec. Service Supplies Co.

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

Car Wheels, Rolled Steel
Bethlehem Steel Co.

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

Cars, Gas, Rail
Brill Co., The J. G.

Cars, Passenger, Freight, Express, etc.
American Car Co.
Brill Co., The J. G.
Cummings Car & Coach Co.
Kuhlman Car Co., G. C.
National Ry. Appliance Co.
Wason Mfg. Co.

Cars, Second Hand
Electric Equipment Co.

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

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

Castings, Gray Iron and Steel
American Steel Foundries
Bemis Car Truck Co.
Wm. Wharton, Jr. & Co.

Castings, Malleable and Brass
Bemis Car Truck Co.
Catchers and Retrievers, Trolley
Elec. Service Supplies Co.
Ohio Brass Co.
Wood Co., Chas. N.

Catenary Construction
Archbold-Brady Co.

Celling Car
Haskelite Mfg. Corp.
Pantastote Co., Inc.

Ceilings, Plywood, Panels
Haskelite Mfg. Corp.

Change Carriers
Cleveland Fare Box Co.
Elec. Service Supplies Co.

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

Clamps and Connectors for Wires and Cables
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.
Ohio Brass Co.

Clusters and Sockets
General Electric Co.

Coil Banding and Winding Machines
Elec. Service Supplies Co.
Westinghouse E. & M. Co.
Colla, Armature and Field
General Electric Co.
Westinghouse E. & M. Co.

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

Coin Counting Machines
Cleveland Fare Box Co.
International Register Co.

Coin Sorting Machines
Cleveland Fare Box Co.

Coin Wrappers
Cleveland Fare Box Co.

Commutator Slotters
Elec. Service Supplies Co.
General Electric Co.
Westinghouse E. & M. Co.
Wood Co., Chas. N.

Commutator Truing Devices
General Electric Co.

Commutators or Parts
Cameron Electrical Mfg. Co.
General Electric Co.
Westinghouse E. & M. Co.

Compressors, Air
General Electric Co.
Westinghouse Tr. Br. Co.

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

Condenser Papers
Irvington Varnish & Ins. Co.

Connectors, Solderless
Westinghouse E. & M. Co.

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

Controllers or Parts
General Electric Co.
Westinghouse E. & M. Co.

Controller Regulators
Elec. Service Supplies Co.

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

Converters, Rotary
General Electric Co.
Westinghouse E. & M. Co.

Copper Wire
American Brass Co.
Anaconda Copper Mining Co.

Copper Wire Instruments, Measuring, Testing and Recording
American Brass Co.
American Steel & Wire Co.
Anaconda Copper Mining Co.

Cord, Bell, Trolley, Register
Brill Co., The J. G.
Elec. Service Supplies Co.
International Register Co.
Roebbling's Sons Co., John A.

Samaon Cordage Works
Silver Lake Co.

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

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

Cranes, Hoists & Lifts
Electric Service Supplies Co.

Cross Arms (See Brackets)

Crossing Foundations
International Steel Tie Co.

Crossings
Ramapo Ajax Corp.
Wm. Wharton, Jr. & Co.

Crossings, Frogs & Switches
Ramapo Ajax Corp.
Wm. Wharton, Jr. & Co.

Crossings, Manganese
Bethlehem Steel Co.
Ramapo Ajax Corp.
Wm. Wharton, Jr. & Co.

Crossings, Trolley
Ohio Brass Co.

Curtains and Curtain Fixtures
Brill Co., The J. G.
Morton Mfg. Co.
Pantastote Co., Inc.

Dealer's Machinery & Second Hand Equipment
Elec. Equipment Co.
Electric Traction and Bus Co.
Hyman Michaela Co.
Sachsenmaier Co., George
Salzberg Co., Inc., H. E.

Dealer Second Hand Rails
Electric Equipment Co.
Hyman Michaela Co.

Derailing Devices (See also Track Work)

Derailing Switches
Ramapo Ajax Corp.

Destination Signs
Elec. Service Supplies Co.

Detective Service
Wish-Service, P. Edward

Door Operating Devices
Brill Co., The J. G.
Consolidated Car Heating Co.
Nat'l Pneumatic Co., Inc.

Doors & Door Fixtures
Brill Co., The J. G.
General Electric Co.
Hale-Kilburn Co.
Morton Mfg. Co.

Doors, Folding Vestibule
Nat'l Pneumatic Co., Inc.

