

ELECTRIC RAILWAY JOURNAL

McGraw-Hill Publishing Company, Inc.

September 24, 1927

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ELECTRIC RAILWAY JOURNAL

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A Better Daily at Cleveland

FOR many years ELECTRIC RAILWAY JOURNAL has published a daily edition in connection with the annual convention of the American Electric Railway Association. This is its service to the delegates at the convention. One of its functions is to point out and to interpret the exhibits of new cars, new track, new buses and new devices. The DAILY JOURNAL is ever new.

This year it is planned to expand and improve the service given by the daily issued during the Cleveland convention in keeping with the spirit of the industry. There will be four issues instead of three, the first one appearing on Monday morning when the delegates are most in need of information regarding the exhibits, details of the program, and announcements of important events. Then, too, the DAILY will be so arranged that it will be even more readable than it has been in the past. Instead of going into detail here, we will only say, "Watch for the DAILY."

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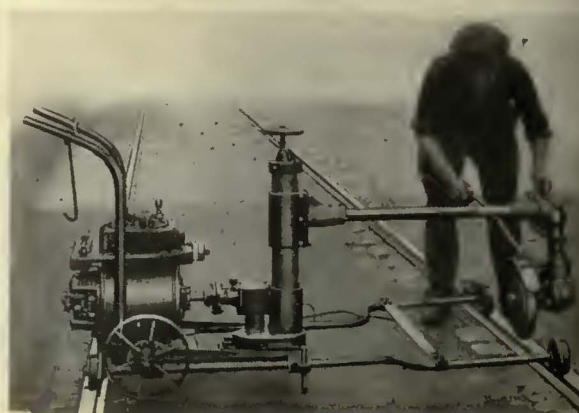
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AGENTS:

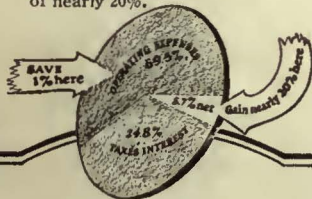
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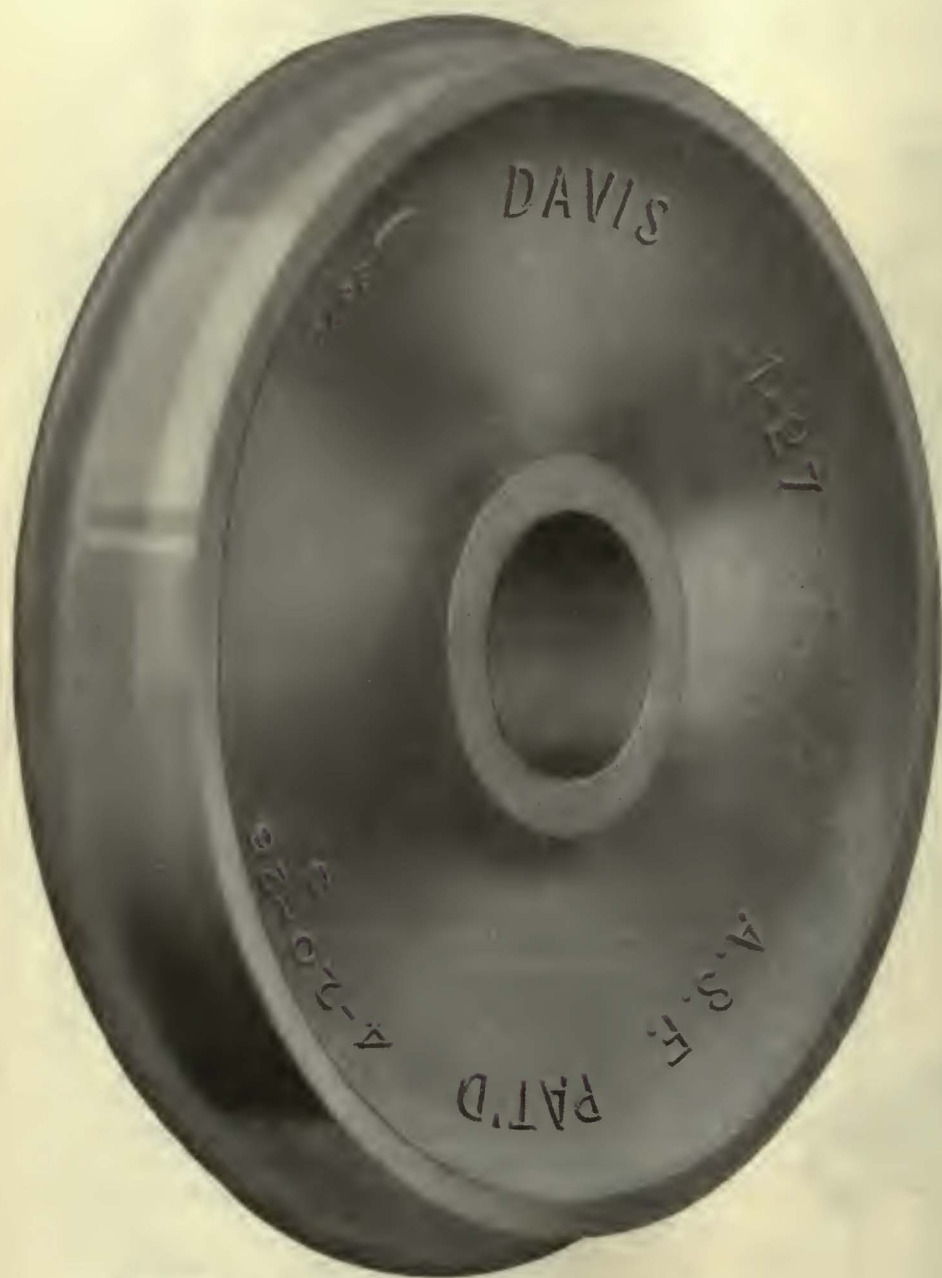
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Ordinary steel makes an ordinary wheel. Only its special composition makes the Davis Steel Wheel "One-Wear" in performance as well as in name.

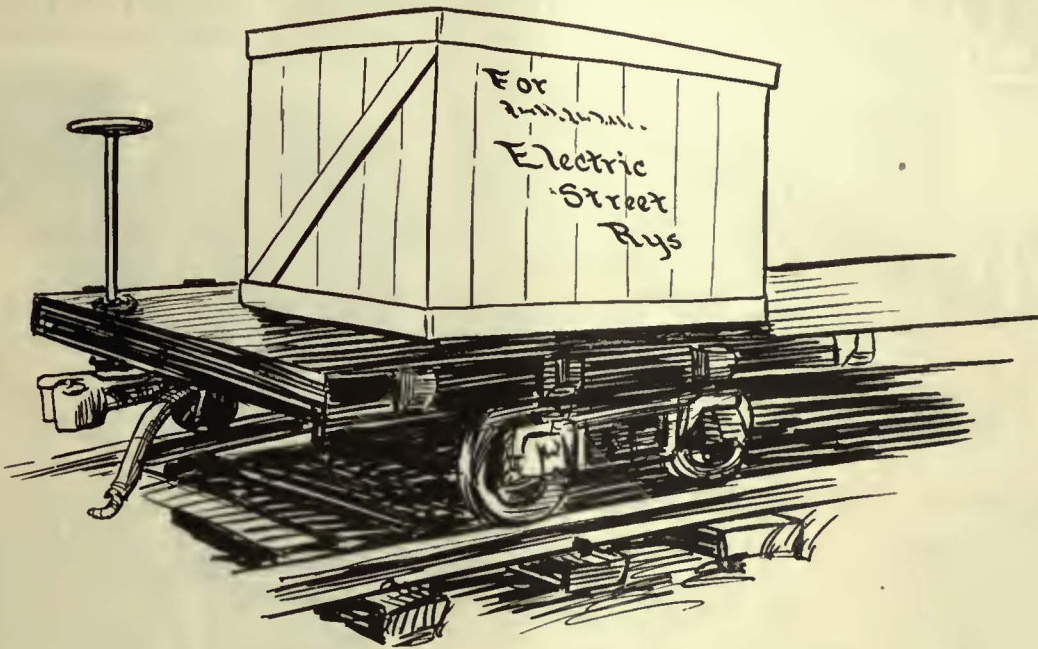


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CLEVELAND, OHIO

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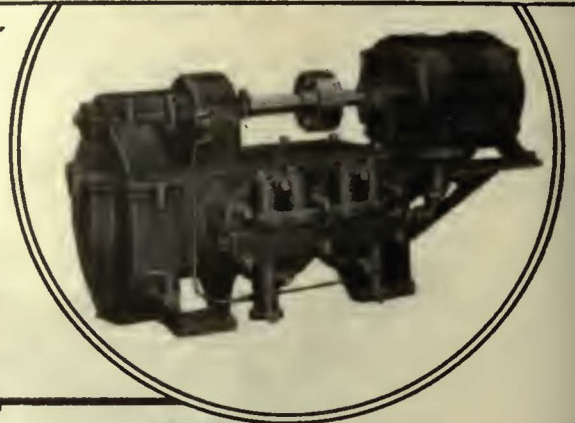
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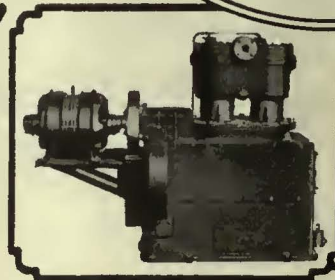
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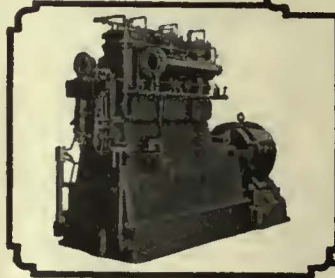
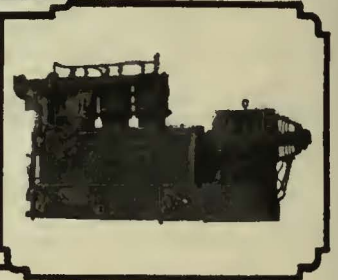


N Type Compressor—12 to 60 cu. ft. displacement. Described in Publication T-2048.



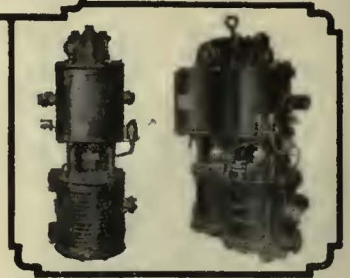
2V Type Compressor—75 to 150 cu. ft. displacement. Described in Publication T-2047.

3VS Type Compressor—208 to 468 cu. ft. displacement. Described in Publication T-2032.



3VD Type Compressor—550 to 700 cu. ft. displacement. Described in Publication T-2032.

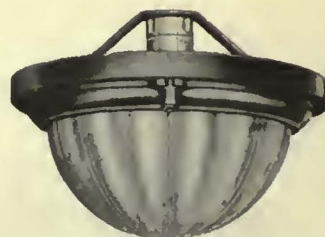
Steam Driven Types—35 to 150 cu. ft. displacement. Described in Publications T-2036 and T-2037.



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Lighting Fixtures
make cars attractive



It's a noticeable fact that the public, whenever possible, selects a conveyance that not merely gets them somewhere, but one that is attractive as well.

Dome Type Lighting Fixtures are designed to provide this essential attractiveness — to give a luxurious Pullman effect.

These fixtures have beautiful Druid glass bowls which produce a soft, pleasing well-diffused light. Substantially made to withstand extreme vibration. Ask for new and interesting wiring plans.

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ELECTRIC SERVICE SUPPLIES Co.

MANUFACTURER OF RAILWAY, POWER

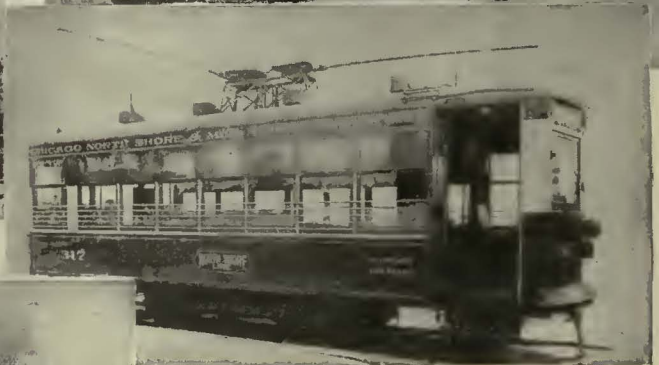
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plan to interchange your passengers by means of "circulating load." The NP Automatic Treadle Exit Door has made this practical in either one or two-man service, irrespective of the size or type of car.



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PHILADELPHIA
1010 Colonial Trust Building

A \$25,000 sale 15 minutes after deciding to call



"THIS METHOD OF SECURING the sale," writes the treasurer of the company, "represented several hundred dollars additional profit to us."

Such is the every-day work of Long Distance for men who are busy. The long lines reach from each office to any other, from Canada to Cuba to England. The continent or any chosen area is the field of action for the man who travels by telephone. Long distance calls accomplish in minutes what otherwise

THE OFFICIALS of a metal specialties company in Plano, Illinois, were discussing an interview that should be made at once in New York. Prospects were fair for making the sale. But the men were unusually busy . . . how could they spare the time to go and return? They decided to telephone. Within 15 minutes the sale was consummated. The amount involved was \$25,000.

might take weeks or days. They result in growth to the individual and to the business. They slash expense. They mean efficiency with comfort.

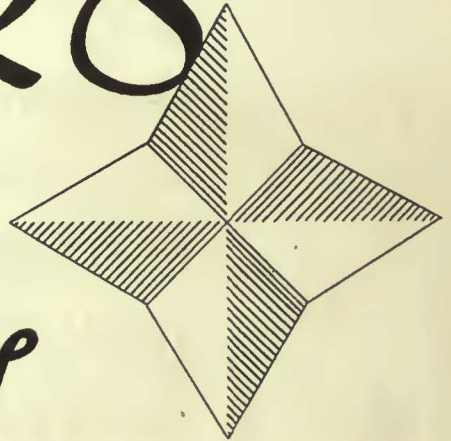
What far-away transactions could you close now — without leaving the office? You'll be surprised how little the calls will cost. . . . *Number, please?*

BELL LONG DISTANCE SERVICE



CINCINNATI BUILDS

for 1928



*The Four Features
of Balanced Design
are the Cardinal Points
of Today's demand.*

You'll agree when you
see our exhibit at the
Convention—

Track D

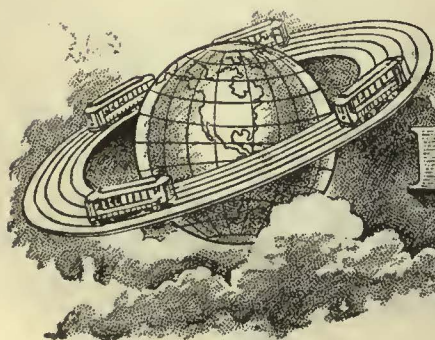
CINCINNATI

**BALANCED
LIGHTWEIGHT**

CARS

— still a step ahead of the modern trend!

JUST as the electric railway companies have to compile and be guided by exhaustive statistics as to peak loads, traffic densities, costs per mile, and so forth, we must constantly keep ourselves informed as to purchasing power, density of population and all vital market information in order to maintain our service as an active asset of your service.



Barron G. Collier

INCORPORATED

CANDLER BLDG. NEW YORK



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St. Louis has confidence in the future of the transportation business. With the acceptance of the Spirit of St. Louis by steam railroads as well as by electric railways, greater demands have been made on the Quality Shops. Greater manufacturing facilities have become necessary.

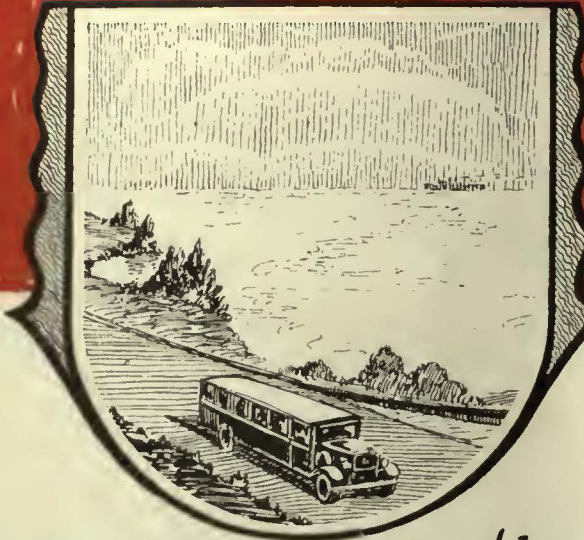
The new modern steel fabricating and erection Shop, the largest of its kind devoted to the building of cars, is 1,000 feet long and 135 feet wide. Equipped with ma-

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St. Louis Car Co.





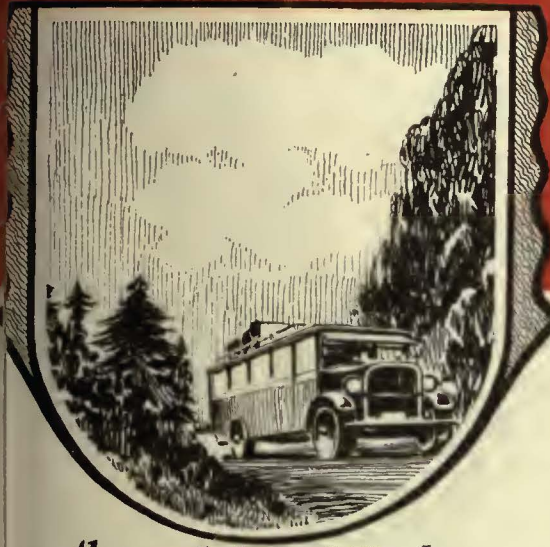
On the shores of the Atlantic



Through Busy Cities

YELLOW COACHES

from coast to coast Yellow Coaches, by dependable, economical operation, are placing motor coach transportation on a sound basis where performance is unquestioned



Along Inland Highways



In sight of the Pacific

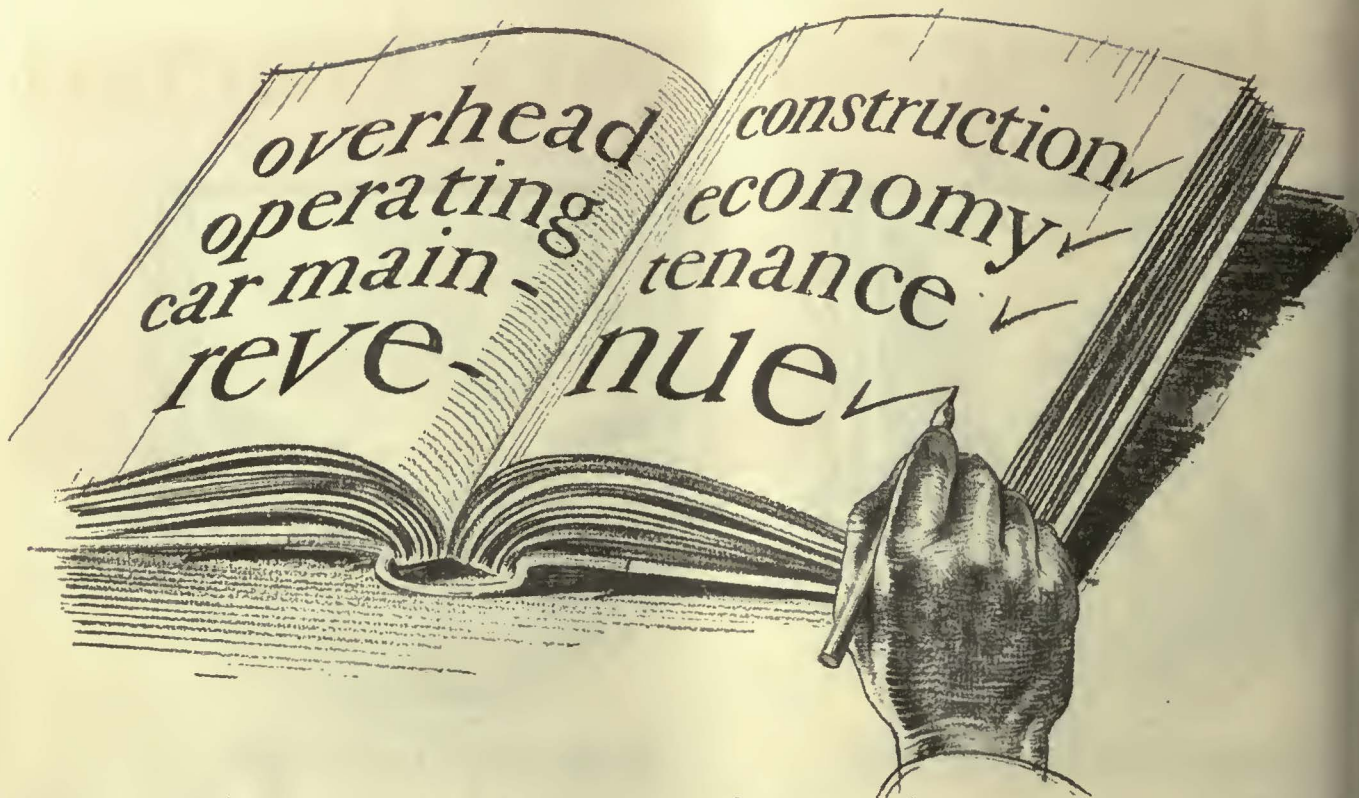
build REVENUE

Year after year, more street railway companies buy Yellow Coaches than any other make - - More Yellow Coaches are bought by street railway companies than any other make.

YELLOW COACH

• a General Motors Product





For all-round health of operation

The railway executive cannot afford to give exclusive attention to any one department. He does not follow overhead to the neglect of maintenance, or operating economy without regard to revenue. He works with a more comprehensive vision and so obtains all-round health of operation.

The manufacturer of railway equipment and renewal parts is under a like obligation. He cannot afford to devote his energies to coils alone—he must also be thoroughly familiar with the motors which they serve. He dare not give sole attention to certain items to the neglect of others.

General Electric realizes its responsibilities for the assembly as a whole—not merely for coils or gear cases or other separate parts. In the entire list of G-E supplies and renewal parts there is not one experimental oddity; every single item is in complete accord with the whole assembly—and is of original-equipment quality.



GENERAL ELECTRIC

330-60

GENERAL ELECTRIC COMPANY, SCHENECTADY, N. Y., SALES OFFICES IN PRINCIPAL CITIES

Electric Railway Journal

Consolidation of Street Railway Journal and Electric Railway Review

Published by McGraw-Hill Publishing Company, Inc.

CHARLES GORDON, Editor

Volume 70

New York, Saturday, September 24, 1927

Number 13

"Liberty" Wants a Statesman

ONCE more the street car is put on the defensive. Once more it is labeled "archaic." Even the editor of a high-pressure magazine like *Liberty* falls into the rut of opinion expressed by those who know little about the facts of traffic and local transportation. While calling upon the motor car manufacturers to produce a "Statesman of Transportation," in an editorial published in its issue of Sept. 17, 1927, *Liberty* summarizes the situation as follows:

Numerous solutions of the problem [traffic congestion] have been offered, of course, but no one of them will do the job. Street cars are on their way out as archaic. Buses, taxis and subways give congested populations greater mobility. Chicago was the first to try double-deck streets. Other cities will follow.

Two-level streets speed up traffic movement. In spite of these makeshifts, people get in one another's way and automobile jams are growing worse.

The automotive industry has the most at stake in this situation.

Here are a number of statements which are of great interest to the local transportation industry. Taking the last one first, *Liberty* apparently starts with the wrong premise. The automotive industry has a lot at stake, to be sure. So also has the \$6,000,000,000 electric railway industry. *Liberty* joins with Walter P. Chrysler and L. F. Loree in the superficial conclusion that the street car is on its way to the scrap heap. If these gentlemen are really interested in the status and future of street cars a trip to Cleveland during the week of Oct. 2 would help considerably to clarify their thinking.

It is not the automotive industry that has the most at stake in the traffic situation. It is the community itself which is losing the most and which will be called upon to foot the bill for whatever relief plans are undertaken. "Two-level streets speed up traffic movement," says *Liberty*. But who is going to pay for them? The automobile manufacturers? Certainly not! They didn't pay for the two-level street in Chicago, and their primary objective in producing a "statesman of transportation" would be to make sure they don't pay for them anywhere else. Of course, there isn't anything wrong with that. The responsibility of providing adequate thoroughfares for the movement of people in cities belongs to the community and to the property owners, the latter because greater accessibility increases the value of their holdings.

Even *Liberty* will probably agree that the community should and probably will pay the bill for facilities to reduce traffic congestion. It seems reasonable to assume so that the primary purpose of traffic relief is to permit people to move about in cities with greater speed, comfort and convenience. If that premise is granted, where does the lead? Certainly, our premise precludes the conclusion that traffic relief should be undertaken from the point of view of increasing the market for more automobiles.

It is at least interesting to pursue this reasoning just one step further. In the Sept. 17, 1927, Annual Convention Number of the JOURNAL, on page 485, E. J. McIlraith, staff engineer of the Chicago Surface Lines, expressed in rather vivid language some figures on relief

of traffic congestion that are the outcome of several years of careful study and analysis. He says that one four-track electric line on specialized right-of-way can serve more people in the rush hour than 25 boulevards used by private vehicles alone. Certainly that is of some importance to the community which undertakes to meet the bill for traffic relief!

Liberty calls on the motor car manufacturers to take the lead and promises that the 20,000,000 car owners will gladly follow. What about the 16,000,000,000 passengers who annually depend for transportation on the electric railway lines of the country? Are they not entitled to consideration in approaching the problem of traffic relief? The country needs a statesman of transportation. But it won't get what it needs if he represents the very manufacturers whose product has caused our present congestion.

Onus for Delay in St. Louis on City

HOPE has been renewed that something tangible may come out of the moves now being made in St. Louis in connection with the affairs of the United Railways. These moves have to do with an appeal to the Public Service Commission for the approval of the securities intended to be issued under the terms of the reorganization plan and with the granting of a new franchise to the St. Louis Public Service Corporation, the proposed successor to the United Railways.

Many things have militated against the lifting of the receivership, not the least significant of which has been the attitude of the city toward the franchise and the financial affairs of the company. Some things, however, appear to be clearly defined. While Mayor Miller has outlined four tentative modes of procedure, one of which contemplates municipal ownership, he is set against this procedure. In this, of course, he is wise. He apparently is reconciled to a service-at-cost proposal, but has split with the company over the allowed rate of return. In addition he has not seen his way clear to accept the value of \$60,000,000 which the reorganization committee made plain it was willing to have fixed for its property. This appears to have been a real concession, for the general belief is that the commission, if the company insists upon it, must fix a value for the property much in excess of this amount.

Meanwhile the city talks through the Mayor about the need of it having expert advice. Such advice it has had in the past and is entitled to in the future. Only recently one of the country's most prominent utility experts has reported to the Mayor findings not yet made public in full, but said to contain recommendations for co-ordination, with operation on a service-at-cost basis. St. Louis is entitled to all the advice it can get, but it does seem that the city has not availed itself fully of recommendations that have been made in the past. That is unfortunate.

Not all the moves made in a receivership that has

existed since 1919 can even be indicated in comment of this kind, but one thing is certain, the disposition on the part of the representatives of the security holders has not been to prolong the receivership. In fact, the decks were cleared for financial action about three years ago. The city should develop a policy and proceed to the work of negotiating with determination; determination that will take fully into account the rights of the company and the city's future needs so far as it is possible to prognosticate them. Let it not seek the unattainable. As Federal Judge Faris pointed out in approving the sale of the St. Louis properties at foreclosure, any suggestion of a return to the 5-cent fare is not even respectable nonsense, pointing out that while fares have advanced from 5 to 7½ and 8 cents, the expenditure for wages, equipment and materials by the company in the same period have advanced 81 per cent. This seems generally to be realized in city circles. So with the need recognized that the company must have a living wage, it ought not to be difficult, if the city approaches the matter in the right spirit, to adjust satisfactorily the matters that have up to this time militated against the settlement. The onus for the delay appears to be clearly upon the city.

The Wording of an Ordinance Penalizing Transfer Abuse Is Important

EVEN in doing a meritorious act there is always a right way and wrong way. The city of St. Louis found this out recently when an effort was made to enforce one of its ordinances punishing abuses of street railway transfers. The ordinance declared it to be unlawful to sell, barter or exchange for any consideration a street railway transfer, or even to give it away to enable another person to use it, or for any person to whom such a transfer was not issued to attempt to use it, or for him to punch or alter the punching of such a transfer, or to attempt to make a round trip by use of a railway transfer. Agents and employees of the railway company issuing transfers to passengers lawfully entitled to them were excepted.

The purpose of the law was entirely meritorious. In a prosecution under it, however, the Supreme Court of Missouri in a decision rendered June 27, 1927, held that the ordinance prescribed the use that might be made of transfer tickets and thereby invaded the province of the Public Service Commission. If, for example, the commission should make these tickets transferable, the ordinance would then be in conflict with the commission's ruling. The fact that the ordinance prescribed a course which coincided with the rulings of the commission did not help the situation because "the city of St. Louis was without the power to regulate to any extent, directly or indirectly, the rates of a public utility, or to prescribe regulations or practices which affect such rates."