Drills, Track
Amer. Steel & Wire Co.
Electric Service Supplies Co.
Ohio Brass Co.

Dryers, Sand
Electric Service Supplies Co.
Ohio Brass Co.
Westinghouse E. & M. Co.

Ears
Electric Service Supplies Co.
Ohio Brass Co.
Westinghouse E. & M. Co.

Electric Grinders
Railway Trackwork Co.

Electrical Wires and Cables
Amer. Electrical Works
Amer. Steel & Wire Co.
John A. Roebbling's Sons Co.

Electrodes, Carbon
Railway Trackwork Co.
Una Welding & Bonding Co.

Electrodes, Steel
Railway Trackwork Co.
Una Welding & Bonding Co.

Engineers, Consulting, Contracting and Operating
Allison & Co., J. S.
Archbold-Brady Co.
Beeler, John A.
Bibbins, Rowland J.
Buchanan & Layne Corp.
Day & Zimmermann, Inc.
Ford, Bacon & Davis
Hemphill & Wells
Holst, Engelhardt W.
Jackson, Walter
Kelker & DeLew
Kelly Cooke & Co.
McClellan & Junkerfeld
Richey, Albert S.
Sanderson & Porter
Stevens & Wood
Stone & Webster
White Eng. Corp., The
J. G.

Engines, Gas, Oil or Steam
Westinghouse E. & M. Co.

Exterior Side Panels
Haskelite Mfg. Corp.

Fare Boxes
Cleveland Fare Box Co.
Nat'l Ry. Appliance Co.
Percy Mfg. Co.

Fare Registers
Electric Service Supplies Co.

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

Fenders and Wheel Guards
Brill Co., The J. G.
Consolidated Car Feeder Co.
Star Brass Works
Wood Co., Chas. N.

Fibre and Fibre Tubing
Westinghouse E. & M. Co.

Field Coils (See Coils)

Flaxlinum Insulators
National Railway Appliance Co.

Floodlights
Electric Service Supplies Co.

Floor, Sub
Haskelite Mfg. Corp.

Floors
Haskelite Mfg. Corp.

Forgings
Brill Co., The J. G.
Carnegie Steel Co.

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

Frogs, Track (See Track Work)

Frogs, Trolley
Electric Service Supplies Co.
Ohio Brass Co.
Westinghouse E. & M. Co.

Funnell Castings
Wm. Wharton, Jr. & Co.

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

Fuses, Refillable
General Electric Co.

Gaskets
Westinghouse Tr. Br. Co.

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

Gas Producers
Westinghouse E. & M. Co.

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

Gauges, Oil and Water
Ohio Brass Co.

Gear Blanks
Bethlehem Steel Co.
Brill Co., The J. G.
Carnegie Steel Co.

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

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

Generating Sets, Gas-Electric
General Electric Co.

Generators
General Electric Co.
Lece-Neville Co., The
Westinghouse E. & M. Co.

Girder Rails
Bethlehem Steel Co.
Lorain Steel Co.

Gongs (See Bells and Gongs)

Greases (See Lubricants)

Grinders & Grinding Supplies
Metal & Thermit Corp.
Railway Trackwork Co.

Grinders, Portable
Railway Trackwork Co.

Grinders, Portable Electric
Railway Trackwork Co.

Grinding Bricks and Wheels
Railway Trackwork Co.

Guard Rail Clamps
Ramapo Ajax Corp.
Wm. Wharton, Jr. & Co.

Guard Rails, Tee Rail & Manganese
Ramapo Ajax Corp.
Wm. Wharton, Jr. & Co.

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

Headlights
Elec. Service Supplies Co.
General Electric Co.
Ohio Brass Co.

Headlining
Haskelite Mfg. Corp.
Pantastote Co., Inc.

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

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

Heaters, Car Stove
Smith Heater Co., Peter

Helmets, Welding
Railway Trackwork Co.
Una Welding & Bonding Co.

Ignition Units
Lece-Neville Co., The

Hose Bridges
Ohio Brass Co.

Hose, Pneumatic
Westinghouse Traction
Brake Co.

Instruments Measuring, Testing and Recording
Amer. Steel & Wire Co.
General Electric Co.
Westinghouse E. & M. Co.

ELRECO TUBULAR POLES



THE "WIRE LOCK" / THE CHAMFERED JOINT

COMBINE

Lowest Cost **Lightest Weight**
Least Maintenance **Greatest Adaptability**

Catalog complete with engineering data sent on request.