While the court thus condemned the wrong way of stopping transfer abuses, it also pointed out the right way. This, it said, was to require under penalty that the individuals composing the public in their dealings with the utility shall observe its rules and regulations, as these rules presumably have had the approval of the Public Service Commission. An ordinance of this kind would avoid any invalidity on the ground that the city was exercising, or attempting to exercise, a control over rates and charges.

It may be assumed that with this legal background the city will amend the ordinance accordingly.

Two Track Reports of Unusual Interest

IN THE American Electric Railway Engineering Association this year two committees in the way and structures division have been working on subject assignments in which way departments throughout the industry are vitally interested. One of these committees is investigating the use of alloys other than manganese steel for special trackwork and the other is studying the subject of rail corrugation. While it is not expected that either committee will be able to conclude its work this year or that definite conclusions may be presented, it is reasonably certain that both committees will have some interesting data to present and that the reports will represent valuable contributions to the present knowledge on the respective subjects.

Manganese steel has served its purpose very well, but without heat treatment it is very difficult to secure a good weld, and heat treatment in the field is not practicable. These things have led the electric railway engineer to seek a substitute that would lend itself more readily to field welding and at the same time possess the necessary shock and abrasion resistive qualities, and thus postpone as long as possible the date of replacement. The advances made in the art of electric welding, both in the matter of equipment, technique and welding material employed, have been largely responsible for this demand for a substitute for manganese steel.

The cause of rail corrugation and its cure have long been subjects for discussion among street railway men. Rail corrugation also has attracted considerable public attention because of its noise-producing effect. Much has been written about it and many reasons advanced as to its cause. Still it seems to occur under so many different conditions that it would appear we really know very little about it. Considerable scientific study has recently been given the subject abroad and it is sincerely hoped that we may finally diagnose the ailment correctly and thus remove one of the most annoying and expensive troubles with which the street railway engineer has had to contend.

"Hand Grasps Hand, Eye Lights Eye"

TENSION is growing throughout the industry as the opening day for the Cleveland convention draws near. Machines and appliances that will tell the physical story of progress are being rushed to the exhibit hall. Those who are charged with revealing the mental story of what has been achieved, of what they believe lies beyond the inscrutable veil of the future are weaving thoughts into words. Speaker, exhibitor and delegate are realizing the great responsibility that such a congress imposes. It is inspiring to think of this great machine of human and material parts gradually gathering momentum and tuned for full speed ahead when the president's gavel shall give the signal.

Yet the whole concept of machines, speeches, debates and constructive legislation is as sounding brass and tinkling cymbal if one neglects the spirit that motivates the gathering. For more than twoscore years men of the electric railway industry have seen mechanical miracles in their field. They have seen a crude crawling vehicle, an unstable experiment, become the swift and powerful servant of mankind. They have trod the heights of success and groped through the valleys of failure. Spurred on by machines? No! but by the faith and trust of their co-workers. That has been revealed through gradual

culture of kind intercourse. Confidence in a man's friendship has meant more than the stereotyped phrases of a contract; faith in each other's word more than the scintillating perfections of steel and wire. To deny that acquaintanceship is the loom upon which is woven the material good of these conventions the JOURNAL thinks is impossible in the light of its years of observation. Impossible, when each of us has found that these contacts are "the mysterious cement of the soul, sweetener of life and solder of society."

What joy, then, is in store for us during the first week in October, when

Hand clasps hand, eye lights eye
In good friendship
And great hearts expand
And grow one in the sense of this world's life.

Discretion in the Payment of Income Bond Interest

ANOTHER interesting financial question which involves the issue of the possible substitution of the judgment of outsiders for that of the corporation management has arisen in New York. A holder of \$35,000 par value of adjustment income bonds of the Third Avenue Railway threatens suit to compel payment of the full 5 per cent annual interest, although on this issue there is a present accumulation of 27 $\frac{1}{4}$ per cent as of Oct. 1.

It is a nice point in corporate management that is raised. Under some circumstances the threatened action might be justified, but not in the present instance. At the outset there is dispute about a question of fact between the threatening litigant and the management. The man about to sue says he has employed counsel to estop the company from using the property of the bondholders for capital purposes "in direct violation of the trust indenture securing the bonds." The management says that the indenture provides that disbursements on the bonds are at the discretion of the directors. The latter seems to be the more reasonable of the two provisions, or it is in accord with the general theory which applies to an issue of this kind.

Questions of law and of fact may have to be passed upon, but there can be no question about the wisdom of the policy of the management. It would seem reasonable to assume that the holder of a security of this kind labors under no delusion about the type of security he is purchasing. He knows that financially its ownership implies hazards. And those hazards are lessened for him only as the management exercises caution. It might, it is true, seek as soon as possible to liquidate the payments that have accumulated and denude the property of cash so quickly as to leave it again in the position out of which grew the necessity for issuing the income bonds. If it did that knowingly, it would not be true to its trust. And the present management of the Third Avenue Railway has been true to its trust.

Operations for the year ended June 30, 1927, showed approximately \$250,000 above the 5 per cent on the adjustment bonds, but some of the last year's earnings were non-recurrent in character. So well did the company do, however, that extraordinary payments of about \$50,000 were made out of surplus for expenditures not chargeable to operating expenses. The credit of the company is, of course, none too good, and in order to avoid the sale of securities at a sacrifice, the company has for the last ten years financed itself out of the sur-

plus. Despite this the railway has in its treasury available for all purposes about \$1,500,000. This is none too much considering that the company has been confronted with conditions extraordinary in their possible adverse affect. These have not been entirely removed by the granting of bus franchises to the railway in the Bronx, though the action of the Board of Transportation in so recommending would appear to have helped the situation immeasurably. The owner of the bonds, however, sees the matter differently. He pretends to scent disaster ahead in impending expenditures for bus operation.

Under the fast changing conditions in New York City with respect to population and modes of movement available to the prospective passenger, transportation men are agreed that its management has in many respects worked wonders with the Third Avenue Railway. But that apparently is not a judgment which weighs very much with the holder of these securities, by their very nature speculative in character, to whom immediate prospects are much more important than future potentialities. The projected suit deserves the dignity of mention only because it shows the length to which the holder of securities will go who is intent upon exacting his immediate pound of flesh.

Replenish Your Well of Ideas

FEW men generate ideas. Rare is the individual who can draw water from his own well, for that is one of the marks of genius. We cannot all aspire to genius, but we can nevertheless progress and improve by utilizing the experience of others. The coming convention affords a well of ideas, constantly replenishing, from which every member may draw a bucketful of transportation working facts.

The meetings of the American Association and affiliated associations will present a valuable picture of the industry as well as a cross-section of it. Financing, traffic regulation, franchises, advertising, fares, valuation and other subjects of importance will be discussed at round-table conferences. The progress in the industry will be stressed; feature accomplishments of the year on properties in different parts of the country related in five-minute talks by operating executives.

Questions to be asked and answered include "Does aggressive property-wide rehabilitation pay?" "How are you meeting the transportation needs of your community?" "How did you change an unprofitable bus operation to a highly profitable one?" and others vital to the industry. At the meeting of the affiliated associations important problems and various phases of accounting, claims, engineering, transportation and traffic will prove other wells from which to draw.

It is indicated that there will be some surprises in store for delegates in the way of new car and truck designs which will prove well worth studying. It is also promised that this year "the exhibit will be the greatest display of local transportation equipment the world has ever seen." De luxe cars and buses, articulated cars, the latest designs in lighting, heating and ventilating and upholstery will be displayed. Fare boxes, motors, track equipment, car and bus seats, wheels, steering gear and the many other exhibits all offer suggestions for providing better transportation.

Delegates to the convention will have a real opportunity to draw deeply from a well that sparkles with new ideas—provided they go to Cleveland determined to get full value for their money.



Fountain Square, Fifth and Walnut Streets, Cincinnati—Proposed terminal of the rapid transit line

Co-ordination Essential for Rapid Transit in Cincinnati

ARTICLE I

UTILIZATION of existing facilities to the greatest extent is the outstanding feature of the report on rapid transit recently made by the Beeler Organization of New York. The report was presented to the special committee representing the Council and Board of Rapid Transit Commissioners of the city of Cincinnati and the Cincinnati Street Railway on Sept. 9, as outlined briefly in this paper for Sept. 17, page 534.

The report goes into great detail to determine what should be done to provide rapid transit for Cincinnati, and whether a rapid transit system should be operated independently or in conjunction with other facilities. The following article and the one to appear next week are abstracted from the report, which is a printed volume of 166 pages.

In many respects the transit situation in Cincinnati is unusual. As early as 1912 a rapid transit commission was appointed, the primary purpose being to construct an entrance into the central business district for the various

Report of Beeler Organization to the city shows that the only practical way to use existing investment in subway lines is in conjunction with the street car and bus system. This article, the first of two, shows the physical plan for extending the subway line

interurban lines reaching the city. Later studies modified the plan and in 1916 the construction of a line was authorized and funds were appropriated. Due to the war the project was deferred, but since then the entire amount of \$6,100,000 has been spent in construction of the line. About 10 miles of double-tracked right-of-way is largely completed.

A portion of the route is along the bed of the old Miami and Erie Canal, which has long been abandoned.

The topographic map on page 543 shows the location of the line. The portions between Canal and Walnut Streets and Fountain Square and between Forest and Oakley have not been built. The remainder is a combination of subway and open cut. The stations are completed only in the rough, and none has been built between Clifton and Oakley or at Fountain Square.

In the intervening period since the project was begun most of the interurbans have been abandoned and those remaining have suffered decided decreases in their busi-

ness, so that the construction of the rapid transit line is not justified from an interurban standpoint. As the rugged topography of Cincinnati imposes unusual difficulties on its transportation facilities, the easy grades of the partially completed rapid transit line appeared to present a possible solution to real rapid transit service within and adjacent to the city. If such service can be provided at a cost that will warrant its undertaking it will benefit a large area of rapidly growing territory and at the same time enable the city to receive benefit from the large investment already made.

The purpose of the present report is to set forth the results of an investigation of the rapid transit situation made for the purpose of determining if the project (a) should be abandoned; (b) should be equipped and operated as it now exists; (c) should be completed and operated in accordance with any existing plan, or (d) should be completed and operated in accordance with other plans. If the line is to be completed and operated a feasible plan is needed, stating (a) whether or not the line should be operated independently or co-ordinated with other necessary transportation agencies; (b) what changes should be made in existing transportation facilities as the result of operating the rapid transit line, and (c) the financial results of operation of the rapid transit line.

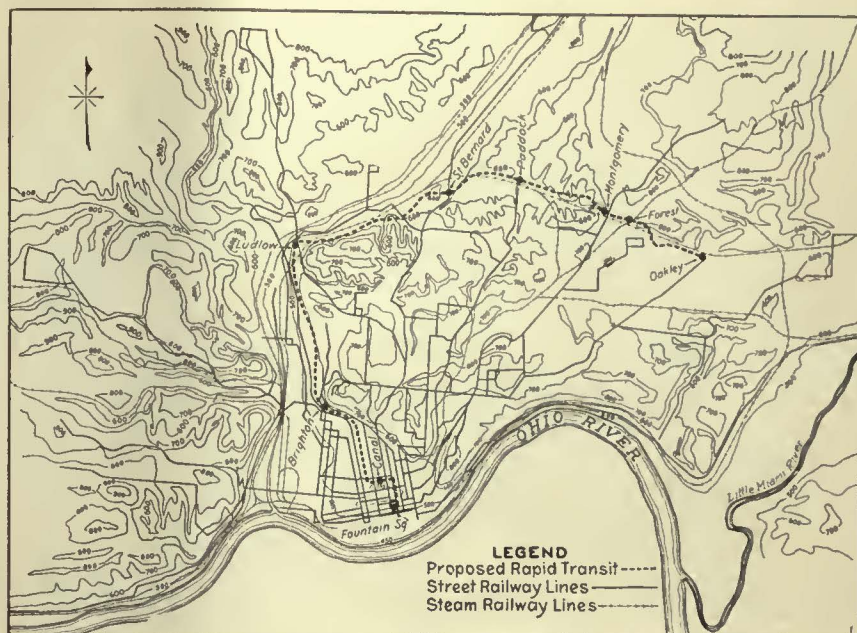
TOPOGRAPHY OF CITY AN IMPORTANT FACTOR

Cincinnati grew up as a river town and in the days of its early great expansion all of its commercial and industrial life depended on the river. The topography of the city is important. In Cincinnati there are more hills and valleys than in any other city in the Union. It is the hilltops that have given the city suburbs unequaled for variety and beauty. These hills and valleys are a problem to industry. The level plain on which the old city was built has long been well filled. It is inevitable that Cincinnati should look for its future expansion to far-flung industrial districts with distances from Fountain Square that might be called metropolitan.

The business section, known as the Basin, is located on a plateau about 2 square miles in area, bounded by the Ohio River on the south and surrounded by bluffs from 200 to 300 ft. high on the other sides. Most of its residential population lives on these bluffs, so that the transportation problem largely becomes one of carrying people up and down the heights. The situation is shown on the topographical map. There are only three level approaches to the Basin district, two along the river, east and west respectively, and a third along Mill Creek, which follows a semi-circular path in getting into the Basin. All three approaches are narrow and are utilized to capacity by steam railroads, highways and street car lines.

ABOUT A HALF MILLION PEOPLE IN DISTRICT

About 410,000 people reside within the corporate limits of Cincinnati. The local transportation agencies, however, serve some 460,000 people in Ohio. The city of Norwood, with 30,000 people, is almost surrounded



Topographical map of Cincinnati and vicinity

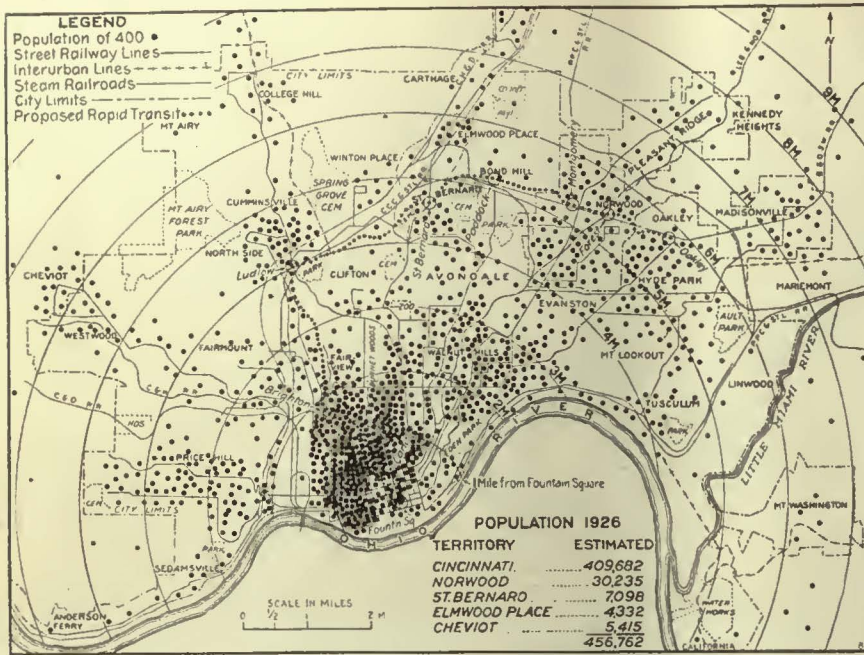
by Cincinnati, while the municipalities of St. Bernard and Beechwood Place, with an aggregate population of 11,000, are entirely within its corporate limits. The smaller contiguous municipalities served make up the Ohio total. In addition the territory across the river in Kentucky, including the cities of Covington and Newport, and the smaller adjacent communities, with an aggregate population of 125,000, increases the transportation requirements of Cincinnati, as about 70 per cent of the working population in that territory is employed in Cincinnati.

The increase in growth for various periods is shown in the chart on page 546. The curve for Hamilton County gives a more nearly correct picture of conditions. The curve for Cincinnati is affected by annexations. The city had its greatest growth between 1840 and 1850, increasing 150 per cent.

Local transportation on the Ohio side is cared for by the Cincinnati Street Railway, independently operated buses and the private automobile; local traffic handled by the steam railroads is almost negligible. The fare on the street cars is 10 cents cash or three tickets for 25 cents. The minimum fare on all buses is 10 cents, and this is increased by 5-cent steps on some of the longer routes.

The trend of passenger traffic is shown by the chart on page 546. The number of revenue passengers increased at quite a definite rate until about 1913. From then until 1920 the number of passengers continued to increase, but at a lower and more irregular rate. Since 1920 the curve has been very irregular and quite decidedly downward. This can be attributed to at least three factors—increases in the rate of fare, increases in the number of automobiles, and more recently to independent bus competition. Independent buses commenced operating in large numbers in 1925, but the number of passengers carried in that year is not shown because no data are available.

For the last few years the company was losing patronage up to Nov. 1, 1925, when under a change in operations and a new franchise a reduced fare went into effect, resulting in an immediate upward trend in passengers carried. Since it engaged in the operation of



Distribution of population, Cincinnati and vicinity

buses early in 1926 the rate of increase has been accelerated, but unfortunately bus operation is increasing its total operating cost faster than its total revenue.

Besides the railway company's buses there are sixteen independent bus routes owned by five different companies and operating approximately 90 buses in local service. These buses are operating about 5,311,000 bus-miles and carrying some 13,300,000 local passengers annually. No information is available as to the financial results of their operation. In addition to these, 23 interurban bus lines have their terminal in Government Square, but do no local business within the city limits. It is questionable if any of these can be routed to the rapid transit line without lowering the quality of their service, as passengers, especially those with baggage, object to a transfer en route. It may be, however, that the rapid transit line may furnish a valid reason for terminating some of these interurban bus lines, especially the shorter ones, at its stations, thus removing just that much more traffic from the downtown streets and giving the rapid transit lines more business without impairing the service, because while a transfer will be required from bus to subway it will give a quicker ride.

AUTOMOBILE AN IMPORTANT FACTOR

The private automobile is a factor in the local transportation situation which merits serious consideration. In the last five years the number of automobiles has increased 111 per cent in the state and 126 per cent in Hamilton County. There are now 88,000 passenger automobiles registered in the county. Checks in other cities have shown that about 15 per cent of the registered automobiles enter and leave the downtown section of the city daily. On this basis the automobiles of Hamilton County would carry some 16,000,000 riders in and out of the Basin annually. This makes no allowance for automobile rides which do not enter the Basin or for passengers carried on trucks. With these figures in mind it is not difficult to understand that the automobile has a serious effect on public transportation agencies.

Generally speaking, daily movement of the people originates and terminates at their residences, though of

course other movements are made between the time they leave home and return. No census or even estimate of population by districts had been made since 1920. It was considered most desirable to obtain population figures for 1926, because while there has been no rapid growth in the total population of Cincinnati and vicinity, quite appreciable differences have taken place in the distribution of the population. Several methods were considered for bringing the 1920 census figures up to date, but the only two that were found sufficiently helpful to warrant their use were extensions of the 1920 census and a study of the report of the city planning commission, which established factors between total population and elementary school enrollment for each school district. As a result of these studies, the estimated population was derived as follows: Cincinnati, 409,682; Norwood, 30,235; St. Bernard, 7,098; Elmwood Place, 4,332, and Cheviot, 5,415, making a total of 456,762 in the territory. There is a further population of about 23,000 in the various other communities immediately surrounding the city and about 112,000 in the Kentucky territory immediately tributary to Cincinnati, making a total of approximately 600,000 people who may be considered as living in and immediately adjacent to Cincinnati.

On account of rapid changes in conditions, the riding on the public transportation lines was determined for the months of September and October, 1926, rather than an average for the year. It was found that the cars of the Cincinnati Street Railway carried on an average 7,600,000 passengers per month and the railway buses 583,000 passengers, or 98,200,000 passengers carried annually by the street car and bus lines of the company. It was estimated that the independent buses carry about 13,300,000 local passengers annually, making a grand total of 111,500,000 revenue passengers to be moved annually by the local transportation agencies in the Cincinnati district. It was also estimated that 4,400,000 annual rides were taken on the Cincinnati lines by persons residing in Kentucky.

Deducting from 111,500,000, the total rides in city service, the 4,400,000 rides originating in Kentucky and the 3,792,000 originating in other outlying sections, 103,308,000 rides remain as the number originating from the 462,000 people accounted for in the area studied. Dividing the number of rides by the population results in a figure of 224 as the average number of rides per capita. Dividing 111,500,000, the total annual rides, by 224, indicates that the local transportation lines are serving the equivalent of a population of 515,000. Further calculation was made to obtain the riding by districts.

BUSES ON CENTRAL PARKWAY NO SOLUTION

Calculations were made as to the number of riders that buses operating on Central Parkway would serve and save time as compared with present facilities. The time saving to the sections in the eastern portion of the city as compared with the present more direct routes downtown would be practically negligible or negative. Under ordinary circumstances it was estimated that the

running time of buses operating between Knowlton's Corner and Fountain Square by the Parkway would be 21 minutes each way. This compares with 28 minutes required at present by street car, 25 minutes by bus and 12 minutes on the proposed rapid transit line. The run between Fountain Square and Knowlton's Corner represents the maximum saving in time possible by buses operating on the Parkway. On the assumption that all riders who could save time would use buses instead of street cars and that the public would be satisfied with bus service instead of street car service in this territory, it was estimated that 16,200 people would use buses daily between Knowlton's Corner and Brighton and 10,200 more between Brighton and the Basin, making a total of 26,000 daily or 8,972,000 rides annually. This estimate is based on the supposition that all the riders now using the car lines beyond Brighton

would be carried on the buses that would operate over the Parkway. Buses at the rate of 78 per hour north of Brighton and 138 per hour south of Brighton would be required to transport these riders during the peak load periods. As in the case of the rapid transit lines, these buses to serve the riders properly must operate to some point in the vicinity of Fountain or Government Squares. The addition of 138 buses per hour in each direction to the present downtown rush-hour traffic would of course be a backward step in minimizing traffic problems.

It will be seen from comparing present street car schedules with those of the proposed bus and rapid transit lines that buses will reduce the running time to Knowlton's Corner 25 per cent, while the rapid transit line will reduce it 58 per cent. From a standpoint of time saving alone buses will benefit approximately 9,000,000 riders annually, while the rapid transit will benefit more than four times that number. A rapid transit car with a carrying capacity several times that of the bus can be operated at a cost not to exceed that of the bus. The rapid transit is underground in the congested district and on its own right-of-way elsewhere, so that its operation improves traffic conditions by removing all of this traffic from the street surface, while the bus does exactly the opposite. The engineers could not, therefore, find any ground upon which to base further consideration of the use of buses on the Parkway as a substitute for the rapid transit line.

STOPS SHOULD BE MINIMIZED

The primary purposes of rapid transit are to save time, reduce street congestion and increase the metropolitan area of the modern city in order that its citizens may live in more healthful and inviting localities than alongside their work. In Cincinnati the problem is threefold: (a) To get the people in and out of the Basin; (b) to distribute them quickly to various communities necessarily quite widely separated because of topographic conditions, and (c) to enlarge the area available for industrial and residential development.

Speed, regularity and frequency combined are essential to the success of rapid transit in Cincinnati. Only in this way can patronage be attracted to the line and thus



Looking north along Central Parkway, prior to completion of automobile roadway

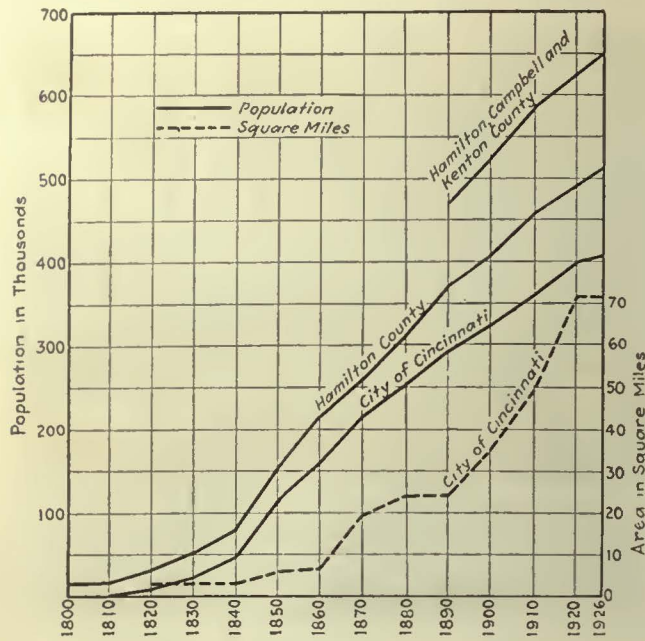
reduce the number who desire to enter the congested section on the surface by public or private conveyance.

Factors influencing the speed and regularity of a rapid transit line are the grade and alignment of the route, power conditions, motor equipment, length of stop and number of stops. The last is by far the most important. The effect of adding a station, which of course involves an additional stop, on the rapid transit line is such a serious matter that it is well worth while to consider what it means, for it looms large not only in the dollars and cents cost, but in destroying the very thing that rapid transit is designed to accomplish—speed. The effect of a stop depends on so many variable factors such as the number of trains, the number of cars in the train, cost of station operation and cost of the station itself. For the type of service proposed for Cincinnati the cost of operating the rapid transit system would be increased \$35,000 to \$40,000 per year for each added station. Besides this it delays every person using the service other than those using that particular station about 1½ minutes on each ride. This means that each station stop adds about three minutes to the scheduled running time of each trip. With a three-minute space between trains an added train must be placed in service for each stop.

Obviously there is little question but that the greater portion of the existing line that is graded can judiciously be made a part of any rapid transit line recommended because service can be operated much cheaper on a rapid transit line than on a surface line if the cost of providing the rapid transit right-of-way is disregarded, which may be done in this case since the investment is already made and if not utilized will be a total loss. The problem in Cincinnati then becomes one of determining whether at a cost that will not be prohibitive additions or changes can be made in connection with the existing line to make it possible for it to function so as to provide the city with a practical rapid transit service.

Several plans for a belt line, utilizing the existing rapid transit line with a return through Duck Creek valley, were investigated. On account of the relatively small population that would be served none of these plans was approved.

It is recommended that the line be extended from



Population Cincinnati and vicinity, 1800-1926

its present terminal to Madison Road, Oakley, as it will increase the territory served by a material amount at a relatively low cost. The reservation is made, however, that this will hold only if no more stations are permitted than those specified in the report, as otherwise the time saving to Oakley would not be sufficient to warrant the extension and operation of the line.

EXTENSIONS WILL ENHANCE EXISTING LINES

It also is the opinion of the engineers and others that the possibility of its successful operation is contingent on extending the line from Central Parkway and Walnut Street to some point in the vicinity of Fountain Square, which would better serve 47 per cent of the people who would use rapid transit. A rough estimate indicates that about 40 per cent of the line's total patronage would be contingent on its extension to Fountain Square.

An investigation was made to determine whether the route of the rapid transit line as already built is the most satisfactory or if changes could be made to advantage. Particular attention was given to the location of the Ludlow station. The line follows the old canal running east of Mill Creek and the B. & O. Railroad in the vicinity. The existing station is located at the south end of the Ludlow Street viaduct. This is at the end of the Central Parkway and automobile traffic will be heavy over the viaduct to Knowlton's Corner, as the Parkway will become the main artery between downtown and that part of the city lying to the north of the point where the Parkway will intersect Ludlow Avenue. To have the surface cars and motor buses that should feed into the rapid transit line cross the viaduct would add materially to the congestion and it would be much relieved by having them reach the rapid transit line at Knowlton's Corner.

It was estimated that with the station located as at present some 2,356,000 people will enter and leave it annually, while if it is relocated as proposed the number would be increased to 4,036,000. In the former case practically all would have to be transported, as 1,600 ft. is farther than people will walk, especially if car service is available. It would require five or six minutes time to walk to the station and from two to three minutes to

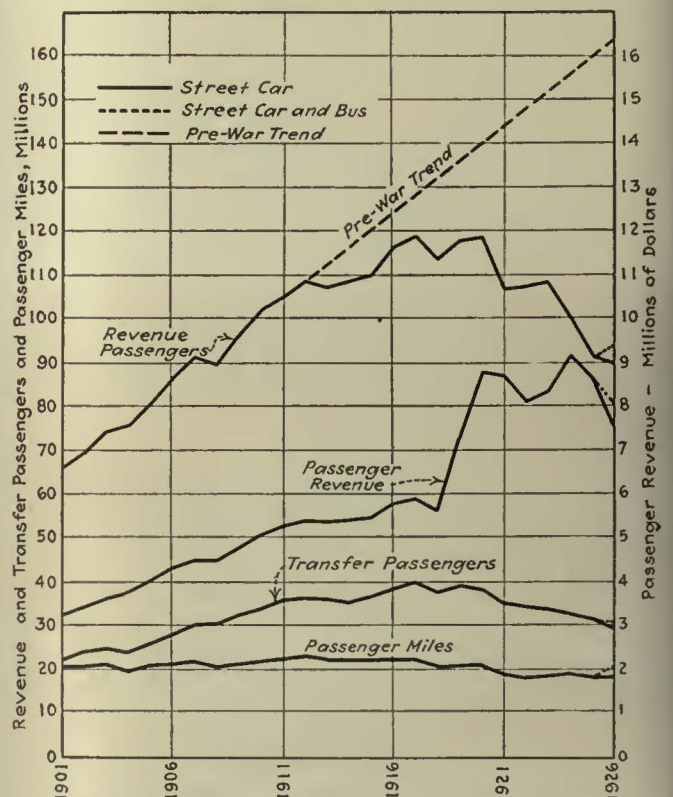
ride to it from Knowlton's Corner. In the new location the additional 1,080,000 rides which would originate at the rapid transit station if located at Knowlton's Corner would continue to use the surface cars if the station is not relocated. It is estimated that the line can be relocated at a cost of \$716,000, the amount covering the cost of construction of the line and station, acquiring the right-of-way, and any incidental damages involved. The loss of investment in the present right-of-way and station probably does not exceed \$150,000.