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"Okonite," "Manson," and Dundee "A" "B" Tapes

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The Okonite Company

The Okonite-Callender Cable Company, Inc.

Factories, PASSAIC, N. J.

PATERSON, N. J.

Sales Offices: New York Chicago Pittsburgh St. Louis Atlanta
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F. D. Lawrence Electric Co., Cincinnati, O.

Novelty Electric Co., Phila., Pa.

Gen. Rep.: Engineering Materials Limited, Montreal.

Cuban Rep.: Victor G. Mendoza Co., Havana.



Waterproofed Trolley Cord



Is the finest cord that science and skill can produce. Its wearing qualities are unsurpassed.

FOR POSITIVE SATISFACTION ORDER
SILVER LAKE

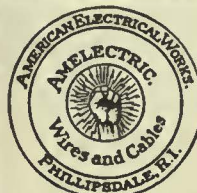
If you are not familiar with the quality you will be surprised at its **ENDURANCE** and **ECONOMY**.

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SILVER LAKE COMPANY

Manufacturers of bell, signal and other cords.

Newtonville, Massachusetts



AMELECTRIC PRODUCTS

BARE COPPER WIRE AND CABLE

TROLLEY WIRE

WEATHERPROOF WIRE
AND CABLE

PAPER INSULATED
UNDERGROUND CABLE

MAGNET WIRE

Reg. U. S. Pat. Office

Incandescent Lamp Cord

AMERICAN ELECTRICAL WORKS

PHILLIPSDALE, R. I.

Boston, 176 Federal; Chicago, 20-22 West Randolph Street;
Cincinnati, Traction Bldg.; New York, 100 E. 42nd St.

THE WORLD'S STANDARD

"IRVINGTON"

Black and Yellow

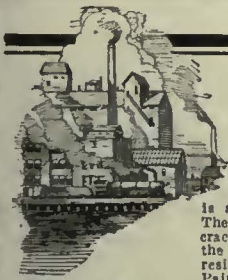
Varnished Silk, Varnished Cambric, Varnished Paper

Irr-O-Slot Insulation Flexible Varnished Tubing
Insulating Varnishes and Compounds

Irvington Varnish & Insulator Co.

Irvington, N. J.

Sales Representatives in the Principal Cities



DIXON'S SILICA - GRAPHITE PAINT

is a natural combination of silica and flake graphite. The vehicle is pure boiled linseed oil. It will not crack or peel off because of the natural elasticity of the flake graphite, while the silica furnishes the wear-resisting qualities. Because of these qualities, Dixon's Paint affords better and longer protection. By making frequent repainting unnecessary, it lowers the cost of paint upkeep. Write for Booklet 180-B

Joseph Dixon Crucible Co.

Jersey City, N. J.

Established 1827



SAMSON SPOT WATERPROOFED TROLLEY CORD



Trade Mark Reg. U. S. Pat. Off.

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.

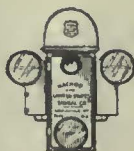
NACHOD & UNITED STATES SIGNAL CO., INC.

LOUISVILLE, KY.