Studies were also made of the locations of several of the other stations along the line. Those at Liberty Street, Marshall Street and Clifton Street were found unnecessary and their abandonment was recommended. It was also recommended that all stations yet to be constructed be built with island platforms, with a mezzanine floor above. This will allow one attendant to sell tickets or make change for trains in either direction.

Prepayment areas into which surface cars and buses can be run for transfer of passengers to the rapid transit line without the use of paper identification tickets are recommended at Brighton, Ludlow, St. Bernard, Montgomery and Oakley stations. The plan proposed is similar to that used by the Boston Elevated Railway at various points.

INTERURBAN TO SERVE SUBURB

The Cincinnati, Hamilton & Dayton Railway, which passes through the College Hill territory and terminates at Spring Grove Avenue, is the only remaining interurban in a position to benefit by utilizing the rapid transit line as an entrance to downtown Cincinnati. With suitable equipment its cars could operate over the proposed rapid transit line directly to Fountain Square. Both the interurban and the Cincinnati Street Railway use the same street through the center of the College Hill territory. If the interurban were to run through and would give



Passengers, revenue and miles, Cincinnati Street Railway, 1901-1926

local bus service in College Hill to enable the residents to reach the car line it would serve the territory much better than the Cincinnati Street Railway.

There are some 3,003,609 annual riders in this territory, of whom 1,620,600 are carried by the street railway and the remainder are divided between the C., H. & D., the steam railroads and the interurban buses. Assuming that the rapid transit line is completed by 1930 it is estimated that the traffic will increase to 6,655,310 riders by 1940 and 8,434,011 by 1905. The running time between Fountain Square and College Hill, now 42 minutes by street car, would be 26 minutes. The time from Fountain Square to the railroad station and thence to Hamilton by the fastest steam railroad train is 66 minutes and by bus 75 minutes; the new time on the interurban will be 55 minutes. Other points will be affected accordingly.

By making this arrangement the total undeveloped land area which could be reached within a total time of 60 minutes would be increased from 2,313 to 10,405 acres.

Should the interurban be accorded the right to operate to Fountain Square via the rapid transit line it should agree substantially to (a) pay a rental based on the miles operated; (b) provide the type of equipment necessary to conform with that operated on the rapid transit line; (c) connect its line at Spring Grove Avenue with the rapid transit line by means of a viaduct extending over Mill Creek, eliminating the grade crossings of Spring Grove Avenue and the B. & O. Railroad.

Pittsburgh Introduces a New Chair Car Service

INDIVIDUAL bucket-type seats have been used by the Pittsburgh Railways in the equipment of one of its latest type low-floor, one-man, two-man cars. These seats have spring cushions and cane covered backs with leather binding around the top. The rear side of the seat back is covered with sheet steel to prevent the cutting and marring that frequently happens with cane covering.

Arrangement of the seats is unique in that they are in a single row along each side of the car. Each seat



A rear view showing the seating arrangement of the chair car, the stanchions and the one-level floor

is placed at an angle of 45 deg. with the side of the car, thus forming the "saw tooth" line-up as may be seen in one of the illustrations. This gives the desirable effect of privacy to each seat which could not be so well obtained in any other way without the sacrifice of considerable space.

Access to these seats is free at all times for the reason that one does not interfere with the one next to it. Patrons may be seated quickly and may reach the doors easily when leaving since each seat faces the aisle.

An additional convenience and safeguard is provided in the porcelain enamel stanchions which are placed beside each alternate chair throughout the full length of the car. The stanchions on one side of the aisle are staggered with respect to those on the opposite side, thus providing one upright for each seat space along the aisle. These stanchions, together with the longitudinal hand rod above the seats, replace the porcelain enamel hand straps which are standard equipment on this series of cars.

Another feature which is being tried out in this unit is the straight floor line throughout the car. Up to the present time the standard arrangement for low floor cars with center doors has consisted of a low floor at the center doors with a ramp leading to the front and rear sections of the car. This particular car has that part



The chair car ready for service. Note the low floor of the car

of the floor raised to the same elevation as the rest of the floor. This necessitates an additional step at the center doors but does not appear to have any appreciable effect in slowing up loading. In the remodeled car, which is now arranged for one-man operation only, the center doors with the additional step could have practically no effect because these doors are used only at heavy loading and unloading points in the city loop, which is only a small fraction of the number of stops the car would make in a trip.

There is no doubt that the appearance of the car in the interior is improved by this new floor arrangement. There is, however, a distinct advantage in this arrangement to passengers who are walking in the aisle when the car is in motion. It is not nearly so difficult to keep one's balance on the straight floor as it is on a sloping one. This type of floor, together with the many stanchions, thus makes it safe for many women patrons who would otherwise not risk their footing in a moving car. A package shelf is another convenience afforded in this unit. This has been placed between the seats and the sides of the car.

Provision has been made for a bulletin board which extends from the ceiling in the center of the car. On this board is carried a notice asking for comments on the seating arrangements of the car. The notice has brought to the commercial department many comments of praise and congratulations on the agreeable type of service this car is providing. Some automobile riders have expressed their complete satisfaction with the unit as a substitute for their own private cars for trips to the city. In fact, all who ride the car appear to be favorably impressed by it.

The car has been operated from the Craft Avenue carhouse on several routes where one-man units are in service. It will later be tried on several other lines of the system which are operated through the better residential districts and where automobile competition is very noticeable. The results of these trial runs will have a distinct bearing upon the future of this type of service in Pittsburgh. If it is found that off-peak traffic can be sufficiently increased by this service, it is very probable that one or more chair cars of this type will be built.

London Railway Headquarters to Cost \$1,665,000



Head office building to be erected by the Underground Electric Railways Company of London

CONTRACT for the construction of the large new building to be erected upon the triangular site of the London transport combine at Westminster, London, to serve as the headquarters of the London underground railways, the London General Omnibus Company and associated companies, has been placed with a London concern on a tender of £333,000 (\$1,665,000). The building will require 4,500 tons of stone and 2,500 tons of steel for the frame of the structure. It will have ten stories and a tower and will be 173 ft. high.

The building is scheduled for completion at the end of 1928.

Tennessee Electric "Saying It" with Newspapers

**THE KIDDIES ARE SAFE
ON STREET CARS**

Vacation time is here. For the kiddies, what a wonderful chance to enjoy healthful outdoor life. There's plenty to see and do in and around Chattanooga every day. And street cars will transport your children to many points of interest in safety and comfort.

A few suggestions:
 Miles—On Mission Ridge, Lookout Mountain, Chickamauga Park.
 Swimming—Warner Park, McCallie Lake.
 Tennis—Jackson and Warner Parks, Cameron Hill, Chisler Cemetery Park.
 Baseball—Andrews Field, many Amateur Games.

A Day Outdoors—then Home by Trolley

**STREET CARS—
ALLIES OF INDUSTRY**

Thousands of men and women whose busy hands and brains keep Chattanooga in the forefront of Southern industrial progress are street car riders.

Every morning and evening—summer and winter—in good and bad weather—street cars are depended upon to transport this local army of 45,000 people in safety and comfort. And they save money by it.

Ride Street Cars—Cheapest Transportation
in the City

**WE HAVE NO QUARREL
WITH THE AUTOMOBILE**

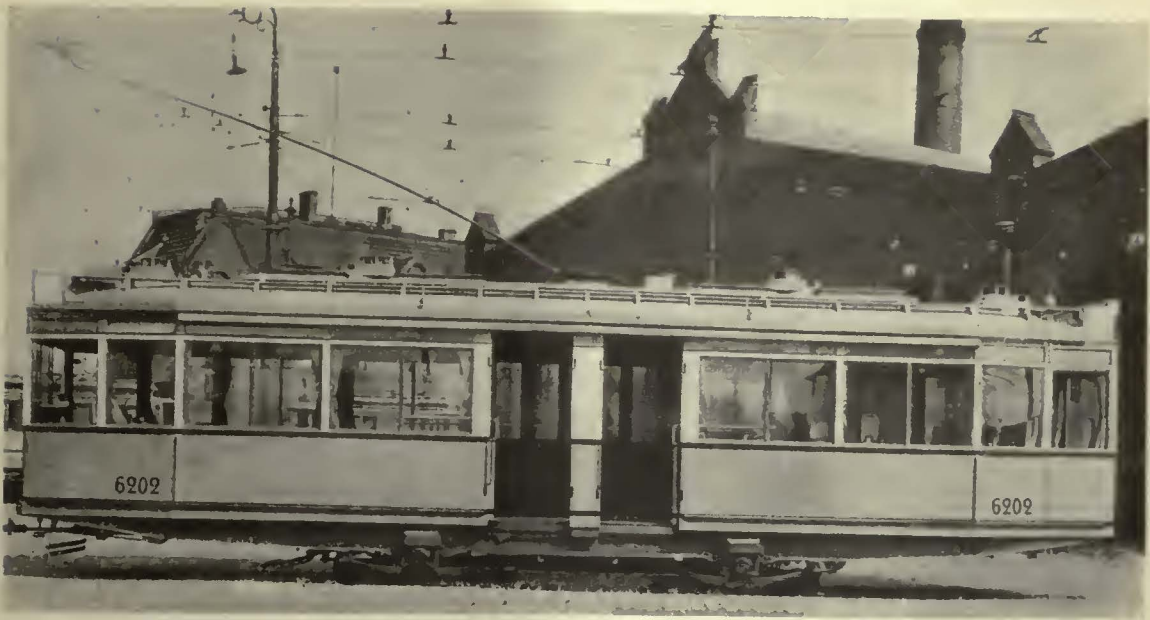
Motor cars have their place, especially for pleasure riding. But there are a lot of people, who drive to town each morning, and leave their cars to the mercy of the elements all day, just to drive back home at night.

To these people we say that street cars offer the safest and most economical medium of transportation. Why not ride for 7 cents and save your auto for pleasure driving with the whole family?

Street Cars are the Backbone of
City Transportation

Combining consistent arguments with what Advertising Manager J. C. Costello of the Tennessee Electric Power Company, Chattanooga, declares "inexpensive

newspaper advertising" the "Volunteer" state utility is making friends with its patrons by means of the copy shown above



Berlin's latest surface motor car has two center doors and is fitted with Cardan drive. This method of operation is still under trial in Berlin

Berlin Practices Co-ordination in Transportation

Policies of rapid transit, bus and surface car line directed by a single commission. Traffic is constantly growing. Operating problems differ somewhat from those in America's largest cities

By Henry W. Blake

Senior Editor *Electric Railway Journal*

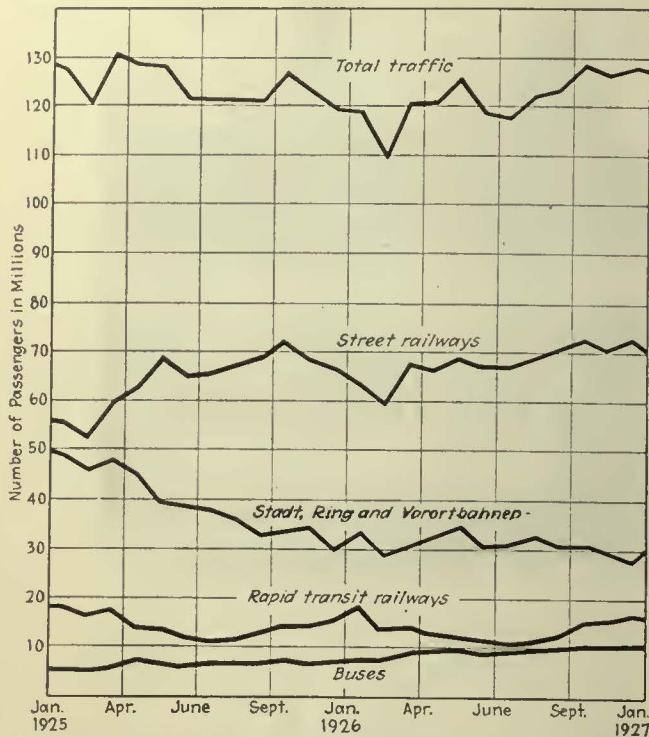
BERLIN is one of the very few large cities in the world in which the bus service, rapid transit lines and street railways are under one management. This is not true of London, where the buses and rapid transit lines are under one control and the principal street railway lines under another, nor is it true of Paris, or of New York or Chicago. In Philadelphia all of these services are under a single management, but free transfers are not given between all of them. Boston also has them under one management, but Boston is much smaller in number of inhabitants than Berlin.

The Berlin situation was brought about by the outright ownership by the city of one of these properties and a purchase by it of a majority of the stock of the other two, following the close of the war.

The city owns the entire surface line system, having taken it over during the inflation period for 20,000,000 gold marks (about \$5,000,000). As a conservative estimate of the value of the property before the war was 300,000,000 marks, it will be seen that the city acquired the property for only a small proportion of its real value.

In each of the other transportation agencies the city has a majority stock interest. The elevated and underground system was organized in 1897, largely by the Siemens & Halske Company and the Deutsche Bank, and began service in 1902. It continued under private direction until 1926, when control was taken over by the city. Under this arrangement the company, which is known as the Hochbahngesellschaft, first absorbed two other rapid transit systems in Berlin, which had been built later and physically were really extensions of its own lines but had been financed independently. These properties were taken over by the exchange of their stock for stock of the Hochbahngesellschaft. Then the city purchased 69,755,000 marks par value of the Hochbahngesellschaft stock, paying therefor in 7 per cent interest-bearing certificates, leaving only 8,517,000 marks of Hochbahngesellschaft stock outstanding.

Of the capital stock of the bus operating company, the Allgemeine Berliner Omnibus Aktien Gesellschaft, the city owns about 8,000,000 marks, leaving only about 2,000,000 marks floating.



Monthly division of traffic between different agencies in Berlin

It has been the policy of the city to continue to operate these systems by private companies with separate officials for each, but to secure unity of policy and co-ordination of service through a single directing commission.

A governing reason for the retention of operation by stock companies was that the original owning corporations had outstanding obligations in regard to bond retirements and other matters which could be fulfilled better by a private company than by the city. Practically, also, there is no doubt that the retention of the com-

TABLE I—PASSENGERS CARRIED (IN MILLIONS) 1911-1926 ON THE VARIOUS SYSTEMS IN GREATER BERLIN

Year	Surface Lines		Stadtbahn System		Bus Lines		Rapid Transit Lines	
	Number of Passengers	Per Cent Total	Number of Passengers	Per Cent Total	Number of Passengers	Per Cent Total	Number of Passengers	Per Cent Total
1911	606	50.6	370	31.0	154	13.0	64	5.4
1912	638	51.1	388	31.1	159	12.7	64	5.1
1913	652	52.7	341	27.5	170	13.9	73	5.9
1914	607	49.6	383	31.3	156	12.7	79	6.4
1915	619	53.5	366	31.6	101	8.7	72	6.2
1916	716	57.7	370	29.8	74	6.0	81	6.5
1917	897	66.3	311	23.0	33	2.4	112	8.3
1918	1,056	69.2	344	22.6	8	0.5	117	7.7
1919	1,008	66.8	376	24.9	11	0.7	115	7.6
1920	784	55.3	528	37.2	6	0.4	101	7.1
1921	672	49.8	559	41.5	21	1.6	96	7.1
1922	520	38.1	693	50.7	33	2.4	120	8.8
1923	286	25.5	643	57.5	23	2.1	167	14.9
1924	530	42.9	474	38.3	48	4.0	183	14.8
1925	772	53.6	442	29.3	74	5.1	172	12.0
1926	813	55.8	371	25.5	113	7.5	163	11.2

pany form of operation tends to remove the direction of the companies farther from politics than otherwise it might be.

GOVERNING COMMISSION OF SIXTEEN MEMBERS

The single governing commission for the three operating companies consists of sixteen members, made up of eight members of the Board of Aldermen, four representatives of the city administration, two distinguished citizens, who are selected for their knowledge of trans-

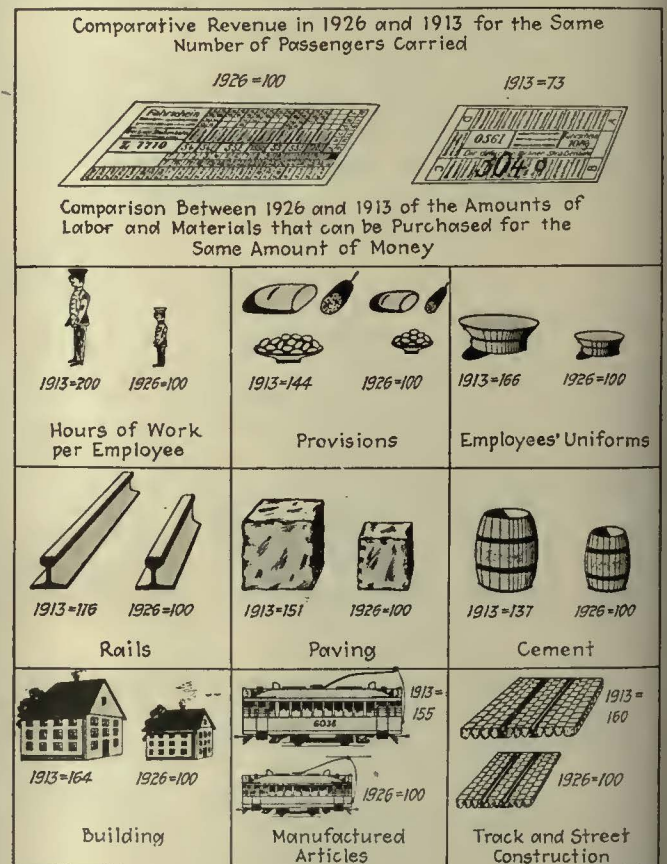
portation matters, and two employees of the operating companies.

While the Aldermen are elected, there is not as much change in Germany in officials of this kind as in the United States, so that these members of the board are more permanent and less likely to be influenced by politics than probably would be the case in the United States. The four members of the city administration are the city councillor for traffic, its chief engineer, its adviser on traffic and its treasurer. These officers are appointed, not elected, and in practice have long terms.

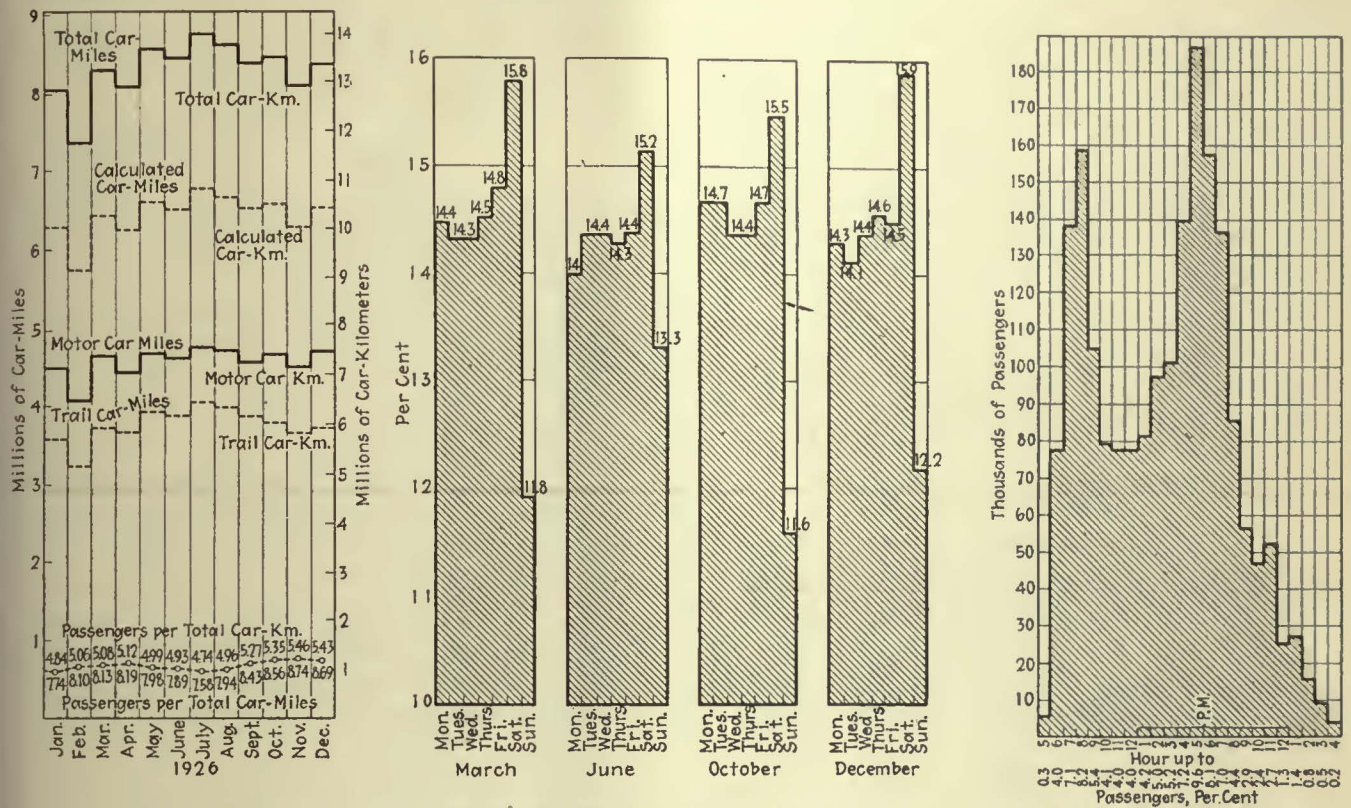
The labor members vary with the topic considered by the board; that is to say, two representatives of the employees of the rapid transit lines sit with the board when the topic to be considered relates to the rapid transit lines, two from the surface lines for surface line questions and two from the bus company when the question at issue affects bus operation.

THE STADTBahn ALSO A FACTOR

While this commission directs the policy of the three companies mentioned, it does not control all the Berlin urban transportation agencies because of the existence of the Stadt- und Ringbahn, a standard-gage railroad extending around and across the city and with suburban extensions. This road is part of the German State Railroads system and was built some 50 years ago to form a physical connection for the steam railroads which enter Berlin from several sides. It also had certain military value in the mobilization of troops. Owing to its location, this road has always done considerable city and suburban passenger transportation business.



This chart was published by the Berlin Surface Lines to illustrate the comparative increase in the cost of material and labor used in street railway operation during the last thirteen years and the much smaller increase in the charge for transportation



Monthly, weekly and hourly load charts for varying periods in 1926, Berlin Surface Lines

At left, monthly load chart of car-miles and car-kilometers, Berlin Surface Lines, for calendar year of 1926, also rides per car-mile and per car-kilometer. In center, weekly load chart in per cent of total, months during 1926. At right, hourly load chart of passengers, Berlin Surface Lines, for four typical days, Wednesday, Dec. 5, 1926.

Operation of this line has been by steam locomotives up to within recently, largely because the government railroad authorities could not decide whether it should be equipped with alternating or direct current. A decision was then reached to equip two of the four tracks with the third-rail direct-current system for urban service, the question of the arrangement to be adopted later when through single-phase trains enter the city to be determined when the through trunk lines entering Berlin are electrically equipped.

With its new direct-current equipment, this transportation system should play an even more important part in Berlin's city transportation than in the past, at least in number of passengers carried. Whether it will increase its proportion of total passengers remains to be seen, because the street railway, rapid transit and omnibus systems are also making important improvements at the present time.

HOW THE TRAFFIC IS DIVIDED

The diagram on page 550 shows the division of traffic between the several agencies by quarters during 1925 and 1926, and Table I, the division by years from 1911 to 1926 inclusive. In the latter the fluctuations in recent years, particularly between the two principal transportation systems, will be noted. Thus, the street railway proportion, which was 69.2 per cent in 1918, fell to 25.5 per cent in 1923, but in 1926 had returned to 55.8 per cent.

Conversely, the Stadtbahn system, which carried only 22.6 per cent in 1918, was responsible for 57.5 per cent of the traffic in 1923. Its local traffic in 1926, amounting to 371,000,000 passengers, was about the same numerically as before the war and represented 25.5 per cent of the total. The period of its spurt, 1920-23 and extending into 1924, corresponds roughly to the time of great

currency inflation in Germany, when the street railways under private ownership were trying to raise fares rapidly enough to meet their financial obligations, whereas the fares on the Stadtbahn, under government ownership, were less susceptible to the devaluation movement in the currency.

TABLE II—DEVELOPMENT OF GREATER BERLIN TRAFFIC SINCE 1890

Year	Inhabitants Within the Boundaries of the Present Greater Berlin	Total Passengers Carried	Yearly Rides per Inhabitant
1890	1,960,000	234,315,000	119
1891	2,022,000	253,669,000	125
1892	2,084,000	268,226,000	129
1893	2,146,000	290,161,000	136
1894	† 2,208,000	306,007,000	139
1895	2,270,000	340,299,000	150
1896	† 2,358,000	391,121,000	166
1897	† 2,447,000	400,752,000	164
1898	† 2,535,000	441,429,000	174
1899	† 2,624,000	496,926,000	189
1900	2,712,000	545,899,000	202
1901	† 2,815,000	536,818,000	208
1902	† 2,917,000	628,037,000	215
1903	† 3,020,000	687,244,000	228
1904	† 3,123,000	758,426,000	243
1905	3,225,000	834,245,000	259
1906	† 3,327,000	919,024,000	276
1907	† 3,429,000	969,500,000	283
1908	† 3,531,000	987,200,000	280
1909	† 3,633,000	1,048,156,000	289
1910	3,734,000	1,125,094,000	301
1911	3,794,000	1,193,781,000	315
1912	3,901,000	1,247,973,000	320
1913	3,944,000	1,289,966,000	327
1914	3,804,000	1,224,700,000	322
1915	3,722,000	1,158,000,000	311
1916	3,625,000	1,219,000,000	336
1917	3,606,000	1,352,000,000	375
1918	† 3,700,000	1,499,000,000	405
1919	3,804,000	1,512,000,000	397
1920	3,864,000	1,424,500,000	369
1921	3,893,000	1,349,000,000	347
1922	3,926,000	1,318,000,000	336
1923	3,938,000	1,198,000,000	304
1924	3,941,000	1,248,000,000	317
1925	4,038,000	1,445,000,000	358
1926	4,139,000	1,460,000,000	353

† Estimated. All other population figures are taken from official municipal publications.

A still more striking evidence of the influence of the war and the inflation period following it is shown in the figures of passengers carried on the buses. In the years 1911-14 these varied from 154,000,000 to 170,000,000, but in 1918 had got down to 8,000,000 and reached their minimum of 6,500,000 in 1920, when rubber and gasoline were very costly. The 1926 figure of 113,000,000 is still somewhat less than the pre-war average, but during the first half of 1927 the bus traffic has been growing rapidly.

Table I shows a notable increase in total passengers carried during the past four years. This appears in a more extended way in Table II, giving total traffic figures for the past 36 years, with the population of the district known as Greater Berlin and the rides per inhabitant.