BLOCK SIGNALS

FOR

ELECTRIC RAILWAYS
HIGHWAY CROSSING SIGNALS



Chapman Automatic Signals

Charles N. Wood Co., Boston



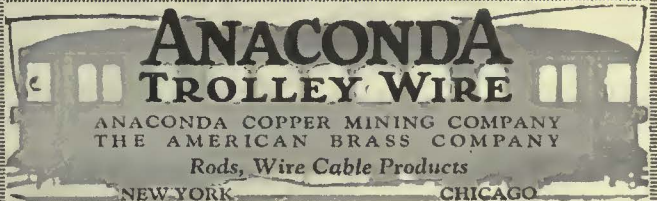
ANACONDA TROLLEY WIRE

ANACONDA COPPER MINING COMPANY
THE AMERICAN BRASS COMPANY

Rods, Wire Cable Products

NEW YORK

CHICAGO



- Insulating Cloth, Paper and Tape**
General Electric Co.
Irvington Varnish & Ins. Co.
Okonite Co.
Okonite-Callender Cable Co
United States Rubber Co.
Westinghouse E. & M. Co.
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Irvington Varnish & Ins. Co.
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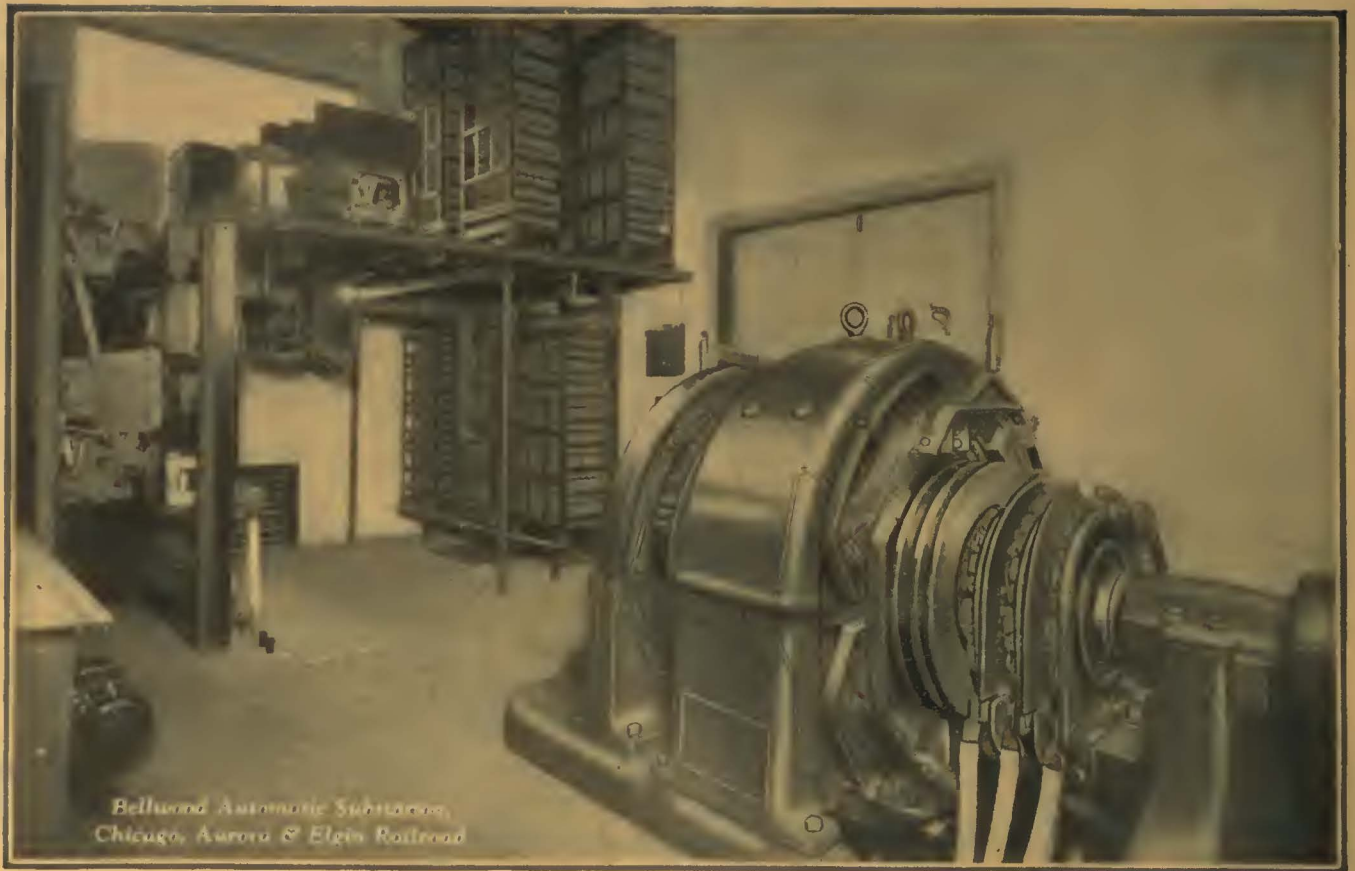
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Some idea of the severe overloads encountered by substations of the Chicago, Aurora & Elgin Railroad is obtained from the fact that frequently two 6-car trains are started at one time, each normally requiring 4000 amperes.



G-E Automatics, early adopted by the Chicago, Aurora & Elgin, have greatly facilitated operation of this road under heavy overloads. Their operating records show that 99.18% of several thousand starts are perfect; attention is one-fourteenth of that for manual stations.

By the use of automatic substations these trains can be accelerated properly and kept on time. Resistance is automatically connected to limit the converter current to a safe value. Thereby service is uninterrupted, even though the power required is greatly in excess of the converter capacity.

This load-limiting feature was one of the considerations upon which this company based its decision to use G-E Automatic Substations.

GENERAL ELECTRIC

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