ADOPTION OF UNIVERSAL TRANSFER
A NOTABLE EVENT

The most notable event in Berlin traffic history since the acquisition of the three local systems by the city was the decision this year to adopt the same fare for all lines with practically universal transfers. The fare chosen was 20 pfennigs (5 cents) and includes a transfer from bus to rapid transit or surface line and between these two. As yet transfers are not given by them to the

TABLE III—SHOWING STREET ACCIDENTS IN BERLIN, RESPONSIBILITY THEREFOR AND THE NUMBER OF VEHICLES OPERATED, BASED ON DATA FROM THE BERLIN POLICE TRAFFIC DEPARTMENT

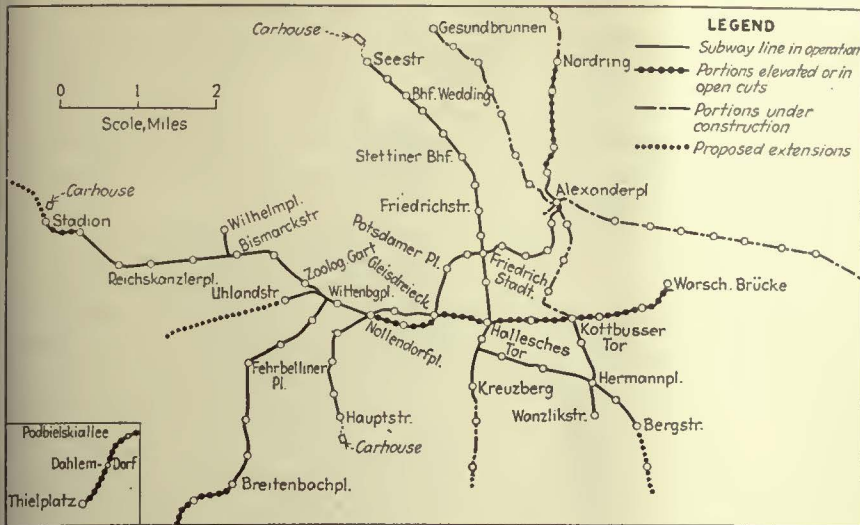
	Number of Power Vehicles on Street, Count Taken Dec. 31, 1926		Number of Accidents During 1926 and Responsibility Therefor, as Determined by Police Traffic Department		Responsibility of Motor Vehicles for Accidents, Based on Number Operated Per Cent of Total
	Actual Number	Per Cent of Total	Actual Number	Per Cent of Total	
Private automobiles....	15,900	29.5	1,697	20.0	12.8
Motor taxicabs.....	8,554	15.9	1,675	19.8	23.2
Motor buses.....	442	0.8	136	1.6	36.0
Commercial trucks....	9,333	17.3	853	10.1	10.5
Motor cycles.....	16,592	30.8	965	11.4	7.0
Street railway cars....	3,075	5.7	288	3.4	10.5
Other kinds of vehicles.....	.....	.....	1,470	17.3	.....
Pedestrians.....	.....	.....	1,392	16.4	.....
Total.....	53,896	100.0	8,476	100.0	100.0

buses, but this is only because of temporary shortage of bus equipment. When this condition is remedied by the receipt of new buses on order it is expected that the transfer privilege will be universal.

This universal transfer plan went into effect March 15, 1927. In addition to the 20-pfennig adult rate, the company sells school tickets at half price. These are good for scholars between the ages of six and fourteen. This rate is also available for scholars up to eighteen



Map showing the Stadtbahn, steam railroads and surface lines in the city of Berlin, Germany



Map showing the rapid transit system in the city of Berlin, Germany

of 22½ miles for a single fare, but the trip must always be in the same general direction.

In this connection it should be remembered that many railway costs, particularly for labor, are much lower than in the United States. Statistics on labor costs in Berlin were published in an article by the writer in the issue of the JOURNAL for Aug. 27, 1927. Nevertheless, German railway costs of the present day are much higher than they were in 1913, although Germany has stabilized its currency. These increases in operating expenses have been effectively pictured in a chart issued by the Berliner Strassenbahn Betriebs Gesellschaft (the title of the street railway operating company). This chart is reproduced on page 550.

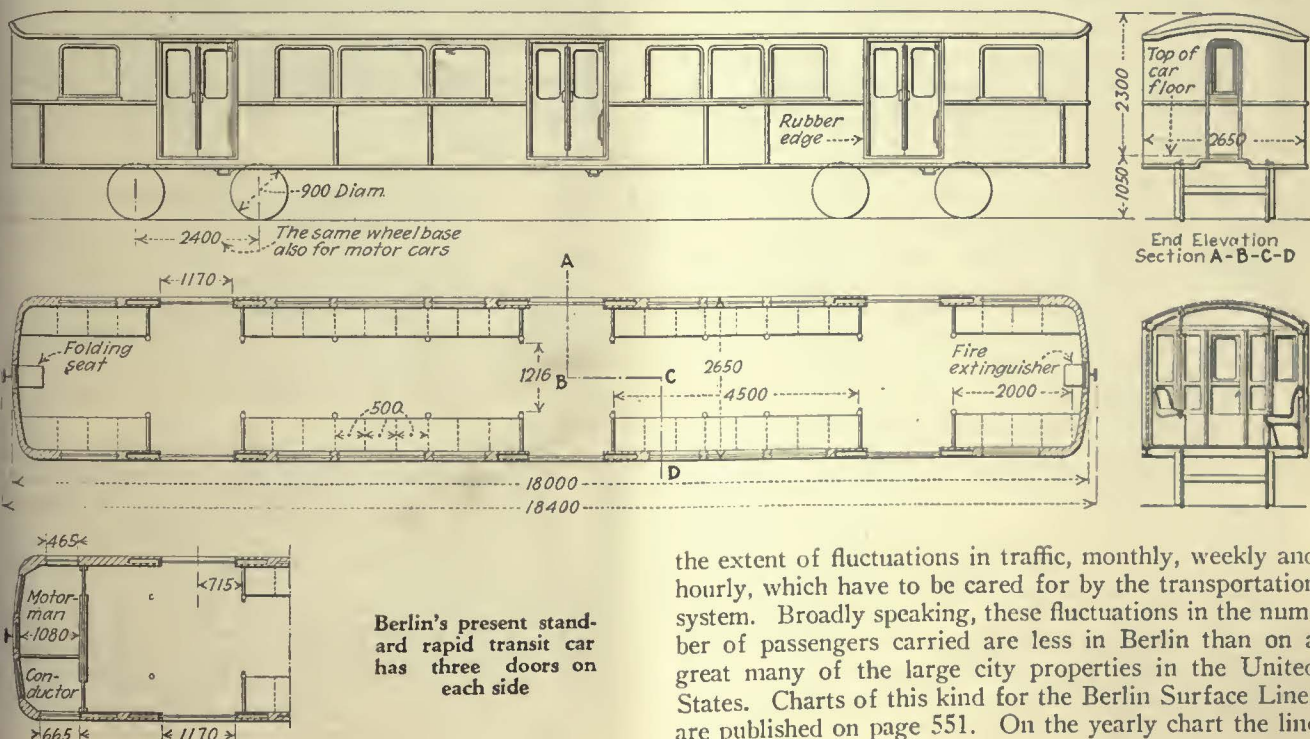
years of age who have secured an official certificate that their financial circumstances call for a reduction in fare. The hours and days on which these school tickets can be used are limited, as in the United States. The reduced rate is also available to crippled war veterans under certain circumstances. Several varieties of monthly passes are also sold by the Berlin Surface Lines and rapid transit system. A purchaser can buy such a pass, good for an unlimited number of rides during the month over one, two, three or all lines of either the surface or rapid transit system, or he can buy one pass good over both the surface and rapid transit lines.

In a number of other respects the operating problems that have to be contended with in Berlin are less acute than those encountered in the larger cities of the United States. This is particularly true in the matter of street congestion, which is notably less severe, since with a population of about 4,000,000 there are only about 50,000 registered automobiles and parking regulations are enforced. On the other hand, there are many bicycles and motorcycles, commercial trucks and taxicabs on the public streets.

The universal transfer in force is limited to one change and also as to time. The initial trip must be taken within 1½ hours, including the time required to make the transfer. This period was selected after a consideration of the length of trips on individual lines and length of time required for transfer. However, by proper selection of lines a person can take a three-hour trip over a distance

Table III gives for the city of Berlin the number of street accidents caused by these various types of vehicles during 1926, an accident being so classified when serious enough to become part of the police records. An attempt in this table has also been made to give an idea of the extent of use of the public streets by these various classes of motor vehicles. Obviously, this could not be done by the number of such vehicles registered. Instead, a count was made on Dec. 31, 1926, and the figures in the first column of Table III are based on this count.

Another factor of street railway operating expense is



the extent of fluctuations in traffic, monthly, weekly and hourly, which have to be cared for by the transportation system. Broadly speaking, these fluctuations in the number of passengers carried are less in Berlin than on a great many of the large city properties in the United States. Charts of this kind for the Berlin Surface Lines are published on page 551. On the yearly chart the line

"calculated car-miles" shows an arbitrary figure made up by adding to the motor-car-miles half of the trail-car-miles. This is considered in Europe a very convenient unit for measuring certain expenses, particularly labor expenses. A notable feature of this chart is the comparatively large number of passengers per car-mile, varying from 7.58 to 8.74. Another is the comparative evenness of the load line, though the demand for passenger transportation seems to be slightly greater in summer than in winter. The weekly curve line indicates that Saturday is the big day and Sunday the low day during all periods of the year. The hourly load chart, based on a count of passengers on Wednesday, Dec. 5, shows a good mid-day load, with the rather unusual feature of a broader afternoon peak than morning peak, due probably to the large number of Christmas shoppers. Generally on German street railway lines the morning peak is higher and narrower than that in the afternoon, due to the fact that the opening hours for business in different fields are closer together than the closing hours.

EQUIPMENT OF EXISTING LINES

To care for this traffic the Berlin Surface Lines had, at the beginning of 1927, 1,920 motor passenger cars and 2,008 trail passenger cars, besides 244 service cars, 21 electric locomotives, 206 freight trail cars, 23 postal mail cars and other miscellaneous equipment. To operate its system it had 13,735 employees. Its latest type of motor car, using Cardan drive, is shown in the illustration on page 549 of this article. Full particulars of this and other types of the company's cars were given in two articles by Manager Pforr of the Berlin Surface Lines, appearing in *ELECTRIC RAILWAY JOURNAL* for Jan. 29 and Feb. 5 of this year.

The rolling stock equipment of the Elevated and Underground Road at the beginning of this year consisted of 427 motor cars and 390 trail cars. It had 50.4 km. (31.5 miles) of route and 127 km. (79.4 miles) of track. It has cars of two widths, because one of the later extensions, the Nordsüd line, was built with wider clearances than the original Hochbahn. Both properties now belong to the same company and all future lines will be built with clearances like the Nordsüd cars. A diagram on page 553 shows a plan and elevation of the trail car which has been adopted for all new equipment. The motor car is just like the trail car except that one end has compartments for the motorman and conductor. All dimensions are given in millimeters.

As will be seen this car has three doors on each side. The trail car has accommodations for 53 seated and 112 standing passengers and weighs empty 29.4 metric tons (64,680 lb.). The motor car has accommodations for 44 seated and 117 standing passengers and weighs, with equipment but without passengers, 40.6 metric tons (89,320 lb.). No ventilators are shown on the accompanying elevations, but the Flettner type will be used on all new cars. The older cars have low monitors. Other particulars of the equipment will be contained in a later article by the writer in *ELECTRIC RAILWAY JOURNAL*.

About one-fourth of the cars in each train are smokers and are painted red on the outside so as to be easily distinguishable by waiting passengers. The non-smokers have yellow as an outside body color. Divisions as to classes by fare have been given up within the last year and only one class of fare is now charged.

Before the war the underground conduit system was used by the surface cars in the center of Berlin. All

cars were fitted with trolley poles, and those cars which passed through the center of the city had to have plow equipment also. During the war the company received permission to equip these sections with overhead wires as an emergency measure to reduce maintenance costs. After the war the overhead wires were allowed to remain. There is now no underground conduit operation in Berlin.

The standard train on the Nordsüd line has four cars, of which the two end cars are motor cars and the other two are trailers. This train is increased to one of six cars by the addition at one end of a motor car and trailer.

The cars on the Hochbahn proper are considerably smaller, on account of smaller clearances. They measure only 12.83 m. (42 ft. 1½ in.) long and 2.26 m. (7 ft. 5 in.) wide. The motor car accommodates 26 seated and 56 standing passengers and the trail car 33 seated and 55 standing passengers. Both have two doors on each side. The longest train which can be run on the Hochbahn at present consists of six cars, three motor cars and three trailers, but when the few remaining platforms are extended it will be possible to run trains of eight cars each.

The bus system in Berlin is operated by the Allgemeine Berliner Omnibus A. G., which on the first of this year had 490 buses, with 100 more on order. By far the greater number are double-deckers with solid tires.

Kansas City Company Tells New Car Story in New Way



IN ORDER to acquaint the public of Kansas City with its \$1,500,000 remodeling and rehabilitating car program and at the same time to present graphically the improvements the Kansas City Public Service Company is using the advertising columns of the daily press, employing such copy as is shown elsewhere on this page.

Besides graphically pointing out the new features with numbered key paragraphs, the company, in a box in the righthand corner of each advertisement, is announcing this policy:

In line with our policy to give greater Kansas City an unexcelled urban transportation system, we will spend in the next twelve months approximately \$1,500,000 to remodel and rehabilitate all of our 745 cars. These cars, to be turned out at the rate of twelve each week, will be equipped with all of the recently invented labor-saving devices, embodying some new features developed in Kansas City.

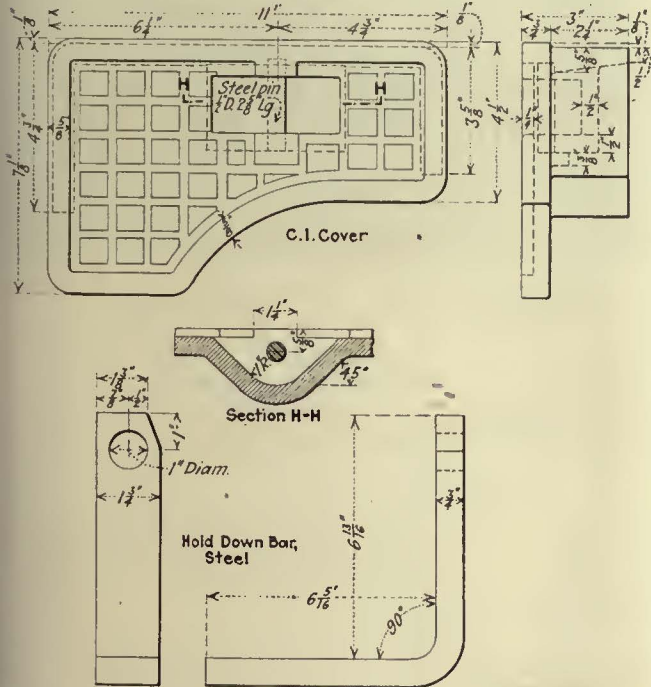
Forty-five of these de luxe cars, the first series to be completed, will be placed in service on the Country Club line early in July. Later they will be rotated on other lines. In addition to the new mechanical and air features, these 45 cars will be equipped with rubber tile flooring Kemi-suede seat covering, new lighting fixtures, sun visors and steel skirts which cover the trucks, minimize the noise and give the car a streamline effect.

Standard Tongue Switch Designed

Study begun in 1924 by committee on way and structures has now been completed. Luncheon conference to be held at convention to discuss proposed design

FOR the past three years the committee on way and structures of the American Electric Railway Engineering Association, acting through a special committee, has been working out a design for a standard tongue switch. This work has now been completed and through the courtesy of one of the manufacturing companies two of the proposed switches will be on exhibition at the Cleveland convention.

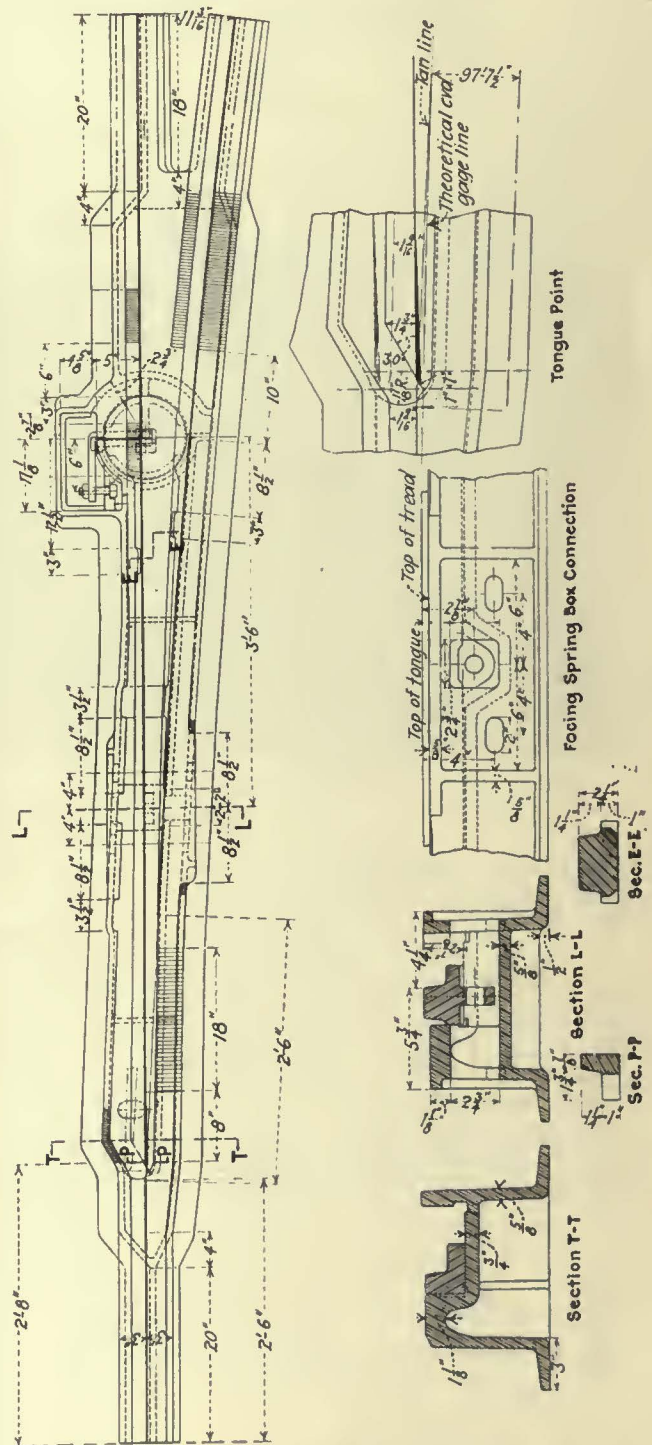
The average street railway has on its lines a great variety of tongue switches, there often being many different styles from a single manufacturer as well as entirely different designs by other manufacturers. The difficulty and expense of maintenance under these conditions is well known to all way engineers. As a result, some of the larger companies have adopted standards of their own, all the way from specifying certain overall lengths to complete designs covering all details. This



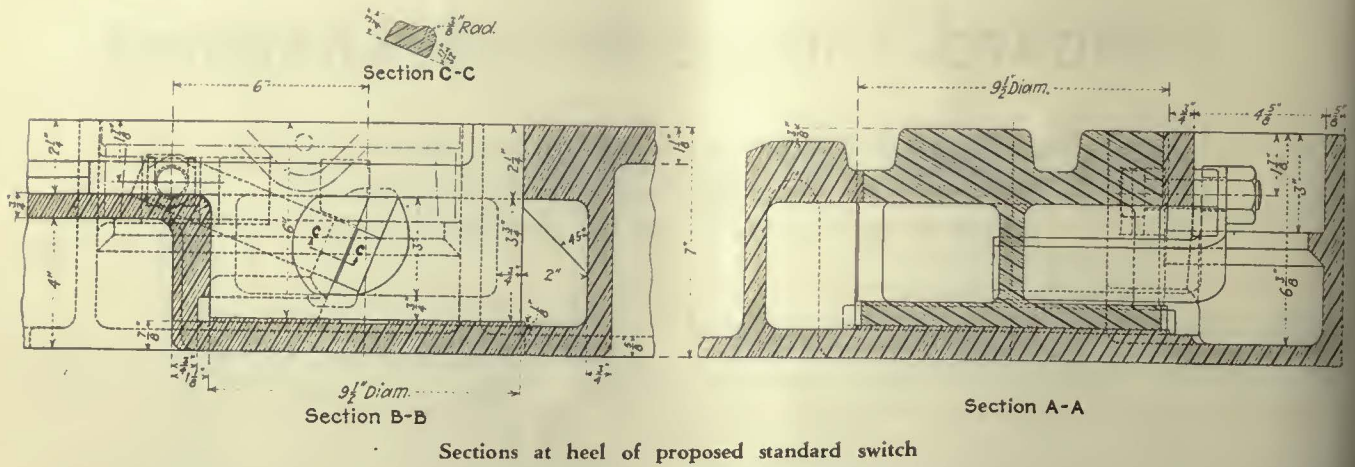
Details of tongue pin holding mechanism

has forced special trackwork manufacturers to carry a still greater variety of patterns. The cost of such multiplicity of designs is, of course, necessarily borne by the industry.

In designing a standard tongue switch it was kept in mind that to be satisfactory the switch must be not only as good as or better than existing designs but must be no more expensive. It is felt by the committee that these conditions have been met and it is desired that the new design should be tried out widely so as to demonstrate as quickly as possible whether or not it is satisfactory.



Proposed A.E.R.E.A. standard solid manganese steel tongue switch, 97 ft. 7 1/2 in. radius, showing detail of tongue point, facing spring box connection, and four cross-sections. The type of heel and heel-fastening device is novel in several particulars. The pin is of the tadpole type of 9 1/4 in. diameter and is carried down to a bed on the base of the 7-in. casting.



Sections at heel of proposed standard switch

Detail drawings are shown herewith for a "100-ft." solid manganese switch, showing the general plan, the plan of heel, sections at heel and pin-holding device.

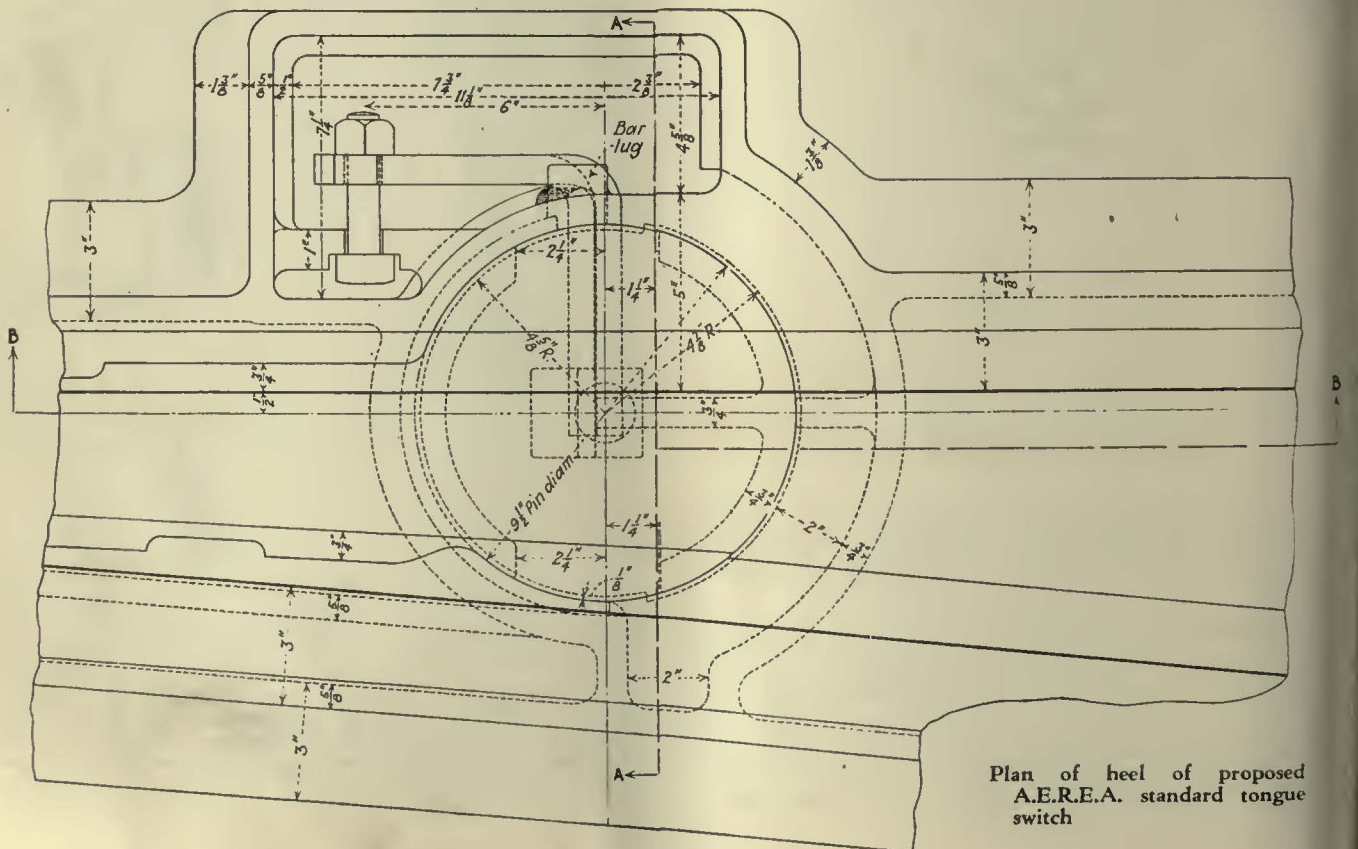
The type of heel and heel-fastening device is novel in several particulars, but is believed to be thoroughly sound and to present several marked advantages. The heel or pin is of the tadpole type, of 9 1/2 in. diameter, and is carried down to a bed on the base of the 7-in. casting. This provides a vertical wall of large dimensions which resists any forward motion of the tongue under trailing traffic. The distributed wear on this wall will be very slight, even if the holding device is not kept in operative condition, so that the joint between heel of tongue and casting should not increase materially during the life of the switch.

The supporting area under the heel is as large as in any previous design and is located with special effectiveness, as the extreme rear portion has a bearing directly at its edge as the recess under the casting back of the pin makes it possible to grind the bed true at this point.

This same recess extends all around the back of the pin, providing a space to be filled with oil or grease in the summer or salt in the winter.

The fastening device holds down and back as well. It consists of a lever held in place by a bolt which is readily accessible. The lever makes contact with the heel on an inside diaphragm at the center of revolution, thus providing rolling motion instead of frictional wear. The diaphragm also stiffens up the floor of the heel.

Arrangements have been made for a luncheon conference at the Hotel Hollenden, Cleveland, at 1 o'clock on Wednesday, Oct. 5, to talk over the desirability of the general adoption of this proposed A.E.R.E.A. standard tongue switch. This will provide opportunity for an interchange of opinion among those competent to pass on the design and bring together representatives of those companies which now have standards of their own. Tickets will be on sale at the association headquarters booth. The number of plates at the luncheon is to be limited to 50.



Plan of heel of proposed A.E.R.E.A. standard tongue switch

London, Ont., Cars Converted to One-Man Safety Operation

By L. Tait
Manager and Secretary-Treasurer
London Street Railway, London, Ont.



Seven of these one-man safety cars have been turned out of the shops of the London Street Railway, London, Ont., Canada. They were converted from two-man, single-truck units

LAST fall the London Street Railway, operating in London, Ont., Canada, converted one of its two-man, single-truck cars to the safety type, with double doors in front and a treadle exit door in the rear. This work was in the nature of an experiment because the company's plan to convert fifteen of its two-man cars was not considered favorably by the City Council and it was therefore necessary to demonstrate that this equipment could be satisfactorily converted into up-to-date safety cars. Careful plans were laid to embody in the design all the requirements of an adequate safety car. Although some changes have been made from the first car converted, these have largely been in the nature of additional improvements, the most important being the installation of a unique back-up arrangement placed on the car for the purpose of turning it around "Y's" and so for backing out of the carhouses. The company's equipment all has single-end control and many of the lines have "Y's" at terminals. Because of increasing auto traffic and the use of a "Y" located on Dundas Street East, which is the main provincial highway through Canada between Detroit and Buffalo, it became increasingly necessary to devise some plan to back up safety cars in order that this equipment could be operated in safety around these "Y's" and without delay traffic.

Many schemes were considered by the staff, including one to have the operator remove the controller and air brake handle from the front and carry them to the rear of the car. This was discarded on account of the work entailed in removing the handles. Likewise a plan to place the air line at the rear of the car with a small removable air brake handle was vetoed because it was felt that failure of an operator to remove the air brake handle after backing might result in operating troubles.

It was finally decided to use an ordinary hand brake at the rear, and the National Brake Company's Peacock staffless brake was selected and placed between the back cross seat and the small seat on the side of the car. In this way no seating space has been lost on account of the installation of the hand brake.

Directly above the hand brake on the side of the car a circuit breaker was installed, so that this apparatus can be operated with the left hand and the hand brake with the right. Wiring between the front of car and the rear circuit breaker is carried through the roof and along top of car. A heavy type knife switch mounted on a slate base and inclosed in a wooden box with only sufficient space for the travel of the handle is placed on the side of car to the left of the controller. This switch is connected at the top terminal to the front circuit breaker and at the bottom terminal of the switch to the

controller. The bottom terminal of this cut-out switch also has a wire connection through a conduit up the left front vestibule post, the wire running through the roof of the car and along the top to the circuit breaker at the rear. Final connection is then made between front and rear circuit breakers.

Operation of this device, which was described in the Maintenance Data Sheet Section of the JOURNAL, issue of Aug. 20, page 319, is as follows:

The operator opens the knife switch, which cuts the line between front circuit breaker and the controller. He

Reconstruction of the company's London West line of 1.1 miles was begun in August and the company has secured authority from the City Council to install a "Y" at the end of this line in a new location. One leg of the "Y" will be placed on a 40-ft. lot acquired for this purpose. But for this back-up device the company would have been faced with a difficult task, as suitable property was available in that locality for installation of a loop.

As far as general car rebuilding plans are concerned a definite program has been followed for converting



View of rear platform of converted units, showing, at right, wheel which controls special back-up device



Motorman's position in new safety cars. Here may be seen, with the aid of the text, the mechanism which controls the back-up device specially constructed for "Y" operation

then places the controller handle on the first position and hooks down the dead man controller handle with a special hook. This hook is so designed that it can be used only on the first notch. The controller is placed in reverse and the air brake released to the brake-off position. The operator then walks to the rear of the car and immediately operates the circuit breaker to close the circuit, using the hand brake to stop the car. The current flows from the trolley through the front circuit breaker, then through the rear circuit breaker and direct to the bottom connection of the knife switch, on to the controller set on the first position. After backing the car, the operator then proceeds to the front vestibule, removes the hook from the controller handle, adjusts the reverse controller lever and throws in the knife switch. The car is then ready to move forward.

This back-up device has now been in operation for six months and is proving entirely satisfactory, giving one-man operators a clear view of the roadway when backing the car. Previously, operators were having considerable difficulty in backing their cars in traffic, particularly backing up in winter with frosted windows.

the two-man cars with safety equipment. This consisted of completely stripping the cars and removing the seats, then thoroughly overhauling each truck, after which reinstallation proceeds along these lines: Each unit is equipped with Canadian Westinghouse air brakes and safety devices and National Pneumatic door equipment, the latter consisting of two door engines for operating the entrance and exit doors at the front and treadle door equipment at the rear. The treadle door engine and its equipment have been placed in a well between the new floor of the car and the old floor of the drop platform at the rear. Installed directly opposite the treadle step and immediately behind a small seat placed lengthwise of the car, the well area was fitted with a trapdoor which completely covered the treadle door engine and its equipment. Some difficulty, however, was experienced last winter in operating the treadle door engine during the very cold snaps, and this difficulty was overcome by boxing in the seat immediately over the well, cutting off half the trap cover and lowering the electric heater under this seat so that the well area could be heated during the winter.

Every car is equipped with two Hunter route

placed one in front and one over the first right-hand window. To distinguish safety cars operating at night from two-man rear-entrance cars, the boxes containing the route signs are made large enough to install a "Front Entrance" sign immediately below them. By this arrangement the two lamps used for the Hunter sign are made to serve a double purpose.

In addition, the units are equipped throughout with aluminum hand railing and stanchions. A mirror has been placed just above the front Hunter sign box so that the operator may see the treadle step and door when the curtains are drawn. All lamps in the front vestibule are fitted with shades and two heavy curtains shield the operator. These curtains slide on rings on rods, bent to proper position. One curtain is immediately back of the operator and the other extends from the front right-hand corner post to the fare box. Curtains at night shut out all reflection from the rear, but allow sufficient opening so the operator has a clear view to the right to observe passengers boarding and leaving car and for fare collection.

Consolidated car heaters with thermostatic control are being placed in each car. All wiring is alongside the cross seats on the right-hand side of the car and is carried in conduit. Air pipes are carried in racks, one pipe above the other on the left side of the car under the longitudinal seat which extends from the front to the rear bulkhead. In front the vestibule air pipes are racked on the side of the car just above the two front door engines. Special seats cover the door engines, these seats being closed in to the floor and provided with a removable face board so that the door engines may be adjusted. All air pipe lines in the vestibule are fitted with unions as well as the air pipe lines immediately connecting with the air brake valve head. This facilitates removal of the valve head for repairs without the necessity of disturbing other connections. Galvanized pipes are now used on all air lines to overcome scale. With all door engines fully inclosed and all air lines off the floor in racks, no difficulty is experienced in sweeping and cleaning under the seats.

Under the new plan the seating capacity has been increased to 41 passengers, a gain of seven seats over the old style two-man type.

REMODELING OF CARS HAS PLEASED THE PUBLIC

To date seven of the converted cars have been released from the shop, each unit being remodeled for approximately \$2,700. The company recently obtained authority from the City Council to operate ten safety cars of this type in regular service. Incidentally, five small safety cars with no rear exit door, operated since 1922, had caused considerable unfavorable comment from time to time when safety car operation was under discussion. The converted car, however, is proving quite satisfactory to the public and many favorable comments are now being received by the management.

Full credit should be given to R. H. Welburn, formerly master mechanic, who is now acting in the capacity of consulting engineer, for the simplicity of the back-up device placed on this car and for many of the details for the conversion of the equipment. Although Mr. Welburn has been in the service of the railway since 1895, a period of 32 years, and recently celebrated his 80th birthday, he is still as actively interested in the equipment of the railway as any of the younger men in the organization.

Readers' Forum

Calculating Rail Tonnage

UPPER DARBY, PA., Sept. 17, 1927.

To the Editor:

Reading the article by Edward A. Roberts in *ELECTRIC RAILWAY JOURNAL* of Sept. 10, setting forth a simplified method of calculating the amount of rail in a given length of track, called to mind the following formula:

Tons rail per mile track = weight rail per yard multiplied by 11 and divided by 7.

This can be readily verified by arithmetic. It is set forth on page 817-b of the 1911 edition of Trautwine and I would not be surprised if it were given in the first edition. Such a formula is easily memorized (just think of the galloping dominoes) and from it a table of quantities for various rail weights and lengths of track can be compiled.

L. E. SUMMERS.

GENERAL ENGINEERING AND MANAGEMENT CORPORATION

NEW YORK CITY, Sept. 17, 1927.

To the Editor:

I note Mr. Roberts' method of calculating rail tonnages on page 426 of the Sept. 10 issue of the *JOURNAL*. As most of the problems involving rail tonnages in the street railway field are calculated in feet and not in miles, I developed a simple formula of calculating rail tonnages when track measurements are in feet, as follows:

Number of lineal feet of track multiplied by weight of rail per yard, divided by 3,360.

This formula is correct for all weights of rail. While it may not be original with me, I have never seen it in print before.

Mr. Roberts' formula is, of course, built up on the familiar fact that 1 mile of 70-lb. rail weighs 110 long tons, by which, of course, rail is always bought. His formula is comparatively simple when rail weights are in even tens, but as a great deal of street railway track is built of rail with odd weights per yard there would be some difficulty in applying Mr. Roberts' rule.

C. G. KEEN,
Railway Engineer.

PHILADELPHIA, PA., Sept. 12, 1927.

To the Editor:

In your issue of Sept. 10 is mentioned a rather longer method of applying a simple old formula which has been used in the rail trade for well over half a century. There are 1,760 yards per mile, so that for 2 miles it would take 3,520 yards of rail. There are 2,240 lb. in a ton, and 3,520 divided by 2,240 equals 11/7. There is therefore required per mile of road 11/7 of 1 ton of rail of 1 lb. per yard. Multiply 11/7 by pounds per mile and number of miles of single track to be equipped and you have the total number of tons of 2,240 lb. each of rails required. This formula of 11/7 multiplied by miles and pounds per yard is, I think, the simplest formula obtainable, though it can be shortened where the number of pounds or the number of miles is divisible by 7. For instance, if pounds per yard is 63, one would simply multiply 11 by 9, getting 99 tons per mile.

FRANCIS RALSTON WELSH.

Maintenance Methods *and* Devices

Body Painting by the Flow Method

PAINTING bus bodies by the flow method, which is considered much more rapid than by the spray method, has been adopted in the Chiswick shops of the London General Omnibus Company. Briefly, the paint is allowed to run from a nozzle over the sides of the bus body in a broad thin stream. One coat by this method is considered equivalent to two by the brush method. It is used only for the final coat, the priming coat being put on by hand, and only about one minute is required by the flow method to paint one side of the body up to the waistline. The roof and top deck are painted by a spray gun and the interior of the lower deck (and of the upper deck in the case of covered top buses), the side posts and



Watering can for painting side sills



Bus bodies up to the waistline are painted by the flow method in the shops of the London General Omnibus Company. Only about one minute is required to paint each side. Paint is applied through a hose or by a can

Keep your bearings from burning, while the car wheels are turning, by modern and improved lubrication learning.

certain other parts of the exterior are painted by hand.

When the flow method is used the paint may be put on in either of two ways, as shown by the accompanying illustrations. In one, the paint is con-

tained in an overhead reservoir and flows by gravity through a flexible hose through a nozzle to the bus body. With the other method the paint is put on by a can which holds about 1½ gal. and looks very much like an ordinary watering can but has the same kind of a flat nozzle as that used when the paint flows through a hose. In both cases a V-shaped trough is used to catch the surplus paint which drops off the side of the bus.

When to Discard Wire Rope

JUST when to discard wire rope as worn out is a problem which depends on the local application of the rope and the degree of maintenance attention accorded during its period of service. Metallic area apparently unharmed cannot alone be taken as a criterion, since two ropes from the same reel, showing the same degree of wear and number of broken wires, may show under test a variation of 25 per cent in reserve strength.

There are several reasons for this variation, the principal one of which may be that one rope may have been subjected to excessive acceleration stresses which greatly fatigued the steel and caused considerable loss of strength, whereas the other rope may have operated under a more uniform tension and was never overstressed. Another factor might be the presence

or absence of proper lubrication, which, of course, would affect greatly the degree of corrosion.

Wire ropes for shop cranes, electric or pneumatic hoists should be discarded when there are four or more broken wires in any one strand, when the outer wires have been worn to two-thirds of their original diameter; that is, when one-third of the wire diameter is worn off, or when loss of area exceeds 15 per cent for combined wire wear and broken wires.

When inspecting crane and hoist ropes it is always advisable to examine that section of the rope passing over the equalizing or compensating sheaves, as there is a slight movement of rope over these sheaves, causing abrasion or breaking of wires, which at times may prove dangerous.

When employed in the work of hoisting elevators or skips the wire rope should be discarded when there are more than three adjacent wires broken in any one strand, when the outer wires have become worn to two-thirds their original diameter or when marked corrosion appears.

The United States Bureau of Mines in Technical Paper No. 237 advocates that after shaft ropes have been in service for a period of three years, even if idle, they shall not be used unless tested for ultimate breaking strength. Indeed, any rope that has remained idle for some time should be submitted to the test of cutting off and examining the interior wires for possible corrosion and wear. The factor of safety on a deteriorated rope in this class of service should be 4 as minimum.

For boom topping lift, fall or hoist-

ing lines, the rope should be discarded when there are six or more adjacent wires broken in any one strand or when the outer wires have been worn to one-half their original diameter.

Holding, closing and boom lines on locomotive cranes should be discarded in conformity with the rules given for the "derrick ropes," but when examination of ropes is made, attention should be given that part of the rope passing over equalizing sheaves.

In the discarding of wire rope consideration should be made of the type of rope employed. It has been known, for instance, that a length of preformed wire rope, discarded as completely worn out, was capable of giving nearly twice the amount of service secured.

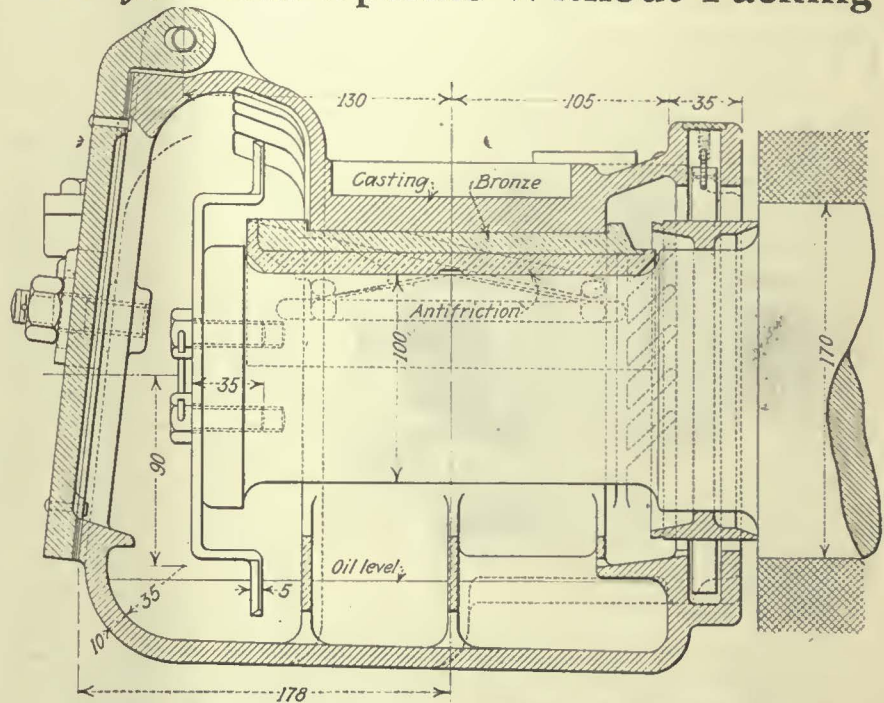
There are many places where life or limb will not be endangered by the breaking of a wire rope, such as car hauls, car transfers, spotters, etc. In such application a wire rope might conceivably be used until an entire strand breaks, but this general rule, of course, has no application to installations that might, in case of emergency, endanger workmen.

Weed Whipper Installed on Snow Sweeper

TO OVERCOME difficulties experienced from weeds growing between tracks, the Southern Ohio Public Service Company, Zanesville, Ohio, has arranged one of its sweepers with a weed whipper attachment. The rattan was removed from the rotary block of one of the brooms and the block was then incased entirely with angle iron bolted securely together. Holes were drilled through the iron to allow steel cables to be

passed through and fastened with clips. When rotated these steel cables grow in the spring are destroyed. During midsummer, when the foliage becomes heavy, the cables have little effect.

Car Journals Operate Without Packing



Longitudinal section of car journal, Paris subway car, showing splash plate (dimensions are in millimeters)

AN INGENUOUS method of splash lubrication for car journals is used by the Chemin de fer Metropolitain of Paris, which operates the subway and elevated system in that city. The construction is shown on the accompanying drawing.

The bearings are of anti-friction white metal and a small curved splash plate, 50 mm. (2 in.) wide and 5 mm. ($\frac{3}{16}$ in.) thick, is screwed on to the end of the car journal. The lower end

of this plate dips in a reservoir of oil at the bottom of the housing and as the axle revolves oil is carried over and around the journal. No packing is used. An inspection of the journal is made every four or five days to see whether there is sufficient oil, but usually none is required. The records of the company show that the average consumption of oil per journal box is 16 grams per 1,000 car-km. (5.64 lb. per 100,000 car-miles) run.

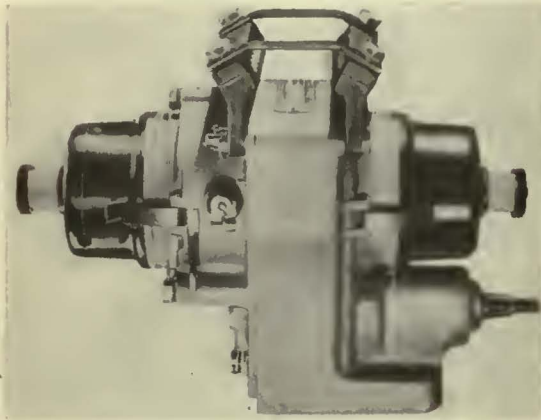


At left, weed whipper attachment in lowered position; at right, raised position of weed whipper

New Equipment Available

Heavy-Duty Ignition of Dual Type

DESIGNED especially for bus and truck use the North East Electric Company, Rochester, N. Y., has brought out a heavy-duty ignition



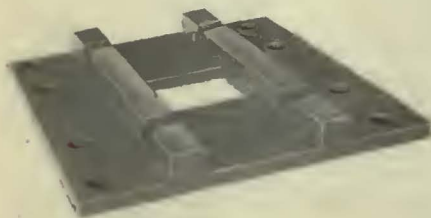
Dual type ignition unit

unit of the dual type. It is used with two distributors and two coils furnishing two sparks to each cylinder. The unit has semi-automatic spark advance, uses four ball bearings and is built for magneto base mounting.

New Joint and Tie Plates of Hamburg Elevated Railway

NEW types of joint plates and tie plates manufactured by the Klöckner Works of Osnabruck have recently been adopted as standard by the Hamburg Elevated Railway of Hamburg, Germany. The two principal features of these plates are heavy ribs on the plates to hold the rail in place and a method of attaching the rail to the plate independent of the attachment of the plate to the tie. Among the advantages claimed for this plate are the following:

The strains from any movement of



This joint plate rests on two ties

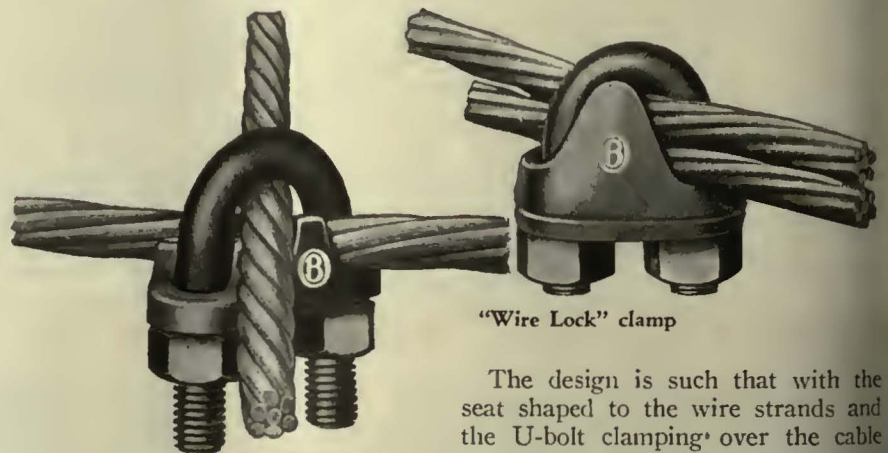
the rails do not come directly against the screw spikes holding the plate to the tie, hence they do not tend to

work in the hole, become loose and pull out.

It is not necessary to change the screw spikes when a rail is changed.

The base of the plate completely covers the portion of the tie on which it rests, so that water does not get through the ties and start decay. The illustrations show a joint plate which is designed to rest on two adjoining ties. The tie plate is similar in construction to the joint plate except that it is less than half as long and has holes for only two screw spikes on each side. The heavy ribs between which the base of the rail rests are shown clearly in both illustrations.

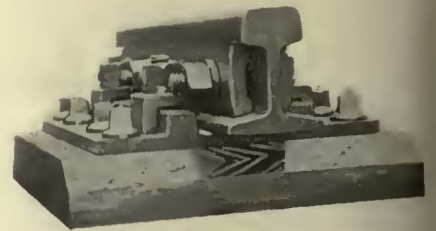
The illustration above shows the clips for attaching the rail to the plate. Each attachment consists of four parts, as follows: (1) A U-shaped clip spanning the rib, one side resting on the base plate, the other on



"Wire Lock" clamp

the base of the rail; (2) a bolt with a triangular head to fit into the triangular opening in the rib; (3) a nut which holds the rib to the base plate, and (4) a lock washer to hold the nut in place. The grip on the rail is so solid that it is expected longer sections of tracks can be welded when the track is exposed without danger of trouble from expansion and contraction.

An adjunct to the plate not previously mentioned is a thin strip of poplar wood between the base of the rail and the plate. This sheet, which is treated for preservation against



Method of fastening rail to tie plate

rot, is 5 mm. (0.2 in.) thick and is capable of being compressed to 3 mm. (0.12 in.) thick. The edges of this wooden strip, which bear no load, tend to swell and form ridges which prevent the rail still further from shifting in the plate.

Clamps for Two Wires

DESIGNED to hold two parallel or cross wires when making splices deadends, etc., the Ohio Brass Company, Ohio, is offering the "Wire Lock" clamp. The shaped seat or groove of the saddle and the angle at which the U-bolt clamps the strands are said to give great strength and holding power. These features permit the clamp to be installed easily and quickly without damage to the wire strands.

The design is such that with the seat shaped to the wire strands and the U-bolt clamping over the cable at a 45-deg. angle tightening the nuts draws the wires downward against the faces of the upright lugs in the shaped seat at the bottom. This provides both lateral and vertical compression on the wires over the greater part of their circumference.

The clamp is furnished in bronze or forged steel, either of which is recommended by the maker for use by electric railways and in overhead and distribution systems generally, the bronze clamp being particularly recommended on interurban and steam road electrification installations, where bronze or copper stranded cables are used.

American Association News

Car Lighting Demonstration at Convention

OF PRIMARY importance among the factors which contribute to the comfort, convenience and safety of electric railway passengers artificial illumination has been accorded special attention by rolling stock committee No. 4 of the American Electric Railway Engineering Association. Supplementing its 1927 report, the committee has prepared a special lighting exhibit for the convention showing a number of recommended illumination systems. The Cleveland Railway has provided a car for this demonstration and installed the lighting equipment. This consists of four independent lighting systems, on separately controlled circuits. The car has a seating capacity of 55 with transverse seats at the rear and longitudinal seats at the front. These two arrangements of seats provide interesting comparisons of the amounts of light available from the various systems of illumination. The arch-shaped headlighting is finished in a light color which gives the greatest efficiency in the utilization of natural and artificial light. System No. 1 consists of five 12-in.

ceiling type inclosing hemisphere fixtures (two qualities of glassware), each containing lamps that may be changed at will, but ordinarily totaling approximately 200 watts. The inclosing bowls are spaced at 8-ft. intervals on the longitudinal center line of the car. Pressed glass deep bowls and blown glass shallow bowls of the diffusing type will be used with this installation.

System No. 2 is composed of ten pendent type fixtures equipped with medium density deep bowl open glass reflectors and 56-watt, 115-volt, S-21 clear-bulb Mazda street railway lamps. The units are spaced at 4-ft. intervals on the longitudinal center line of the car.

System No. 3 has twenty pendent type fixtures equipped with open diffusing glass deep bowl reflectors and 36-watt, 115-volt, S-19 clear-bulb Mazda street railway lamps. These units are arranged ten in a row, one row on each side of the car over the seats on 4-ft. longitudinal centers. Both medium and light density glass reflectors will be shown with this installation.

System No. 4 employs 25 bare 36-watt, 115-volt A-19 inside-frosted bulb Mazda street railway lamps. They are

Many Special Acts Scheduled for Theater Party

CHOICE seats are still available for the theater party to be held at Keith's Palace Theater, Euclid Avenue, Cleveland, for Wednesday evening, Oct. 5, as one of the entertainment features of the convention. In order to avoid confusion in obtaining tickets after delegates reach the convention, they are urged to purchase them in advance. They may be obtained from T. L. Kennedy, vice-president Ohio Public Service Company, Box 693, Cleveland, Ohio. The committee in charge of the theater party has obtained many special acts and a special de luxe performance is assured.

mounted in two rows of twelve on each side, above the seats, with the remaining lamp placed in the center at the rear end of the car.

A summary of the average light intensities obtained on the horizontal and 45-deg. planes for transverse and longitudinal seats with each system of lightings is given in the table.

For convenience in reading fine print, such as newspapers and magazines, the committee has recommended a minimum light intensity of six foot-candles on the reading plane. This is defined as the 45-deg. plane at the normal sitting position at a point 33 in. above the car floor. Each of the four installations described will provide an average of six foot-candles or more on the reading plane at the transverse seats when lamps are operated at average rated voltage.

The fixtures and glassware were loaned by the Adams & Westlake Company, the Electric Service Supplies Company and the Macbeth-Evans Glass Company. The lamps were furnished by Mazda lamp manufacturers.

A cordial invitation is extended to all visitors at the convention to inspect this exhibit. The car will be open for inspection at all times and committee members or their representatives will be in attendance to demonstrate the various installations.

Metropolitan Section Breakfast at Cleveland

DEFINITE arrangements have been completed for a Metropolitan Section breakfast during the Cleveland convention. This will be held on Wednesday morning, Oct. 5, at 8 o'clock in Parlor D on the second floor of the Hotel Statler. The breakfast will be simply a get-together meeting and all members are earnestly urged to attend.

System No.	Reflector Glassware Density	Total Watts	Foot-Candles		
			Average Horizontal Illumination	45 Deg. Plane Illumination Transverse Seats	45 Deg. Plane Illumination Longitudinal Seats
	Light.....	1,000	11.57	9.10	6.63
	Medium.....	1,000	9.11	7.08	5.29
	Medium.....	600	9.27	7.27	5.13
	Light.....	800	8.67	6.30	5.00
	Medium.....	800	10.13	7.93	6.67
	None.....	1,000	11.68	9.33	7.00



Interior of Cleveland Railway car equipped with four lighting systems on separately controlled circuits

News of Other Associations

C.E.R.A. Master Mechanics Meet

SOME 75 representatives of the Central Electric Railway Master Mechanics' Association from several Midwestern states gathered in South Bend on Sept. 8 and 9 for a two-day program. Reports from the standardization committee and from the committee of uniform charges were read and other routine business conducted. George R. Green, general superintendent Chicago, South Bend & Northern Indiana Railway and president of the association, presided.

Following the first meeting, luncheon was served in the hotel and the afternoon of the first day was devoted to addresses by D. F. Smith of the General Electric Company, Schenectady, N. Y., who spoke on "Railway Motor Manufacture and Maintenance," and by L. F. Mullen of the Sherwin-Williams Paint Company, Cleveland, Ohio, who spoke on "Insulating Varnishes." Later in the day a tour of inspection of the South Shore shops at South Bend was made.

The program on the second day began early in the morning when the guests were transported on a special train over the South Shore lines to Chicago and return, with a stop at Michigan City for an inspection tour of the shops there.

Specifications for Track Materials

ON SEPT. 9 the twelfth meeting of the A.E.S.C. sectional committee on specifications for materials for use in special trackwork and the design of 7-in. plain girder rails was held at the headquarters of the American Electric Railway Association in New York. The American Electric Railway Association is the sponsor body for these projects.

Present at the meeting were R. C. Cram, vice-chairman; J. E. Davidson representing J. B. Strong, E. B. Entwisle, W. G. Hulbert, E. F. Kennedy, E. P. Roundey, E. M. T. Ryder, and H. H. George, secretary. R. E. Hess, representing the American Society for Testing Materials, and G. C. Hecker, special engineer of the A.E.R.A., also attended. Mr. Cram presided at the meeting.

The work of the committee covering design of 7-in. plain girder rails was completed late in 1925, and the designs were adopted as tentative American standards July 1, 1926. The specifications for special trackwork materials have now taken definite shape as the result of the work of a special committee on form consisting of Messrs. Ryder, Alden and Cram. This committee presented a tentative specification, which was approved at the meeting after thorough discussion. The specifications will be submitted to the entire membership of the committee for formal letter ballot and upon approval will go to the sponsor body for approval and submission to the A.E.S.C.

Work of the committee has been delayed through the deaths of its chairman, Victor Angerer, and of George L. Fowler. R. C. Cram was elected chairman to succeed Mr. Angerer and E. B. Entwisle was elected vice-chairman to succeed Mr. Cram.

COMING MEETINGS OF Electric Railway and Allied Associations

Sept. 26-30 — National Safety Council, annual congress, Hotel Stevens, Chicago, Ill.

Oct. 3-7—American Electric Railway Association, annual convention, and exhibit, Public Auditorium, Cleveland, Ohio. Exhibits open at noon of Oct. 1.

Oct. 4—American Automobile Association, Motor Bus Division, Cleveland, Ohio.

Oct. 18-21—National Association of Railroad and Utilities Commissioners, thirty-ninth annual meeting, Baker Hotel, Dallas, Tex.

Oct. 26-27—Public Utilities Association of West Virginia, annual convention, Parkersburg, W. Va.

Oct. 26-27—Society Automotive Engineers, Transportation Section meeting, Hotel Sherman, Chicago, Ill.

British Fares Vary Greatly

ORDINARY fares on British municipal tramways vary per mile from 0.67 cents (in Glasgow) to more than 2 cents on some of the smaller lines, as in Cardiff and Dundee. The average fare varies from 1.86 cents (in Aberdeen) to 3.34 cents in Burnley. The average fare in Glasgow is 2.776 cents and in London 2.9 cents. Only three of the seventeen principal municipal systems sell season tickets. Glasgow, New Castle and Aberdeen are the only systems having adult fares less than 1d. (2 cents), though three others have such a rate for children only.

These figures are given in a paper on "Maximum and Minimum Fares," presented at a meeting of the Municipal Tramways and Transport Association at Cardiff, Sept. 7-9, by Lachlan MacKinnon, general manager of Glasgow Corporation Tramways. In speaking of the Glasgow system he said that the $\frac{1}{2}$ d. fare in that city was given up in 1920 but reintroduced July 1, 1927. A 2d. (4-cent) maximum fare is still in force in Glasgow and has helped increase the receipts and reduce bus competition. The speaker believes in the principle that the long-distance passenger should pay a lower rate per mile than the short-distance passenger.

This was the only paper scheduled for the meeting, though there were a

number of conferences. The presiding officer was R. L. Horsfield, general manager Cardiff City Tramways, who referred to the changed name of the association, which is now Municipal Tramways and Transport Association, to recognize the bus service by members. He said that the number of buses so operated has increased from 326 in 1920 to 1910 in 1927. He thought the idea that tramways had become obsolete was disproved by the fact that last year the British tramways carried 4,668,812,206 passengers, an increase of more than 48,000,000 over the previous year.

Utilities Commissioners to Meet at Dallas

DALLAS, Tex., has been selected for the 39th annual convention of the National Association of Railroad and Utilities Commissioners. The meetings will be held at the Hotel Baker on Oct. 18-21.

According to the call for the convention issued by Secretary James B. Walker, one whole session will be devoted to the regulation of motor vehicle carriers. There will be reports from the committee on motor vehicle transportation, Hon. Amos A. Betts chairman, and the committee on motor vehicle legislation, Hon. John E. Benton chairman. There will also be an address by H. S. Ives on insurance.

There will be a round-table discussion of "Holding Companies." In addition the several committees of the association will present reports.

The address of welcome will be delivered by Governor Dan Moody of Texas. Hon. John J. Esch, chairman Interstate Commerce Commission, will deliver an address if possible. Other speakers will be United States Senators Pittman of Nevada and Mayfield of Texas, F. A. Farrar, president Investment Bankers Association; Chief Justice Cureton of the Texas Supreme Court; Senor Alexjandro P. Carillo, Mexican Consul-General at San Antonio; Albert L. Reed, member of the National Industrial Traffic League and Industrial Traffic League of Texas, and Prof. W. M. W. Splawn, president University of Texas.

William A. Prendergast, chairman Public Service Commission of New York, will speak on "Valuation." H. G. Taylor of Nebraska, now with the American Railway Association; Carl D. Jackson, Alexander Forward, M. H. Aylesworth and Hon. Sherman T. Handy also will speak.

Prominent executives of the railroad and public utility organizations on the program will include Gen. W. W. Atterbury, president Pennsylvania Railroad; Walter S. Gifford, president American Telephone & Telegraph Company; Oscar H. Fogg, next president of the American Gas Association; Lucius S. Storrs, managing director American Electric Railway Association; Paul S. Clapp, managing director National Electric Light Association; John S. Wise, Jr., president Pennsylvania Power & Light Company.

News of the Industry

Seattle Continues Discussion

Extension of payment of Municipal Railway purchase bonds before Council—New move in Von Herberg suit

A NEW attempt to secure an extension in the payment period for the \$15,000,000 Seattle Municipal Street Railway purchase bonds has been launched in the City Council of Seattle, Wash., with an apparent intention of removing from the office of Mayor Bertha K. Landes to the Council chamber the seat of negotiations for such an extension.

In a resolution introduced by Councilman A. Lou Cohen, the president of the Council is authorized to appoint a special committee to negotiate with representatives of the Puget Sound Power & Light Company and other bondholders. At present Mayor Landes is negotiating with A. W. Leonard, president of the company, by a tacit understanding of Council members, with the idea that the negotiations would continue, and Council members could participate. Mr. Cohen pointed out that the extension plan, recognized as vital to the successful financing of the railway system, had been hanging fire for five years, but so far without tangible results.

LEGAL DIFFICULTIES RETARD SETTLEMENT

The carrying on of the negotiations with the Puget Sound Company has been complicated by the various legal entanglements in which the municipal railway has been embroiled, including the Von Herberg suit, brought to prevent the railway setting aside any funds from its revenues to pay on the purchase bonds until all salaries and operating costs were paid. Mr. Leonard declared, when the suit was brought, that all negotiations, as far as the company was concerned, would be held in *status quo* pending settlement of the litigation.

Asking for dismissal of the action and assesment of costs against the plaintiffs, Thomas J. L. Kennedy, corporation counsel for Seattle, has filed a motion for leave to file an amended and supplemental answer in the suit of J. G. Von Herberg against the city in the railway litigation. At the same time, the city has set up an affirmative defense and filed a bill of interpleader. This is the first move taken in some time in the litigation which started last February, when Mr. Von Herberg purchased some of the "no-fund" warrants issued in payment of the December wages due the trainmen.

All phases of the cases involving the railway system will be argued before Circuit Judge Frank S. Dietrich when he arrives in Seattle within the next two weeks. Two separate suits are

pending, that of Mr. Von Herberg's to halt payment of funds to the bondholders, and one brought by the Puget Sound Power & Light Company to halt this character of litigation involving the system.

The city charges that Mr. Von Herberg purchased the wage warrants merely to continue the "vexatious litigation against the city of Seattle."

Hearings Begun on Omaha Franchise

The City Council of Omaha, Neb., has begun hearings on the draft prepared by City Attorney Van Dusen of the proposed franchise for the Omaha & Council Bluffs Street Railway. Senator R. B. Howell presented his plan for forcing the company, as the price of getting a new franchise, to agree to sell its Missouri River bridge to the city. Spokesmen for the company say no consideration will be given the proposal. Counsel for the Guaranty Trust Company of New York, trustee for the bondholders, has received no instructions as to the clause contained in the city attorney's draft which makes it a condition of the grant that the trustee shall concede that the present franchise is not perpetual.

New York Plan Expected Soon—Mr. Dahl Ordered to Answer

Samuel Untermyer, special counsel for the New York Transit Commission, has nearly completed his report, which will contain his recommendations for transit readjustment for New York City. It is understood a feature of the plan will include recapture of the B.-M. T. subway system, recapture of the Interborough east side subway in event property of the Interborough and B.-M. T. companies cannot be acquired by purchase, and the combination of these lines with the new city subway system. The plan also will contain recommendation for referendum as to whether the fare shall be increased in case the combined system shows deficit of whether any deficit on 5-cent fare shall be paid by taxpayers. It is expected the plan will be ready before Oct. 1.

In the case of Chairman Dahl of the Brooklyn-Manhattan Transit Corporation, who must answer certain questions by Samuel Untermyer, special counsel to the Transit Commission, Justice Frankenthaler said:

The court will require all questions to be answered which bear on the holdings of B.-M. T. stock in the I. R. T. both at date of refusal to testify and for a period of three months preceding. The price and time of purchase need not be given, but quantities of purchases and sales as well as holdings must be fully and frankly stated.

Emergency Rate Denied

Maryland commission is not satisfied that public interest requires higher temporary rates in Baltimore

THE Maryland Public Service Commission has refused to grant an emergency increase in fares to the United Railways & Electric Company, Baltimore, pending hearing on the company's application for a permanent fare of 10 cents. At the same time the commission dismissed the petition for an emergency increase it set Oct. 26 as the date to start hearing the petition for a permanent 10-cent fare. In denying the emergency increase it was stated that the United had failed to make it appear to the satisfaction of the commission that the public interest required the establishment of substantially increased fares or temporary emergency fares pending the establishment of permanent fares, or that establishment of such temporary emergency fares was necessary for the purpose of providing adequate and efficient service, or for the preservation of property.

The hearing had been conducted several days and was hurried through as soon as possible. Opposition to the temporary increase was led by Thomas J. Tingley, people's counsel, who was assisted by attorneys representing the city and various organizations opposed to the increase. Although the United had requested an increase as an emergency it left the amount of increase to the commission. Charles D. Emons, president of the company, said on the stand, however, that the company thought it should receive a temporary increase to 10 cents pending the hearing to make the 10-cent fare permanent.

The application to be heard in October is for a flat rate of 10 cents, 5-cent or half fare for children between four and twelve years of age, school tickets at 5 cents each and special commutation rates. The present fare is 8 cents, with two tokens for 15 cents.

Bill Drawn to Continue Public Control of Eastern Massachusetts

Extension of the period of public control of the Eastern Massachusetts Street Railway, Boston, Mass., for ten years from the date of the termination of the present period of Jan. 15, 1929, is proposed in a bill drawn for introduction at the coming legislative session. Among the bodies that favor the plan is the Savings Bank Association of Massachusetts. The proposed act contains twelve sections substantially the same in their provisions as those contained in the present act. The whole act is based around the provision in Section 1 to the effect that:

The company may, subject to the pro-

visions of this act, exercise all the powers and privileges of a street railway company organized under the general laws, so far as the same are applicable, and, subject to the approval of the department of public utilities, hereinafter referred to as "the department," any powers or privileges granted by any special acts applicable to the company, until the general court shall otherwise provide, and shall be subject to all the duties, restrictions and liabilities imposed upon street railway companies, except as otherwise provided herein.

Higher Fare in Lorain Expected

Rates of fare on cars of the Lorain Street Railroad, operating in Lorain, Ohio, are to be increased soon to 6 cents, with an extra cent for transfers. No definite date has been set for the new rate to go into effect.

Inability of the company to operate on its present income has forced the increase in rates, according to John W. Heim, superintendent.

On the Alert in Buffalo Against Accidents

Co-operating with a local newspaper in a campaign to reduce traffic accidents, Bernard J. Yungbluth, president of the International Railway and the International Bus Corporation, Buffalo, N. Y., has issued a general order to all trainmen and bus drivers to continue their efforts to reduce accidents and promote a greater degree of safety. In his general order President Yungbluth said that if there was any question as to the right-of-way, trainmen and bus drivers should play safe, observe scrupulously the commands of traffic signals, and be particularly careful when children are at play. He recommended a redoubling of efforts to reduce the appalling loss of life occurring through street accidents. "Let us constantly be on the alert," he said, "that the splendid record in safety you have set up may be continually improved."

The president of the traction and bus company said that in spite of the heavy increase in the registration and use of automobiles, the total number of accidents in which the company's cars and buses were concerned was 9.6 per cent less this year than last; 14.2 per cent less than in 1925 and 24.4 per cent less than in 1924.

Fares Increased in Michigan City

The Chicago, South Bend & Northern Indiana Railway has been authorized by the United States District Court at South Bend, Ind., through R. R. Smith, receiver, to increase the fare on local lines in Michigan City from 5 cents to 7 cents. The application for a higher rate of fare in Michigan City alleged that the company had incurred a deficit last year of \$25,245 in operating its cars in that city. The company operates approximately 90 miles of interurban and city lines in north central Indiana.

Argument Started on Schenectady Fare

The first hearing on the petition of the Schenectady Railway seeking a reasonable rate of fare on the lines in Schenectady, Albany, Rensselaer and Saratoga Counties, N. Y., was held on Sept. 8. Authority is also sought to file schedules authorizing a 10-cent fare and 5-cent school token in Schenectady, with corresponding increase in the various fare zones on its divisions to Albany, Troy and Saratoga Springs. The company proposes to issue commutation tickets or 50 rides at commutation rates.

In answer to the query of Mayor Blessing of Schenectady, on the jurisdiction of the commission to fix fares in Schenectady, as such fares had heretofore been fixed by the Common Council, John E. MacLean, attorney representing the Schenectady Railway, said the question had been decided by the Appellate Division of the Supreme Court in the United Traction Company case that the commission had jurisdiction in such proceedings. Commissioner Pooley advised Corporation Counsel Poersch that the commission would reserve decision on the question raised and permit the railway to present such proof at this time as it were prepared to present.

Daniel Naylon, representing the Schenectady Railway, recited the history of the company and concluded with the statement that its present financial condition was such that a serious crisis confronted it inasmuch as its income was insufficient to go on and perform its duty as a public carrier. Adjournment was taken to permit the representatives of the city to examine the evidence and exhibits presented by the company and for the commission to determine the points raised by the city.

Delos Wilcox to Report for San Francisco

At a recent conference between the public utilities and the finance committees and City Attorney John J. O'Toole, at which Delos F. Wilcox was present, the need of expert advice and information was generally conceded and Mr. Wilcox was designated as the man most familiar with San Francisco's situation, sympathetic with the movement of municipalities in acquiring their own transportation and thoroughly competent to make a comprehensive study.

The survey that Mr. Wilcox will make for the city of San Francisco will deal with the expiration of franchises of the Market Street Railway, the best methods of acquiring the properties and the elimination of duplication of service. Major franchises begin to expire in 1929 and the public utilities and the finance committees are making their recommendation of a survey so that the city may be in a position to act when the franchises run out. Mr. Wilcox is reported to have said:

San Francisco is in a better position to solve her transportation problems than any

other city in the United States that has already a system controlled by private ownership. This is due in part to the fact that the city has the nucleus of a city-wide system and in part because the franchise of the privately operated lines are nearing their end. I am convinced that a consolidation can be effected in a manner satisfactory to the public.

Mr. Wilcox estimated the survey would require about two months and set his price at \$5,000 a month. He is prepared to undertake the work at once.

The recommendation to the Supervisors will be made by the City Attorney, whose office had for several weeks been investigating the legal phases of the franchise expiration and the city's rights relative to taking them over.

Want Overhead Wires in Columbus Removed

The City Council of Columbus, Ohio, has asked C. C. Slater, general manager of the Columbus Railway, Power & Light Company, to explain in writing the cause of delay in starting work of removing poles and overhead wires in North High Street between Fifth and Arcadia Avenues. The company has until April 1, 1928, to complete the work but was ordered to start the program several months ago. A 30-day extension, which expired six weeks ago, was later granted and so far no work has been done.

Economics at Boston

Under the caption "Every Day Economics" the Boston Elevated Railway, Boston, Mass., is running in *Co-operation*, its official publication, short chapters from the new book of J. E. Le Rossignol, called "First Economics." Special arrangements have been made with the publishers, the A. W. Shaw Company, for the reproduction of any or all of this book by the Boston Elevated Railway. In August *Co-operation*, there are excerpts on income, wealth and capital. Here are valuable lessons for the employees in the rudiments of economic management and finance.

Change in Rates on Reading Line

A reduction in the cost of monthly 30 round-trip tickets became effective on the lines of the Reading Transit Company, Reading, Pa., on Sept. 1. The new and old rates follow:

	New Reduced Rate	Old Rate	Saving
2 Zone Books.....	\$6.25	\$7.25	\$1.00
3 Zone Books.....	7.50	9.50	2.00
4 Zone Books.....	8.65	11.35	2.70
5 Zone Books.....	9.65	12.65	3.00
6 Zone Books.....	11.75	15.75	4.00
7 Zone Books.....	12.75	17.50	4.75
8 Zone Books.....	13.80	18.55	4.75

On Sept. 1 the company also resumed the sale of its round-trip excursion tickets between Oley Valley towns and Reading. The round-trip fare to Friedensburg is 45 cents and to Boyertown 90 cents. Each ticket allows a six-day stop over privilege.

Fight in Columbia Gains Many Adherents

The transportation problem in Columbia, S. C., long discussed in the public prints and often in the courts, has come in for attention from three new angles recently—the executive board of the Richland County Federation of Women's Clubs has gone on record as favoring the restoration of railway service in Columbia and the school board of the city of Columbia and the board of trustees of Chicora College (a denominational school located in Columbia) have filed intervention petitions with the state Supreme Court with regard to the action instituted some time ago against the Broad River Power Company to bring about a restoration of railway service.

The club women urge the use of every effort to have the railway service reestablished as they are convinced that it is the safest and most reliable system of transportation.

In its intervention petition the Columbia city school board sets forth that an adequate railway system is for many reasons the most desirable form of transportation service for Columbia and its environs, and particularly for this petitioner's purpose for furnishing a safe and reliable means of transporting the school children; further, that the school problem in the city of Columbia is now tremendously increased and rendered more difficult by the lack of an adequate or satisfactory transportation system. The petition from the Chicora College trustees sets forth that the "students and faculty are largely dependent upon an adequate system of public transportation for its best service to the state and community."

This case will likely come up for hearing before the State Supreme Court in October. Several weeks ago the Attorney-General of the state instituted suit for a writ of mandamus requiring the Columbia Railway, Gas & Electric Company to resume the operation of street cars, discontinued last March. The matter has been before the courts for some time. At present, buses are in operation in Columbia and also 10-cent jitneys, which operate without restrictions at present. The jitney, it is generally believed, had much to do with cutting down the patronage of street cars as the jitney takes its passenger to his door. But the jitney has neither schedule nor route, often goes off the street in disagreeable weather and is a free lance in the transportation business.

Smoking Killed in Atlanta

By a vote of nearly four to one Atlanta, Ga., street-car riders have requested the continuance of the present rule forbidding smoking. Not only were hundreds of individual letters received, but many petitions as well, some signed by as many as 100 riders.

Some of the reasons given why smoking should not be permitted were as follows: The unpleasant and unhealthy

atmosphere in smoke-filled cars during seasons when ventilation was not always possible, danger of fire and difficulty for railways to preserve their reputation for cleanliness. Finally, it was generally agreed that any normal man could refrain from smoking for the short period of time he was on a street car and that any gentleman would be glad to do this rather than cause discomfort to his fellow-passengers. The vote against allowing smoking in the cars was so definite that the rule prohibiting smoking will be kept in force.

Inquiry Started on Philadelphia Suburban Rates

Increased rates, effective July 20 on the lines of the Philadelphia & West Chester Traction Company, Upper Darby, Pa., were called for inquiry before James S. Benn, Public Service Commissioner, at a hearing in City Hall on Sept. 15. Protests had been filed by many organizations.

In a statement read by A. Merritt Taylor, president of the company, it was set forth that the investment was \$5,466,725, with the company entitled to a return of 7 per cent. This, he said, in view of a decrease in return of 3.49 per cent in the year ended Aug. 26, compared with the previous year, necessitated an advance in fares to keep the company out of bankruptcy. The hearing was continued.

The schedule of fares, which was published in the *ELECTRIC RAILWAY JOURNAL*, issue of July 2, page 33, called for a flat 10-cent rate where formerly the zone rate was 8 cents.

State Department Overrules Boston Transit Commission

In a case involving the construction of a section of the Dorchester rapid transit system the Massachusetts State Department of Public Utilities has overruled the Boston Transit Commission. The Transit Commission opened bids last August for the construction of Section 4, but decided to reject all the bids on the ground that the time wanted to build the section seemed to the commission "unreasonable, excessive and impracticable because of reasons special and peculiar to the work." The lowest bidder wanted 300 days and the commission was of the opinion that it should be done in 200 days. Hence the commission requested the Public Utilities Department to authorize the rejection of all the bids. In its decision the Department of Public Utilities says:

At the hearing the chief engineer of the Transit Department testified that, in his opinion, the time reasonably required for the completion of Section 4 of the Dorchester Rapid Transit Extension was not more than 200 days, and it was contended that the necessities of the public for the improved transportation contemplated by the act required the completion of the work as soon as it was reasonably possible to do it, and that to take 300 days to complete the work of Section 4 was not in

the interest of the public and that, consequently, there were reasons, special and peculiar, which made it impracticable to proceed under any of the proposals submitted, and thus a rejection of all the bids was justified, under the provisions of Section 15 of said Chapter 480, in order that arrangements might be made by which the work included in Section 4 would be completed within 200 days. The Transit Department did not include this 200-day limit in its proposals.

The statute obviously contemplates that where practicable proposals for contracts shall be advertised and open to competitive bidding and the contract made with the lowest responsible and eligible bidder. We feel that we ought not to authorize a departure from the general plan contemplated by the Legislature unless it is clear that the public will derive substantial benefits thereby. While we are satisfied that the Transit Department has acted in good faith, a majority of us are not convinced that such substantial benefits will be derived from the rejection of the bids as to warrant our authorizing such action.

Accordingly, it is ordered that the petition be and hereby is dismissed.

Commissioner Goldberg dissents.

More Dissension Over Holyoke Fares

A special committee of Aldermen has been appointed by the City of Chicopee, Mass., to investigate and hand down its finding on the proposed increase in rates by the Holyoke Street Railway, Holyoke, Mass., in so far as those increases affect patrons from Chicopee. The committee is anxious to seek a further postponement on hearings regarding these fare changes, which were scheduled to go into effect Oct. 1. The Holyoke Street Railway has stated that increased rates in Chicopee, were essential to the continuation of service on that line. Mayor Michael I. Shea is opposed to the rate increases. The main objection to the rate changes is based on alleged discriminations. According to reports the objection lies in the fact that citizens of Chicopee will be forced to pay a fare increase of 10 cents, whereas citizens in certain sections of Holyoke will pay less.

Another "Coming Out" of Guide Book

The third edition of Guide and Information, published by the Boston Elevated Railway, Boston, Mass., and distributed to tourists and others desiring information regarding the railway, has just come off the press 50,000 strong. The folder is being furnished to all employees.

Compared with the second edition, issued late in 1926 and comprising 100,000 copies, the third edition is designed to stimulate riding as well as to furnish specific information desired by users of the service. It has been made smaller than the second with the idea of bringing out future editions at more frequent intervals. On the large colored map, the central feature in the folder, revision on route changes have been included.

Special Sunday Trips Out of Reading

The Reading Transit Company, Reading, Pa., started on Sept. 18, and continuing each Sunday thereafter for a 30-day trial period, a one-day excursion trip from Reading to Lancaster and return for \$1.25. The route from Reading to Lancaster passes through some picturesque sections of Berks and Lancaster counties. The first car for Lancaster leaves Reading at 4.30 a.m. and every hour thereafter. Returning, the last car for Reading leaves Lancaster at 10 p.m.

Tickets are for sale only at the cashier's office, 412 Washington Street. They cannot be purchased from the conductors.

West Penn Dedicates Lake to Public Uses

Before an assembly of notables, including Gov. Howard M. Gore of West Virginia and his staff, industrialists, bankers, power officials and engineers, the West Penn Electric Company, a subsidiary of the American Water Works & Electric Company, dedicated to the public use on Sept. 14 Lake Lynn, a recreational development. Railway subsidiaries of the American Water Works & Electric Company include the Monongahela West Penn Public Service Company, Fairmont, W. Va., and the West Penn Railways, Pittsburgh, Pa.

Lake Lynn was created by the Cheat Haven hydro-electric development of the West Penn System on the Cheat River in West Virginia, 80 miles south of Pittsburgh. It stretches 13 miles through the West Virginia hills. It was named in honor of the late Albert M. Lynn, former president of the West Penn properties, during whose administration the Cheat Haven project was developed and put into service. A memorial to Mr. Lynn was unveiled during the ceremonies.

Lake Lynn will perform a dual service for people in this region. It will not only furnish an ideal place for recreation, as there are no lakes of any considerable size in this territory, but also the 52,000-kw. power plant located there will provide additional energy to meet the demands of the expanding industries along the Monongahela and Cheat River Valleys.

Teaching "Safety" in Indiana

"Safety Always" was the slogan of a car of the Interstate Public Service Company which visited Scottsburg, Ind., on Sept. 21 and was viewed by many people. The car bore signs and posters urging safety at all times and was thoroughly equipped to convey lessons in safety to all who visited the exhibit. Instructions in the Schaefer prone pressure method of resuscitation were given during the exhibit by an employee of the Interstate in charge of the safety car.

Many school children at Scottsburg and other towns along the route visited the "exhibit" car. Stops were made at all cities and towns along the line.

Portland Theaters Pay Railway Fares

All inbound street cars and buses of the Portland Electric Power Company, Portland, Ore., were chartered between 6:30 and 7:30 on the night of Aug. 19 by the West Coast Theaters, Inc., in celebration of its fall season opening, known as the "Greater Movie Season." Five of the leading theaters in the city are included in the combine. Conductors on the street cars helped to spread the publicity by saying to each patron who entered the car: "This ride is through the courtesy of the West Coast Theaters, Inc. It is the night of their grand opening."

Price Put on Use of Houston Tracks

An agreement has been reached between the City Council of Houston, Tex., and the electric railway interests by which a franchise will be granted allowing the Houston North Shore Electric Railway, operating an interurban between Houston and Baytown, to pay the Houston Electric Company 18 cents per car-mile for the use of the latter's tracks inside the city limits. The cars of the Houston North Shore Electric Railway will use the tracks of the Houston Electric Company on a number of streets.

Higher Fare Sought in Beacon and Fishkill

The Fishkill Electric Railway filed a petition on Sept. 16 with the Public Service Commission for permission to increase fares on its lines in Beacon and Fishkill and in the surrounding territory to 10 cents with twelve tokens for \$1. With the petition is filed a proposed rate schedule, establishing two zones. Strip tickets of twelve coupons each will be sold for \$1. Commutation tickets good for 54 trips, for use during the calendar month indicated on the ticket, will be sold for \$6. School tickets for those under seventeen years of age and attending school will be sold in strips of ten in Zone 1 and Beacon for 70 cents and in Zone 2 for 50 cents.

The petition alleges that its present fare is insufficient to yield a reasonable compensation for the service rendered, is unjust and unreasonably low, and does not allow a reasonable return on the value of its property used in the public service. It further alleges that the company is unable to meet its assessment of \$40,000 as its proportionate share of the paving cost of Main Street from Beekman to Herbert Street in Beacon, which was authorized at a special election of the voters of Beacon in August, 1927. A public hearing will be held on this petition.

Certain Rate Reductions in Seattle

Reduced rates of fare on rides which involve transfers from one system to the other went into effect on Sept. 16 on the Seattle & Rainier Valley Railway Line and the Seattle Municipal Railway of Seattle, Wash. The Rainier company has formally notified the City Council that it accepted the provisions of a recent ordinance which provided for issuance of transfers on either line to the other on an 8½-cent token. At present transfers are given only on a 10-cent fare. In return for this concession, the City Council has provided by ordinance that the railway be credited with 1½ cents on its delinquent franchise tax for each transfer from its lines accepted by the municipal system. The company is in arrears a total of \$77,135 in its franchise tax.

Plans of the Seattle Municipal Railway to extend its service in the Rainier Valley by operating the Empire Way buses over Renton Avenue from Henderson Street to Ryan Street brought a protest from the Rainier Valley Line, which informed the Council by letter of its intention to extend its Rainier Beach bus route on Renton Avenue.

\$27,765 for Efficiency in Brooklyn

For efficient performance of their duties during the year ended July 31, 1927, 1,026 trainmen of the Brooklyn-Manhattan Transit Corporation, Brooklyn, N. Y., shared in a bonus totaling \$27,765. The awards were based upon the efficiency ratings of each conductor and trainman made at periodic inspections of their work. Individual bonuses ranged in amount from \$50 to \$12.50. Because there were in all more than 200 trainmen whose inspection records gave them 100 per cent efficiency ratings for the year, a total of 233 bonuses of \$50 each were awarded instead of 100 such bonuses specified in the bulletin.

Massachusetts Property Enlarge Service

The Union Street Railway, New Bedford, Mass., has been authorized by the Public Utilities Department to take over some of the service that the New Bedford & Onset Street Railway will discontinue on Sept. 30. It will extend its tracks into Massachusetts and it is authorized to construct, maintain and operate a street railway in New Bedford, Fairhaven, Dartmouth and Westport.

Free Rides in Denver

Howard S. Robertson, president of the Denver Tramway, Denver, Col., permitted all boys and girls under eighteen years of age to ride the cars free, between the hours of 1 and 5 p.m., on Aug. 31, the day that Colonel Lindbergh visited Denver. He said he wanted every child in Denver to see the Colonel

Recent Bus Developments

Southern Pacific Opens Bus Service

A bus service was to be started on Sept. 20 by the Southern Pacific Railroad in conjunction with its steam and electric lines. This announcement was made by T. B. Wilson, vice-president and general manager of the newly organized Southern Pacific Motor Transport Company, a California corporation, which was granted a permit to operate in Oregon two months ago.

The new service will extend from Portland to Salem, Eugene, Roseburg and Ashland, and from Portland to points in other directions, and will include an interurban run connecting Portland, Lake Oswego and other resorts. About 30 buses will be used at first, with probably 45 in use within a month.

It is stated that plans are complete for replacing railway service in the cities of Salem and Eugene with the new buses. The Southern Pacific Motor Transport Company has acquired the traction lines in these two places.

Detroit Coaches Start Passengers on Air Voyages

The Department of Street Railways, Detroit, Mich., is operating daily its Graham Brothers parlor coach from the Detroit hotels to the Ford Airport, 11½ miles away. At that point passengers board Stout air lines for aerial tours or trips to other cities. Regular two-hour coach service was instituted Sept. 1, with a fare of 25 cents each way.

Acquires Perth Amboy Bus Lines

The Public Service Transportation Company, subsidiary of the Public Service Railway, Newark, N. J., acquired three important bus lines in the vicinity of Perth Amboy. One runs from Perth Amboy to Carteret via Woodbridge, another is the Perth Amboy-Cahway line, and the third is the Fords-Woodbridge-Iselin line. Purchase was made from one corporation and several individuals. Twenty-two permits and 6 buses were involved in the transaction. The purchase price was withheld.

Extension of Bus Route in Rome May Mean Profits

The Public Service Commission recently granted the petition of the New York State Railways for the discontinuance of railway service on North James Street, Rome, from Thomas Street to Linden Street, for a period of one year only.

A bus line paralleling this route is operated by the Utica Railway Co-

ordinated Bus Line, Inc., which extends into territory not now served by street cars. The railroad company does not wish to abandon the line and remove the tracks until bus service has proved successful. The city of Rome has consented to discontinuance of street car service and the substitution of bus service for five years.

The evidence showed that the street car line in Rome has been operated at a loss, but the railway believes that by the extension of the bus route and other economies additional revenue will result and prove profitable. Repairs to existing street pavements will be made.

Bus Rehearings in New York State Denied

The New York Public Service Commission denied the petitions of the cities of Albany, Troy and Cohoes on Sept. 12 for a rehearing on the application of the Capitol District Transportation Company, Inc., for increased passenger fares on its bus lines in Cohoes, Troy, Albany, Rensselaer and the town of Guilderland. Insufficient reasons were shown why the rehearing should be held.

Express Bus Service Proposed in Washington

The Washington Rapid Transit Company, Washington, D. C., petitioned the Public Utilities Commission on Sept. 18 for permission to establish new routes for express or limited bus service, which would be in addition to the present local service. The routes over which the limited buses would run, however, are slightly different from the regular routes. The use of two streets is contemplated, the buses using less congested streets, returning from the main trip during rush hours to facilitate rapid movement. At the start approximately six buses will be scheduled in the limited service.

Citizen's Peace Threatens School Attendance in Evanston

Application for a permanent injunction filed on Sept. 11 before Circuit Judge Otto Kerner to restrain the Evanston Railway from operating buses over a certain portion of Grant Street in Evanston, Ill., is seriously threatening attendance at the Evanston Township High School, on the far west side of the city. The school reopened the morning the suit was called for hearing with a heavy enrollment. A majority of the students are dependent upon the railway bus service and Grant Street is the only thoroughfare which reaches the school. A citizen residing on Grant Street obtained a temporary injunction

several weeks ago on the grounds that the passing buses destroy the peace and quiet of his home. Now he is seeking an order permanently to restrain their operation on this street.

Buses on Meriden-Middletown Route

The Connecticut Company has lately decided to change over to bus service on the Meriden-Middletown line, and has petitioned the Public Utilities Commission for such authority. The date for the public hearing has not been specified.

Morris County Planning Change Over

Otto G. Schultz, general manager of the Morris County Traction Company, is on a trip, during which he will meet with the bondholders' committee of the company at Pittsburgh to arrange for the substitution of buses for trolleys. He planned this trip following the favorable decision on Sept. 3 of the Public Utility Commission on the matter of the substitution.

It is expected that buses will be ready to operate within thirty days after the order is placed and this will mean shortly after Oct. 2. While Mr. Schultz desires to secure all new buses of the type now in use and giving satisfactory service on the Springfield-Elizabeth line, it may be that arrangements will be made with the Public Service Corporation for the use of some of its buses. The new buses would cost about \$350,000.

The railway is in the hands of receivers. It is proposed to offer the assets under foreclosure sale in four lots. One will be the right to operate bus lines, another will include the right to operate railway lines and other rights under this franchise, the third lot will comprise the real estate and the fourth will include the personal property and equipment.

In its decision the Public Utility Commission reserved the right to issue an order at some future time concerning the removal of the poles and overhead lines and also the replacement of the pavement when the tracks are taken up. This, Mr. Schultz said, was due to the fact that the company did not ask to abandon these and will not do so until after the bus lines are in routine operation. Then the commission will be requested to grant permission for the removal of these rails. Both buses and cars will be run for a time until the bus routes are thoroughly worked out and the machines running satisfactorily. In the event that the travel by bus proves more popular than by trolley car, the company will be prepared to increase its service.

Just how the change will work out in relation to the direct line running into Newark has not yet been decided. Now the Morris County cars operate over tracks of the Public Service Railway through special arrangement. If

the bus route is substituted there, the buses will be run as an express line direct from the terminal of the Morris County line.

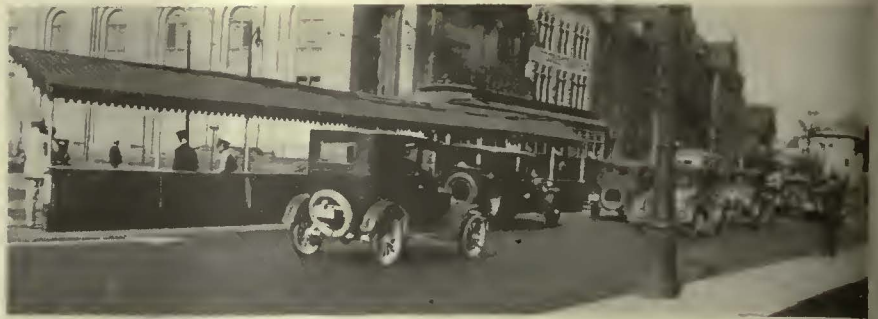
Express Service in Detroit

The plans for express service as worked out by the Department of Street Railways in Detroit and put in operation on Jefferson Avenue on Sunday, Sept. 18, have proved successful after the first few days of operation and, according to General Manager Del A. Smith of the Detroit Municipal Railways, the express system is a distinct improvement over the old system. The cars are run express. Between express stops local buses, known as transfer buses, pick up passengers and deposit them at the nearest express stop. These buses double back between express stops.

At a meeting of the Street Railway Commission after the Jefferson Avenue express service had been started it was announced that a number of other improvements were contemplated. These include the synchronization of traffic lights on Jefferson Avenue, which are now operated manually; facilitation of the movement of cars in the downtown loop, extension of the local bus service to the downtown district and the installation of windows in the loading stations. The commission also authorized the purchase of 50 instruments for buses to record the time of stops, the speed and mileage.

It is anticipated that express service will also be established on Grand River Avenue in the near future. Ultimately, it is planned to extend the service throughout the entire Jefferson line and to run a modified express service even through the downtown loop. The Jefferson line will probably be extended about 2½ miles beyond the city limit into the village of Grosse Pointe.

The Miller-Schorn system is applied experimentally to the Jefferson Avenue line. The total route is 6.8 miles. The express portion from Antoine to Lillibridge, 4.3 miles, is covered at an average speed of 18.4 miles. The maximum running speed is 27 miles. The stations are at intervals of 0.9 miles, located



Sheltered express stations are spaced at 1-mile intervals at Detroit

at Antoine, Chene, Grand Boulevard, Parker, Parkview, Lillibridge. Express zones are equipped with orange and black awnings and splash aprons. In the express section transfer buses pick up passengers at the curb and deliver them to the express zones. The present zones are being used temporarily. Loading stations to be located between tracks with sub-walks are being considered by the city.

A three weeks publicity campaign with posters and newspaper co-operation educated the public for the change. There were three days of preliminary training for motormen, conductors and special guards for express stations. Police traffic officers were supplied for automobile control so as to approximate the condition expected when the cascaded traffic lights and the stations with sub-walks are installed between the tracks.

Traffic Director Gustave C. Schink is enthusiastic over the change. He says auto traffic has been speeded 40 to 60 per cent and the street capacity proportionately increased. Newspapers report the system has public approval.

Mr. Smith states many letters of approval have been received from patrons and only two criticisms from 60,000 daily passengers on the Jefferson line after four days operation. Improvement associations of other Detroit sections are requesting similar service. According to Mr. Smith the soundness of the plan has been definitely established, but it is too early to state the exact operating costs.

Contends Bus Routes in Brooklyn Not Needed

Objections to the granting of a certificate to the Equitable Coach Company by the Board of Estimate to operate buses in Manhattan, Brooklyn and Queens were filed with the Transit Commission on Sept. 21 by Clarence J. Shearn of counsel for the Brooklyn-Manhattan Transit Corporation and the Brooklyn City Railroad, Brooklyn, N. Y. A protest was also made by the New York Railways Corporation through William Wallace of the law firm of Chadbourne, Stanchfield & Levy as counsel. A hearing will be held on Sept. 26.

Mr. Shearn said the Equitable company in its application failed to say anything about its financial condition or how it proposed to finance the operation of its bus routes. He also questioned the necessity for the different bus routes which the board authorized. He added that the Brooklyn-Manhattan Transit Corporation was prepared to meet the contentions to disprove the necessity of the bus routes in Brooklyn.

Bus Replaces Rail Line in Gadsden

Bus service has replaced railway service on the North Fourth Street and Ewing Avenue line in Gadsden, Ala. The Alabama Power Company is operating as an experiment a 25-passenger bus on the short crosstown line.



Buses run local and cars express in new service on Jefferson Avenue, Detroit

Financial and Corporate

Brooklyn Case Appealed

Brooklyn-Manhattan Transit Corporation secures order to require commission to submit records of bond case for review

THE New York Rapid Transit Corporation, a subsidiary of the B.-M.T., obtained on Sept. 21 from Supreme Court Justice Phoenix Ingraham an order in certiorari proceedings requiring the Transit Commission to submit for judicial review all papers and records in connection with the company's application for permission to sell \$20,000,000 in refunding mortgage 5 per cent bonds to pay for new cars and for other purposes. The New York Rapid Transit Corporation proposed to sell these bonds to the B.-M. T. at 80, or for \$16,000,000. The commission on Aug. last denied the application on advice of Samuel Untermyer, its special counsel.

In its petition the New York Rapid Transit Corporation attacks statements made by Mr. Untermyer during the recent transit inquiry hearings and asserts that the commission in denying its application acted merely upon the advice of Mr. Untermyer without requiring proof of his assertions. The decision of the commission, the petition alleges, was erroneous because the commission denied consent to the issuance of the entire amount of the proposed issue of bonds, notwithstanding that Mr. Untermyer had consented to the issue of bonds at the price of 80 up to the amount of \$3,467,000, the amount which the company desired to spend for purposes not covered by its contract with the city.

The commission, the petition charges, confused its functions as a regulatory body under the Public Service Commission act and its functions as an agent of the city under the contract between the city and the company. The commission, the petition continues, has assumed to use its powers as a regulatory body and to give consideration to the alleged effect on the amount the city would be required to pay the petitioner for debt discounts and expenses in case the petitioner should sell the bonds at 80 and the city should exercise its alleged right of recapture of the city-owned rapid transit lines operated by the petitioner.

The right of the city to recapture is questioned in the petition, which states that the city has not given the company the one year's notice required, as a condition precedent to the exercise of its alleged recapture right. The petition contends that the city is not now and will not be in a position to give such a notice or to exercise its alleged recapture rights until it constructs the Nassau Street subway, as provided in the contract.

The city has not indicated that it has any intention or desire to exercise its alleged right of recapture and to separate the city-owned and company-owned

rapid transit lines of the B.-M. T. system and disrupt the service, the petition recites, unless statements of Mr. Untermyer, unsupported by any evidence or proof of his authority to make them, is accepted as an indication of city policy.

The commission erred, the petition recites, in giving consideration to Mr. Untermyer's statement that the petitioner is "a mere creature of the Brooklyn-Manhattan Transit Corporation, which proposes to take these bonds at 80 cents on the dollar." Exception also is taken to the statements attributed to Mr. Untermyer that "the parent company is both the seller and the buyer" and that "the parent company is selling the bonds to itself at a price and upon terms fixed by it."

Would Free Nashua Property from Tax Payments

The Public Service Commission has certified to the State Tax Commission that the Nashua Street Railway, Nashua, N. H., should be exempted from taxation for the year 1927, because the road failed to earn operating expenses through the year closing March 31.

Railway Property Not Included in Transfer

Commissioner Lunn held a hearing on Sept. 13 on the petition of the Eastern New York Utilities Corporation, Rensselaer, N. Y., and the Municipal Gas Company, Albany, for consent to transfer the gas and electric franchises, works and systems of the former to the latter. The petition alleges that this transfer is to be made on the basis of the net book value of the property transferred, plus or minus adjustments, the book value to be determined by the commission. The electric railroad property of the Eastern New York Utilities Corporation is not to be transferred.

Colorado Springs Rejects Railway Offer

After deliberating the matter for some time, the City Council of Colorado Springs, Col., on Sept. 13 answered that the city will not purchase the Colorado Springs & Interurban Railway. Buses have already supplanted some of the car lines in that city.

The railway made it plain to the city officials of Colorado Springs that it could not operate the street cars much longer unless there were more revenue; that regardless of the increased fare it was not making sufficient money to justify the continuance. It then offered the system to the city for \$500,000, agreeing to accept half that amount in city bonds.

Day & Zimmermann Deal Approved

U.G.I. votes additional stock necessary to carry out plan first voted months ago

STOCKHOLDERS of the United Gas Improvement Company at a special meeting on Sept. 15 voted to increase the authorized capital stock of the company from 2,036,528 shares, par \$50, to 2,130,088 shares; the additional shares to be used in the acquisition of the engineering and public utility firm of Day & Zimmermann, Inc., of Philadelphia, and stock of several gas companies operating in Connecticut.

Shareholders of the company also voted to increase the number of directors to twelve, including the president, who is an ex officio member of the board. Three new directors were elected as follows:

Thomas S. Gates, of Drexel & Company and J. P. Morgan & Company; Charles Day, of Day & Zimmermann, Inc., and Morris W. Stroud, president of the American Gas Company.

After approving the increase in capitalization, the stockholders authorized the board of directors to issue 53,082 shares in exchange and payment for 58,980 shares of the no-par common stock of Day & Zimmermann, Inc., 2,017 shares in exchange and payment for a like number of shares of the no-par preferred stock of Day & Zimmermann, payment for 3,656 shares of the com- Inc., and 38,461 shares in exchange and mon stock of the Hartford City Light Company and for 204,481 shares of the no-par common stock and 8,361 shares of the no-par preferred stock of the Connecticut Gas & Coke Securities Company.

Directors of the company convened immediately after adjournment of the stockholders' meeting and approved a resolution providing for the exchange of stock, as authorized by the shareholders.

Concerning the exchange of shares as arranged with the Day & Zimmermann concern, a statement issued by the management of the United Gas Improvement Company said:

The exchange of stock with Day & Zimmermann, Inc., will give the U.G.I. a controlling interest in that widely known public-utility company. Day & Zimmermann, Inc., is interested in and operates properties in fifteen States, serving 935 communities with a population of 2,369,000. Among the largest properties controlled and managed by Day & Zimmermann are the National Public Service Corporation, the General Public Utilities Company and the Southern Ohio Public Service Company.

Kansas Road Sold Under Foreclosure

The Kansas City, Kaw Valley & Western Railway, an interurban operating from Kansas City to Lawrence, Kans., was sold to the first mortgage bondholders for \$300,000 at a recent special master's sale. The bid presented

by George W. York, Cleveland, chairman of the first mortgage bondholders' protective committee, included a cash payment of \$50,000 specified in the sale order made by Judge John C. Pollack, in federal court. Mr. York was the only bidder. A valuation of \$1,500,000 had been placed on the line.

The interurban has been in receivership since July, 1924, but continued to operate during that period.

Mr. York said that approval of the sale would be asked of Judge Pollack promptly and a general plan for the reorganization would be announced as soon as the approval was given. The line will continue to operate unchanged until that order has been approved and the reorganization completed.

Talk of Akron-Youngstown Merger

It is stated that a discussion that may lead to a consolidation of the Northern Ohio Power Company and the Penn-Ohio Power system has been resumed. Practical control of the Penn-Ohio system rests with the American Superpower Corporation, through holdings in the Penn-Ohio Securities Corporation. Interests friendly to American Superpower control Northern Ohio. Properties of the companies in the reported merger are adjacent. Northern Ohio serves Akron and vicinity in a radius of 30 miles. Penn-Ohio has headquarters at Youngstown, about 60 miles east of Akron, and sends electricity as far as Pennsylvania. Connections through other lines make a superpower system

extending from Cleveland to Akron and Canton in Ohio, Windsor in West Virginia, Charleroi in Pennsylvania, and back to Youngstown and to Cleveland.

\$900,000 Needed to Complete St. Louis Reorganization

The St. Louis Public Service Company will require at least another \$900,000 in addition to the cash now available to complete the reorganization of the United Railways, St. Louis, Mo. This estimate was made by W. DeW. H. Bradley, secretary of the company, in a letter sent to the Missouri Public Service Commission, which has the reorganization plan under consideration.

The cash requirements of the new company include \$2,000,000 to pay off Suburban bonds, \$2,937,000 for cash settlement with holders of St. Louis Transit Company bonds, \$440,550 for accrued interest and \$1,130,745 for accruing preferred stock dividends, a grand total of \$6,508,295. Cash available will be \$1,040,187 from common stock sold to holders of transit company bonds, \$1,041,720 from common stock sold to holders of other securities of old company, \$3,000,000 cash estimated to be sum receiver will turn over to new company and \$276,280 from sundry items, a total of \$5,662,937. The estimate of requirements did not include any of the actual expenses of reorganization. These expenses are expected to exceed \$800,000, while in addition the reorganization committee advanced \$409,754 to the St. Louis Bus Company for 35 buses.

Union Traction Lines Carry 11,800,810 Passengers

The revenue from railway operation for 1926 of the Union Traction Company of Indiana, Anderson, Ind., was \$3,060,465, compared with \$2,939,182 for 1925. Expenses of railway operation were \$2,566,742, compared with \$2,541,873. Gross income for 1926, being the income after operating expenses and taxes, but before charges for bond interest and other fixed charges, was \$408,625, compared with \$324,787. These facts were contained in the annual report of the company, submitted by the receiver to the Madison Circuit Court in Indiana.

In operating expenses for the year are included \$571,623 for maintenance

INCOME ACCOUNT OF THE UNION TRACTION COMPANY FOR THE YEAR 1926

Revenue from transportation:	
Passenger.....	\$2,046,994
Baggage.....	6,285
Parlor, chair and special car.....	10,003
Mail.....	5,565
Express.....	131,502
Milk.....	14,171
Freight and switching.....	696,466
Total.....	\$2,910,990
Revenue from operation other than transportation:	
Station and car privileges.....	\$15,153
Parcel room receipts.....	120
Car service and storage.....	544
Rent of tracks and terminals.....	2,826
Rent of equipment.....	9,589
Rent of buildings and other property.....	13,569
Power.....	107,302
Miscellaneous.....	348
Total.....	\$149,475
Total operating revenue.....	\$3,060,465
Operating expenses:	
Way and structures.....	\$571,623
Equipment.....	351,599
Power.....	512,676
Conducting transportation.....	737,559
Traffic.....	41,180
General and miscellaneous.....	352,071
Total operating expenses.....	\$2,566,741
Net operating revenue.....	493,723
Taxes.....	110,000
Net operating revenue less taxes.....	\$383,723
Other income.....	24,901
Gross income.....	\$408,624

Conspectus of Indexes for September, 1927

Compiled for Publication in This Paper by
ALBERT S. RICHEY
Electric Railway Engineer, Worcester, Mass.

	Latest	Month Ago	Year Ago	Since War	
				High	Low
Street Railway Fares* 1913 = 4.84	Sept. 1927 7.53	Aug. 1927 7.52	Sept. 1926 7.36	Sept. 1927 7.53	May 1923 6.88
Electric Railway Materials* 1913 = 100	Sept. 1927 141.6	Aug. 1927 142.1	Sept. 1926 154.2	Sept. 1927 247.5	Sept. 1927 141.6
Electric Railway Wages* 1913 = 100	Sept. 1927 227.8	Aug. 1927 227.8	Sept. 1926 226.1	Sept. 1927 232	March 1923 206.8
Am. Elec. Ry. Assn. Construction Cost (Elec. Ry.) 1913 = 100	Sept. 1927 199.4	Aug. 1927 200.9	Sept. 1926 203.2	July 1920 256.4	May 1922 167.4
Eng. News-Record Construction Cost (General) 1913 = 100	Sept. 1927 203.6	Aug. 1927 205.5	Sept. 1926 208.3	June 1920 273.8	March 1922 162.0
U. S. Bur. Lab. Stat. Wholesale Commodities 1913 = 100	Aug. 1927 146.6	July 1927 144.6	Aug. 1926 149.2	May 1920 246.7	Jan. 1922 138.3
Bradstreet Wholesale Commodities 1913 = 9.21	Sept. 1 1927 12.90	Aug. 1 1927 12.58	Sept. 1 1926 12.70	Feb. 1 1920 20.87	June 1 1921 10.62
U. S. Bur. Lab. Stat. Retail Food 1913 = 100	Aug. 1927 152.4	July 1927 153.4	Aug. 1926 155.7	July 1920 219.2	March 1922 138.7
Nat. Ind. Conf. Bd. Cost of Living 1914 = 100	Aug. 1927 162.0	July 1927 162.2	Aug. 1926 165.3	July 1920 204.5	Aug. 1922 154.5
Steel Unfilled Orders (Million Tons) 1913 = 5.91	Aug. 31 1927 3.196	July 31 1927 3.142	Aug. 31 1926 3.542	July 31 1920 11.118	May 31 1927 3.051
Bank Clearings Outside N. Y. City (Billions)	Aug. 1927 17.92	July 1927 18.37	Aug. 1926 17.63	Oct. 1925 20.47	Feb. 1921 10.43
Business Failures Number	Aug. 1927 1448	July 1927 1503	Aug. 1926 1512	Jan. 1924 2231	Aug. 1925 1353
Liabilities (Millions)	Aug. 1927 43.76	July 1927 37.90	Aug. 1926 39.26	Aug. 1925 122.95	Aug. 1925 27.22

*The three index numbers marked with an asterisk are computed by Mr. Richey, as follows: Fares index is average street railway fare in all United States cities with a population of 50,000 or over except New York City, and weighted according to population. Street Railway Materials Index is relative average price of materials (including fuel) used in street railway operation and maintenance, weighted according to average use of such materials. Wages index is relative average maximum hourly wage of motormen, conductors and operators on 136 of the largest street and interurban railways operated in the United States, weighted according to the number of such men employed on these roads.

TRAFFIC STATISTICS OF THE UNION TRACTION COMPANY

(Year ended Dec. 31, 1926)

Passengers carried, interurban lines.....	4,174,308
Passengers carried, city lines.....	7,626,502
Total passengers carried.....	11,800,810
Freight handled, tons.....	268,644
Express handled, tons.....	10,976
Mileage of cars, interurban lines, miles.....	6,745,003
Mileage of cars, city lines, miles.....	1,770,914
Total mileage of cars, miles.....	8,515,917

of way and structures and \$351,560 for maintenance of equipment, making the total sum charged in these directions for maintenance of the property \$923,223. This is equal to 30 per cent of the gross railway operating revenue for the year.

The 1926 account for additions and betterments shows debits of \$139,627 and credits of \$164,687, making the balance for the year a credit of \$25,061. The credits arose principally out of the removal of three railway lines at Muncie and the sale to the Indianapolis Street Railway of part of the Broad Ripple line at Indianapolis. This amount is exclu-

STATEMENT OF EARNINGS OF VARIOUS DIVISIONS OF UNION TRACTION COMPANY

	Total Operating Revenue	Total Operating Expenses	Taxes	Other Income	Gross Income
Union Traction	\$1,423,413	\$1,257,537	\$45,529	\$9,157	\$129,499
Indianapolis Northern	784,114	597,881	23,232	11,748	174,748
Muncie, Hartford & Fort Wayne	274,211	221,610	10,384	1,196	43,414
Muncie-Portland	105,069	84,102	5,951	400	15,416
Indianapolis, New Castle and Eastern	308,408	230,856	10,065	1,460	68,948
Muncie-Union City	84,976	88,087	8,195	490	*10,814
Marion-Wabash	59,414	61,017	4,444	344	*5,703
Anderson-Middletown	20,856	25,647	2,200	106	*6,884
Total	\$3,060,465	\$2,566,741	\$110,000	\$24,901	\$408,624

*Deficit.

sive of charges in 1926 for the purchase of buses and bus lines, amounting to \$289,602 and also of charges of \$26,029 for extensions of and betterments to the property of the Traction Light & Power Company, wholly owned by the Union Traction Company of Indiana. The principal debt item included in additions and betterments is \$60,000, representing the purchase under a conditional sale contract of twenty freight box cars.

Buses were operated by the receiver during much of 1926 between Indianapolis and Peru, Indianapolis and Muncie, Indianapolis and Sheridan and Anderson and Marion, in the cities of Anderson and Muncie and at Fort Benjamin Harrison. Gross revenues for bus operation were \$129,423 and operating expenses, taxes, interest and amortization charges were \$268,288, making a deficit resulting from bus operation of \$138,865, which includes \$81,495 for depreciation and amortization.

The report mentions the record of the general safety board and department safety organizations in promoting safe and efficient operation, and to the co-operation shown and interest taken by employees generally in the endeavors made during the year to meet the difficult conditions confronting the company.

Operation of the Anderson-Middletown interurban line resulted in a deficit of \$6,884 for the year. This deficit is greater by \$2,628 than that of 1925, as shown in the receiver's report for that year. Operation of the Muncie-Union City line resulted in a deficit of \$10,814, being \$2,896 greater than that shown for 1925. Operation of the Marion-Wabash interurban line resulted in a deficit of \$5,703, which is \$962 less than that shown for 1925. Further consideration is being given to the question of the course which should

ROUTE MILEAGE OF THE UNION TRACTION COMPANY

Lines owned:	Miles
Muncie-Anderson-Indianapolis	561
Anderson-Marion-Wabash	531
Alexandria-Elwood-Tipton	20
Indianapolis-Kokomo-Logansport	80
Kokomo-Peru	191
Muncie-Union City	33
Anderson-Middletown	91
Anderson City Lines	10
Marion City Lines	141
Muncie City Lines	121
Total	309
Lines Leased:	
Muncie-Hartford City-Bluffton	42
Indianapolis-New Castle-Muncie	621
Muncie-Portland	32
	1361
Total	4451

be taken with respect to these three interurban lines and certain non-paying street railway lines.

Some facts are also given on the Traction Light & Power Company, the sales of the Broad Ripple lines, the Broad Ripple Traction Company's bonds and the Traction Land Company, a subsidiary of the Union Traction Company of Indiana.

The segregation of earnings and expenses of the respective lines subject to the liens of the principal mortgages and also of the lines leased to the Union Traction Company of Indiana was undertaken, and the earnings and expenses so segregated for the year are shown, tentatively and subject to revision.

Would Abandon Illinois Interurban

The Illinois Power & Light Corporation has filed a petition to abandon its interurban line between Danville and Catlin, Ill. With suspension of its operation traffic between the two terminals will be handled by the Allerton bus line, which up to this time has been forbidden to handle passenger traffic in the territory. The traction line has been a losing proposition for more than a year.

Local Interests Take Over Wichita Property

Passage of control of the transportation business in Wichita, Kan., from the Illinois Power & Light Company to a \$3,000,000 Wichita concern is noted in the organization of a new company, details of which were completed on Sept. 14 at a meeting of the Wichita Transportation Company's directors and officers.

The meeting marked completion of negotiations and organization work through which ownership in the Wichita traction systems passes from the Illinois Power & Light Company to a group of Wichita capitalists.

Officers of the company are: H. V. Wheeler, banker, president; R. B. Campbell, president of the Arkansas Valley Interurban Company, vice-president; R. C. Clevenger, banker, secretary-treasurer, and Robert C. Foulston, former city attorney, counselor.

All stock of the new company, formed to operate the transportation facilities of the city, including both bus lines and car lines, is owned by local people in Wichita.

Seeks Receiver for Fitchburg Road

A bill in equity against the Fitchburg & Leominster Street Railway, Fitchburg, Mass., seeking appointment of a receiver was filed in the Suffolk County Superior Court on Sept. 21 by Charles S. Cummings of Boston, who asks to have the company ordered to pay interest on \$5,000 in bonds he holds and also to have it restrained from payment on unsecured notes until the bonds are paid in full. E. W. Baker, president, looks upon the action as entirely unwarranted and characterizes Mr. Cummings' statements as not being in accordance with the facts of the case.

Auburn Abandonment Authorized

The Public Service Commission granted on Sept. 15 the petitions of the Auburn & Syracuse Electric Railroad for permission to abandon all of its car lines in the city of Auburn and two lines forming part of its system in the towns of Owasco and Fleming. The abandonment does not affect the interurban lines of the company and these are to be continued in operation. Hearings were held on these applications by Commissioner Lunn in Auburn on Aug. 2 and Aug. 20. In his memorandum accompanying the order he said that the representatives of the city practically conceded that local trolley service could no longer be carried on profitably in Auburn and the Common Council has gone to the extent of soliciting bids for bus service to supplant the trolleys. The order of the commission becomes effective on Oct. 15, 1927.

Binghamton Sale Ordered

The properties of the Binghamton Railway, Binghamton, N. Y., which include a \$1,000,000 electric lighting plant at Endicott, will be sold under mortgage foreclosure to the highest bidder on Dec. 1 next, according to an order issued by Federal Judge Frank Cooper at Elmira.

Bidding must start at \$2,300,000 "upset price," according to the court order. The properties were appraised some years ago at \$3,000,000 and the debts aggregate that sum.

Market Street Railway Deal Rumored

Plans are said to be underway for an offer of exchange of Standard Gas & Electric Company stock for the shares of the Market Street Railway, San Francisco, Cal. It is known that the subject has been discussed more or less officially but it is stated the actual working out of the plan will take some time. The Byllesby organization obtained the privately owned railway in San Francisco when the United Railways Investment Company was acquired some time ago.

Personal Items

J. F. Egolf with Western United Company

John F. Egolf, former general manager of the Aurora, Elgin & Fox River Electric Company and lately general manager of the Chicago, North Shore & Milwaukee Railroad, has been appointed operating vice-president of the Western United Gas & Electric Company, effective on Nov. 1. At the same time officials of the Western United announced that the agreement between the Western United and the General Engineering & Management Company, under which the latter concern has been operating and managing the properties of the former, would be terminated on Nov. 1.

The General Engineering succeeded Stone & Webster as operator of the Western United property on March 1, 1926, shortly after controlling interest had been acquired by E. H. Rollin & Sons and A. E. Fitkin & Company. Later the Fitkin interests were acquired by the Rollins interests, which now own practically all of the class B common of the Western United Corporation, which in turn owns all the common stock of the Western United Gas & Electric.

B. P. Alschuler, vice-president of the Western United, announced that after Nov. 1 operation of all affairs of the company will be in the hands of its own executives. The change will affect very few men now engaged in the executive offices.

Mr. Egolf will succeed B. E. Waltz, who was elected when the General Engineering came into the property and who was elected through that corporation. Mr. Egolf is well known in the railway field. He began his railroad career as a conductor on the street railway at Columbus, Ohio, in 1902 and from that position rose to assistant superintendent of the Ohio Electric Railway. Later he became general manager of the Springfield & Xenia Railway. He was president of the Illinois Electric Railway Association in 1925.

E. E. Whiting, Trustee at Boston

Edward E. Whiting, who writes the Whiting column in the Boston *Herald*, has been appointed by Governor Fuller to the position of trustee of the Boston Elevated Railway, Boston, Mass., to succeed Andrew Marshall, resigned. Mr. Whiting was born in Springfield, Mass., in 1875. He studied three years at Harvard College. He became interested in journalism through his father, who was editor of the Springfield *Republican*. Edward E. Whiting has been connected with Boston newspapers since 1903. He was at one time editor of the defunct Boston *Evening Record*, and has been on the Boston *Herald*

staff since 1921. In recent years he has written much on political matters. He succeeds Edward Marshall, who in turn succeeded James F. Jackson.

Ross Schram with Twin Coach Corporation

Ross Schram, whose name is indelibly written in the annals of transportation history in Detroit, Mich., is now vice-president in charge of sales of the Twin Coach Corporation, Kent, Ohio. He has also been elected a director of the corporation. The announcement of his appointment was made by Frank R. Fageol, president.

In 1925 Mr. Schram resigned from the



©C. M. Hayes & Co., Detroit, Mich.

Ross Schram

Detroit Municipal Railway after many years service. He, with Clarence E. Wilcox, former corporation counsel for the city of Detroit and later head of the claims department of the Department of Street Railways, became associated with Senator Couzens in the Couzens Ice Machine Company. It was in 1924 that Ross Schram succeeded William B. Mayo as general manager of the Detroit Department of Street Railways. He was well known at the time, having served as secretary to Mayor-elect James Couzens in 1918. Later, when construction was started on the municipal railway system, Mr. Schram was made secretary of the Street Railway Commission. When on Dec. 23, 1921, he was made assistant general manager of the Detroit Municipal Railway he knew the problems confronting the railway management and was a valuable aid to the late Joseph S. Goodwin, then general manager. Upon the death of Mr. Goodwin, Mr. Mayo resigned his place on the Street Railway Commission to become general manager and Mr. Schram continued as assistant general manager. In reality he assumed full responsibility of a 400-mile municipal system whose early history had played a conspicuous part in the making of the present-day Detroit. Further details of Mr.

Schram's rôle were given in the *ELECTRIC RAILWAY JOURNAL*, issue of July 12, 1924, page 71.

Mr. Schram was born in Battle Creek, Mich., in September, 1888. He was graduated from the Detroit University School. At one time he was connected with the Charles H. Fuller Company, the J. Walter Thompson Company and the Packard Motor Car Company.

A. W. Stace Directs Michigan Committee on Utility Information

Arthur W. Stace, Grand Rapids, has been appointed director of the Michigan Committee on Public Utility Information with offices in Ann Arbor, Mich. The committee was formed in 1920 to provide responsible information on utility operation and to promote public understanding. Through its bureau speakers are furnished for clubs and schools.

During the past four years Mr. Stace has been engaged in writing articles concerning Michigan, her resources and possibilities. For many years he was identified with the Grand Rapids *Press*, leaving the post of managing editor there to become special writer for the Booth newspapers, his particular field being constructive editorial research and studies looking to the solving of Michigan problems and the development of Michigan's natural resources.

Mr. Stace was the first president of the Michigan Associated Press Editorial association. He was graduated from Notre Dame University. In his new position he succeeds Alfred Fischer, who resigned on April 1, to become affiliated with the Semet-Solvay Engineering Corporation, New York.

J. R. Blackhall Made North Shore Manager

J. R. Blackhall, vice-president and general manager of the Chicago & Joliet Electric Railway, has been appointed general manager of the Chicago North Shore & Milwaukee Railroad at Highwood, Ill., succeeding John F. Egolf, who has returned to the Western United Gas and Electric properties a manager. No successor to Mr. Blackhall has been named so that he will divide his time between Joliet and Chicago until the Chicago & Joliet appoint a manager. Mr. Blackhall was born on Nov. 16, 1869, in a little French community named Carquet, in New Brunswick, Canada. He left home when he was fifteen years old, and after working in several different places in Canada he went to Portland, Me., in 1889. In the spring of 1891 he entered railway work with the Woodbridge & Turner Engineering Company, New York, which had taken a sub-contract under the Thomson-Houston Company, the engaged in electrifying the Deerlin branch of the Portland Railroad. A few months after the Woodbridge & Turner Engineering Company con-

pleted its work at Portland the company employed Mr. Blackhall on the construction of the electric railway extending from Buffalo to Tonawanda along the Lake. He was finally promoted to the position of superintendent of the road.

Subsequently Mr. Blackhall served the Woodbridge & Turner Company in connection with the electrification of the horse car lines in Providence, R. I., the construction of the Westbrook branch of the Portland (Maine) Railway, the building of the Scranton-Moosic line, the electrification of the mule lines in Chester, Pa., the installation of an electric scenic line on Briganteen Island, N. Y., the electrification of the lines in Poughkeepsie, N. Y., and the construction of the independent telephone system at Mount Vernon, N. Y.

After leaving the Woodbridge & Turner Company, Mr. Blackhall constructed an overhead line connecting the new power plant with the old system in Wilkes-Barre, Pa. He next became connected with the Portland (Maine) Railroad in charge of its electrical work and remained in Portland until the spring of 1900. He then secured a position with the American Railways, Philadelphia, on work at Bridgeton, N. J. He was next sent to Joliet by the American Railways in the capacity of electrical superintendent on the rebuilding of the local lines there and the construction of the interurban line to Chicago. Upon the completion of that work he served the American Railways in other places, returning to Joliet in January, 1904, to become manager of the Chicago & Joliet Electric Railway.

George D. Powell at Terre Haute

The appointment of George D. Powell as division engineer at Terre Haute, Ind., of the Terre Haute, Indianapolis & Eastern Traction Company is seen in an official order sent out by G. O. Nicolai of the company. Mr. Powell will be engineer of maintenance of way with supervision of all tracks, buildings and grounds of the division. He was with the Union Traction Company of Indiana before going to Terre Haute in 1926 as assistant to the late W. F. Graves.

G. L. LEDERER has been appointed local superintendent of the railway system of the Milwaukee Electric Railway & Light Company in Racine, Wis., succeeding the late A. W. Weyker.

W. J. CARR has been appointed a member of the California Railroad Commission to fill the vacancy caused by the death of Harley W. Brundige. Mr. Carr is a well-known local attorney and former State Senator from Los Angeles.

J. L. BILLINGSLEY is superintendent of the newly organized Southern Pacific Motor Transport Company, a California corporation with a permit to operate buses in Oregon. Mr. Billingsley has been superintendent of the Southern Pacific city railway lines in Salem and Eugene for the past fifteen years. His headquarters will be in Salem.

OBITUARY

Frank C. Wight

Frank C. Wight, editor of *Engineering News-Record*, one of the McGraw-Hill publications, died at his home in Summit, N. J., Sept. 18. He had been ill for only a week.

Mr. Wight was a man of brilliant attainments and remarkably broad understanding and sympathies. On these qualities and on his great administrative talents was based his success in his chosen vocation. He worked both rapidly and surely, and was incessantly active throughout his career. As an authority on reinforced concrete, Mr. Wight had contributed largely to the advancement of the art. Other subjects had also commanded his major attention during the past years, studies of the Mississippi River flood problem and traffic control among them. He was a member of Secretary Hoover's Com-



Frank C. Wight

mittee on Street and Highway Safety when that body was first organized.

Mr. Wight entered technical journalism in December, 1906, as associate editor of *Engineering News*. For six years his main assignments were in the fields of concrete, general construction and river and harbor work. In 1913 he was promoted to the managing editorship of *Engineering News*, a position which he held until *Engineering News* and *Engineering Record* were consolidated in 1917. Four years later he became managing editor of the consolidated journal, and on Jan. 1, 1924, was made editor of *Engineering News-Record*.

Mr. Wight was born in Washington, D. C., Feb. 26, 1882. He studied at Columbian (now George Washington) University and later at Cornell, where he received the degree of civil engineer in 1904. After graduation he spent three years in the office of the engineer of bridges of the District of Columbia, his previous summer vacations having been spent in the district surveyor's office.

He was a member of the American Society of Civil Engineers, the Cornell Society of Engineers, the American Concrete Institute and the Engineers Club. He had for years been active in the work of both the National Confer-

ence of Business Paper Editors and the New York Editorial Conference. Of the former organization he was president at the time of his death. He was a former chairman of the New York Editorial Conference.

A. E. Clifford

Arthur E. Clifford, business manager of *Automotive Industries*, published in Philadelphia, died suddenly at Cleveland, Ohio, on Sept. 20. For many years Mr. Clifford was connected with the McGraw Publishing Company and its successor, the McGraw-Hill Publishing Company, Inc., as business manager of the *American Electrician* and the *Electrical World*. In December, 1923, he resigned as assistant to President James H. McGraw to join the business staff of *Automotive Industries*, at that time published in New York.

In speaking of Mr. Clifford's death, Mr. McGraw said:

"Both capacity and courage were conspicuous characteristics of Arthur Clifford, whose earnest and devoted work will long be remembered by those for and with whom he labored. A large circle of friends in the McGraw-Hill Publishing Company and the United Publishers' Corporation, as well as in the other circles where he mingled, will miss him for his sterling personal and business qualities.

Mr. Clifford was born in New Hampshire 59 years ago.

CHARLES BARRETT ATTLESEY, division superintendent at the Ninth Avenue depot of the Brooklyn-Manhattan Transit Corporation, Brooklyn, N. Y., died recently. With this property he served in various capacities until in 1918 he was promoted to the position of acting division superintendent. This was made permanent on Feb. 1, 1919. His work in Brooklyn was interrupted by a short period of service with the Public Service Corporation of New Jersey. Mr. Attlesey was 58 years old.

HENRY DOERR, director of the Twin City Rapid Transit Company, Minneapolis, Minn., for the term expiring 1930, died Aug. 11 at his country home in Minnetonka. He was president of the Minneapolis Drug Company, director of the Northwestern National Bank and had been affiliated with other banking institutions. He was 74 years old.

G. T. WISWELL, president of the Wiswell Improved Railroad Crossing Company, Chicago, Ill., died on Aug. 8. He was prominent in the construction end of railroad work for more than 40 years. He was the organizer of the Roadmasters Association in Massachusetts and its first secretary. For the past ten years he gave his entire attention to his invention, the Wiswell improved railroad crossing, a noiseless, jarless, grooved flangeway patent. This invention was described in the *ELECTRIC RAILWAY JOURNAL* more than a year ago. One such pattern was recently installed on the Great Northern and Illinois Central crossing at Sioux City, Iowa.

Manufactures and the Markets

Large Expenditures Planned by Virginia Company

Double-tracking of the Bay Shore Line to Ocean View on the Norfolk Division of the Virginia Electric & Power Company, for which \$207,000 has been appropriated, is one of the many large rehabilitation and construction projects announced by officials for completion during the latter part of this year. Most of the right-of-way for the second track of the Bay Shore Line is clear and the company does not expect to have serious difficulty in completing it. With the construction of this second track, Ocean View, one of the most popular seaside resorts near the Virginia coast, will be furnished with a high-speed express service.

The company will spend in addition to the money appropriated for this work \$36,000 for reinforcing and replacing in part the primary system of its 2,000-volt distributing lines. In Norfolk it will construct an underground conduit between Bank and Cove Streets to cost \$5,300. Extensions of the power distribution system to Fentress and vicinity is estimated to cost \$6,000. Plans include the double-tracking of portions of the Church Street line and laying of new track on Church Street between Eighteenth and 26th Streets, for which \$60,000 has been allocated.

New business in Norfolk necessitates the extension of the power distribution system in various parts of the city, particularly in the suburbs. This project will cost about \$150,000. Storage and garage facilities at Cove Street substation are being improved at a \$30,000 expenditure. Sums of \$52,000 and \$53,000 respectively have been allocated to the construction of new transmission lines from the Reeves Avenue power station to Gilmerton and Newton Park. These lines will serve to strengthen the link between Norfolk and the high-tension line which runs from Gilmerton to Suffolk and permits interchange of power between Norfolk, Richmond, Petersburg and Roanoke Rapids (N. C.) generating stations. The rebuilding of an 11,000-volt transmission line will cost \$20,000 and the installation of a transformer bank at the Reeves Avenue power station \$15,000.

It is estimated that the company has spent in the territory of eastern Virginia and North Carolina \$5,530,000 for extensions and improvements during the first six months of this year and that the program under way will cost \$6,652,339. The largest project which the company has undertaken in Norfolk is the addition to the Reeves Avenue station, which has been under way for several months and which in order to put this generating plant in first class condition will absorb \$2,500,000 of the construction funds during the last half of the year. The total cost of the Reeves Avenue additions is estimated

at approximately \$5,000,000. It is understood that plans for the North Carolina extension include the acquisition of property of the independent power companies in one or more of the smaller North Carolina communities. The local plants will be scrapped and their customers supplied by current brought in over the new transmission line. Construction last year of the transmission line through the Dismal Swamp to Edenton, Hartford and other North Carolina communities makes it possible for the company to branch out in that state at a relatively small expense, for the Dismal Swamp line is not used at its full capacity at present. At Richmond the company recently received a shipment of track steel to be used in completing the work on Main Street at Fourteenth, Eighteenth and 21st Streets.

Southern Utility Completes \$100,000 Car Program

The last of seven cars built in the company owned plant of the Southern Public Utilities Company, Charlotte, N. C., has been completed. Seven cars were included in the construction program, estimated at \$100,000, and all of the units have been placed in operation. Others, it is announced, will be built as needed. In the meantime the car building shop at the company's carhouse on East Boulevard will engage in construction of bodies for cars to be used in Charlotte and Winston-Salem. Each of the new cars recently turned out cost approximately \$15,000. They are of

the double-truck type, and are for one-man or two-man operation. The frames are of steel and the bodies are constructed of steel and wood. Each unit has a seating capacity of 40 passengers. Over-all length of each car is 38 ft. 3 in. and the width over all is 8 ft. 4 in. The height, from rail to top of car, is 11 ft. 6 in. All units are equipped with air brakes and numerous safety devices. Each car is provided with comfortably upholstered seats. W. B. Osborne, master mechanic, had charge of the building details.

Noiseless One-Man Cars for Minneapolis

The Minneapolis Street Railway, Minneapolis, Minn., contemplates putting one-man noiseless cars on its Bryn Mawr line to reduce the cost of operation as on this line at times only six to eight persons are carried on a trip. T. Julian McGill, vice-president, says under the circumstances there would seem to be no necessity for using two men. If the service proves satisfactory it may be extended to other lines where there is light operation. Similar service is being discussed for some of the St. Paul lines. One-man cars are utilized for local service on the Stillwater city division and some are utilized in Duluth. The 25 new cars are to be equipped with roller bearings, automobile type brakes and herringbone gears. They will cost about \$25,000 each and will be turned out from the Snelling shops in St. Paul in three or four months.

R. H. Goodwillie Heads Electrical Manufacturers

R. H. Goodwillie, manager of the Otis Elevator Company, Yonkers, N. Y., was elected treasurer of the National Electrical Manufacturers Association by the executive committee at its meeting on Sept. 16, according to an announcement by Gerard Svope, president. Mr. Goodwillie succeeds J. W. Perry, formerly associated with the Johns-Manville Corporation, who has resigned from active business connections. I. A. Bennett of the National Metal Molding Company, Pittsburgh, Pa., will succeed Mr. Perry on the board of governors.

International G. E. Men Promoted

Loren Emery, merchandise sales manager of the International General Electric Company, has been appointed a member of the executive department and assigned to special duties in Mexico. He is succeeded as merchandise sales manager by R. A. Rowlands. George F. Mosher, assistant to treasurer of the General Electric Company, has been named auditor of disbursements, succeeding C. H. Stull, who becomes treasurer of the Ohio Contract Purchase Corporation, an associated company, with headquarters in Cleveland.

"Babies Mixed in Cleveland"

says news item

They may do that out there, but with the A.E.R.A. Exhibit Committee on deck there'll be

No Mixing of Progeny of the Street Railway and Manufacturers

Every exhibit will be tagged and everything will be in its place in the 115,007 feet of space

**Be There on Time,
October 1, at 12 Noon**

**Unless You've Decided to
Walk, Call Your Local
Ticket Agent**

New Gary Cars Embody Utmost in Comfort and Safety

Marking another step in the progressive modernization and improvement of the system, ten new light-weight safety cars for one-man operation have recently been placed in service by the Gary Railways, Gary, Ind. The entire fleet of nine city-type cars and one interurban was built by the Cummings Car & Coach Company, Paris, Ill., and embodies the most modern principles of construction and design. Car dimensions recommended by the committee on "essential features of modern cars" were followed as far as possible, the builders using the same post centers, height, etc.

From the standpoint of comfort and attractiveness to riders the new equipment is unsurpassed by but few, if any, street cars manufactured. The low dash, a feature developed by Gary Railways engineers, gives a becoming streamline appearance to the new cars which is suggestive of speed and smoothness in riding. Equipped with four 40-hp. motors each and automatic safety and control apparatus of every description, the cars are capable of unusually rapid acceleration and retardation, features which are of great importance in operating through the congested streets.

With 52 semi-individual, leather-upholstered seats and ample aisles and vestibules the new city-type cars are designed to handle heavy loads during rush hours with comfort and dispatch. Delays in loading and unloading passengers are minimized by automatic rear floor treadle exits, sliding doors and a passenger signal system which not only indicates the proper door to use on boarding or leaving the car but which also warns trailing motorists of an imminent stop. Provision against sudden incapacitation of the operator is



The low vestibule rail in line with the side belt rail carries out the streamline appearance

made in the "dead man's control." With the inauguration of service with the nine safety cars on the Broadway-45th



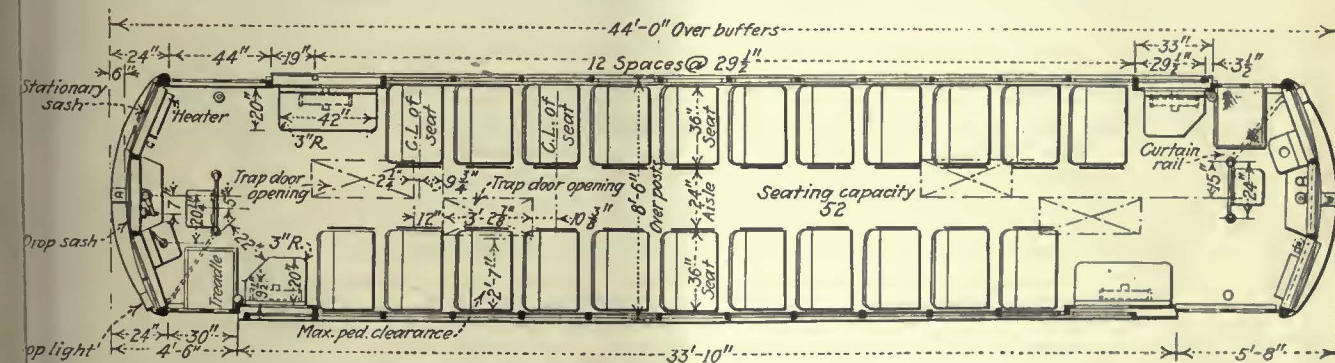
Comfort is the keynote of the interior design, the cars being equipped with semi-individual, leather-upholstered seats and having ample aisle and vestibule

Avenue line in Gary, the company increased the headway from ten to fifteen minutes.

Other specifications of the city-type cars are shown below.

The new interurban car differs from the city-type equipment only in the wider spacing and plush upholstery of its seats. Like the other units for local operation in Gary, this car, which is now being used on the Gary-Indiana Harbor interurban line, is finished on the interior in cherry with an ivory-toned ceiling. The cars are illuminated by standard Pullman fixtures and carpeted with handsome gray linoleum. Windows are properly spaced for clear and easy vision and are framed in brass sash.

The car is of the same type as the seven interurban cars received during January of this year and described in the Jan. 29 issue of ELECTRIC RAILWAY JOURNAL.

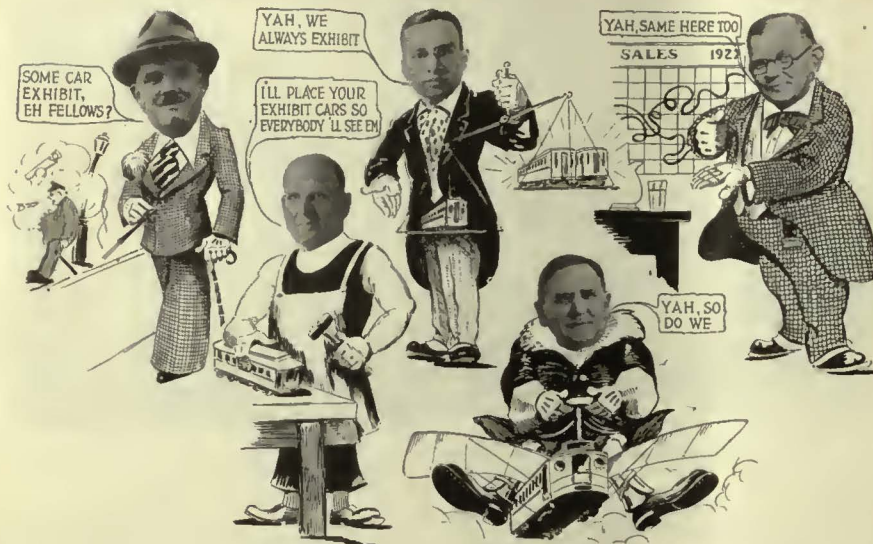


Plan of the new city type Gary cars. Although the length is only 44 ft., the cars have a seating capacity of 52 passengers

SPECIFICATIONS FOR GARY CITY UNITS

Type of unit	One-man, motor, passenger, city, double end, double truck	Car signal system	Faraday high-voltage	Motors	Four GE-265, inside hung
Number of seats	52	Control	General Electric K-75	Painting scheme	Orange and maroon
Date of order	Jan. 20, 1927	Curtain fixtures	National Lock Washer Co.	Registers	Ohmer
Date of delivery	June 9, 1927	Curtain material	Black Pantasote	Roof material	Haskellite
Total weight	37,000 lb.	Destination signs	Hunter illuminated	Safety car devices	Safety Car Devices Co.
Motor centers	21 ft. 6 in.	Door mechanism	National Pneumatic Co.	Sash fixtures	Edwards, brass
Length over all	44 ft. 0 in.	Emergency-saving device	Economy meters	Seats	Hale-Kilburn 392 No. A semi-individual
Truck wheelbase	5 ft. 4 in.	Finish	Sherwin-Williams lacquer	Seat spacing	29 1/2 in.
Width over all	8 ft. 8 in.	Gears and pinions	General Electric	Step treads	Kass
Height, rail to trolley base	11 ft. 0 1/2 in.	Glass	D.S.A.A. plate	Trolley retrievers	Ohio Brass Co.
Window post spacing	29 1/2 in.	Hand brakes	Pittsburgh No. 35	Trolley base	U.S.-20
Body	All steel	Heaters	Railway Utility Co. (thermostatic control)	Trolley wheels	Holland 6 in.
Boiler	All steel	Headlights	Golden Glow H.D.B.	Trucks	Cummings Car & Coach Co., MC, No. 62
Brakes	Arch	Headlining	7-in. Agasote	Ventilators	Railway Utility Co., Honeycomb type
Trailer brakes	General Electric	Journal boxes	Cummings Car & Coach Co.	Wheels, type	26-in. Davis, steel
Wheels	A. E. R. A. standard	Lamp fixtures	Dayton Mfg. Co., Pullman type	Wheelguards	Gary Railways standard

EXHIBITOGRAPHS—No. 5



We might well label this masterpiece "Great Expectations." Here are five gentlemen steeped in the art of no-pushee-no-pullee locomotion. Begin at the left, skyward, A. M. Robinson, P.M. of the Brill-American-Kuhlman-Wason aggregation, known as "Robbie," the A.M. signifying the time of day that he is going to show the buyers some real stuff. To his right is A. P. Jenks, V.-P. of the Cummings Car & Coach Company. Behind his dignified expression lurks a knockout in the matter of the light-weight material. Will the referee raise his hand at the Cleveland bout? "Were you ever in Zinzinnati?" questions the gentleman at the extreme right, A. L. Kasemeir, V.-P. Cincinnati Car Com-

pany. What is behind this question will be revealed between Oct. 1 and 7. And he with the wings, G. L. Kippenberger, "the Spirit of St. Louis," has he another world surprise in transportation like unto Lindbergh, which he will bring from the shops of the St. Louis Car Company? Another V.-P. with a royal flush?

But who is the husky Vulcan with the hammer, standing a little to the left of center? Little Charlie Clark, who when not engaged in maintaining a way for the Cleveland Railway, is chairman of the sub-committee on car exhibits. He knows all that the four others know, but won't tell, because at present he's as busy as two bees in a tar bucket.

Copper Market Active

A much larger business in copper, with all sellers participating at 13½ cents delivered in the East, has been the feature in the non-ferrous metal markets in the week ending Sept. 20. Lead has also sold in improved volume, and the St. Louis price has advanced to 6.075 cents. Zinc and tin, however, have been quiet and slightly lower.

The large producers, who have been

holding their copper at 13¼ cents delivered Connecticut, for over a month, finally brought buyers to their way of thinking, and the sales have been the largest for any week since June 1. In the East, 13½ cents was generally realized, with a fair amount of business in the Middle West at 13¾ cents. Foreign sales are now about normal for this time in the month, the export association's price continuing at 13½ cents, c.i.f.

The week has witnessed better business in lead, leading to an improved tone in the St. Louis market toward the end of the week. This had the effect of bringing the St. Louis price up to 6.075 cents. The New York sales have also improved, but the market price has not risen to correspond with the St. Louis quotation. In many quarters not only is no rise in price expected, but uncertainty is expressed as to whether 6.25 cents New York is rock bottom.

Galvanizers have shown but little interest in zinc this week. Until Sept. 19 6½ cents, St. Louis, was generally realized, with an occasional carload at slightly higher prices.

Tin has been declining steadily, and even at the present low prices sales are not being made in any quantity.

METAL, COAL AND MATERIAL PRICES
F. O. B. REFINERY

Metals—New York		Sept. 20, 1927
Copper, electrolytic, cents per lb.	12.95	
Copper wire, cents per lb.	15.25	
Lead, cents per lb.	6.075	
Zinc, cents per lb.	6.225	
Tin, Straits, cents per lb.	61.50	
Bituminous Coal, f.o.b. Mines		
Smokeless mine run, f.o.b. vessel, Hampton Roads, gross tons	\$4.275	
Somerset mine run, Boston, net tons	1.80	
Pittsburgh mine run, Pittsburgh, net tons	1.95	
Franklin, Ill., screenings, Chicago, net tons	†	
Central, Ill., screenings, Chicago, net tons	†	
Kansas screenings, Kansas City, net tons	2.70	
†Quotations withdrawn because of strike.		
Materials		
Rubber-covered wire, N. Y., No. 14, per 1,000 ft.	\$5.55	
Weatherproof wire base, N. Y., cents per lb.	5.20-5.70	
Cement, Chicago net prices, without bags	2.05	
Linseed oil (5-bbl. lots), N. Y., cents per lb.	11.3	
White lead in oil (100-lb. keg), N. Y., cents per lb.	13.75	
Turpentine (bbl. lots), N. Y., per gal.	\$61.0	

ROLLING STOCK

SEABOARD AIR LINE RAILWAY, Portsmouth, Va., has placed an order with the J. G. Brill Company, Philadelphia, for ten combination gas-electric passenger cars and nine trailers. The equipment will be used by the railroad in local interurban service. In addition to this four gas-electric cars will be built by the Electromotive Company, East Cleveland, Ohio, according to an announcement recently made by the Timken Roller Bearing Company, Canton, Ohio, which will equip the cars with its bearings.

CLEVELAND RAILWAY, Cleveland, Ohio, has ordered twenty White six-cylinder buses, which brings the company's quota to 100 vehicles, including trucks.

GREAT NORTHERN RAILWAY, St. Paul, Minn., has placed an order with the Westinghouse Electric & Manufacturing Company for six additional locomotives to be used on the Cascade Mountain electrification project. This is part of the \$15,000,000 program of improvement which includes line revisions and an 8-mile tunnel through the Cascade Mountain.

TRADE NOTES

ATLAS CONVEYOR COMPANY, Philadelphia, announces the opening of offices at 20 South Fifteenth Street, Philadelphia, and the appointment of Percival K. Reed, L. G. Weygandt and E. A. Thumert as chief engineer, Eastern sales manager and general manager, respectively.

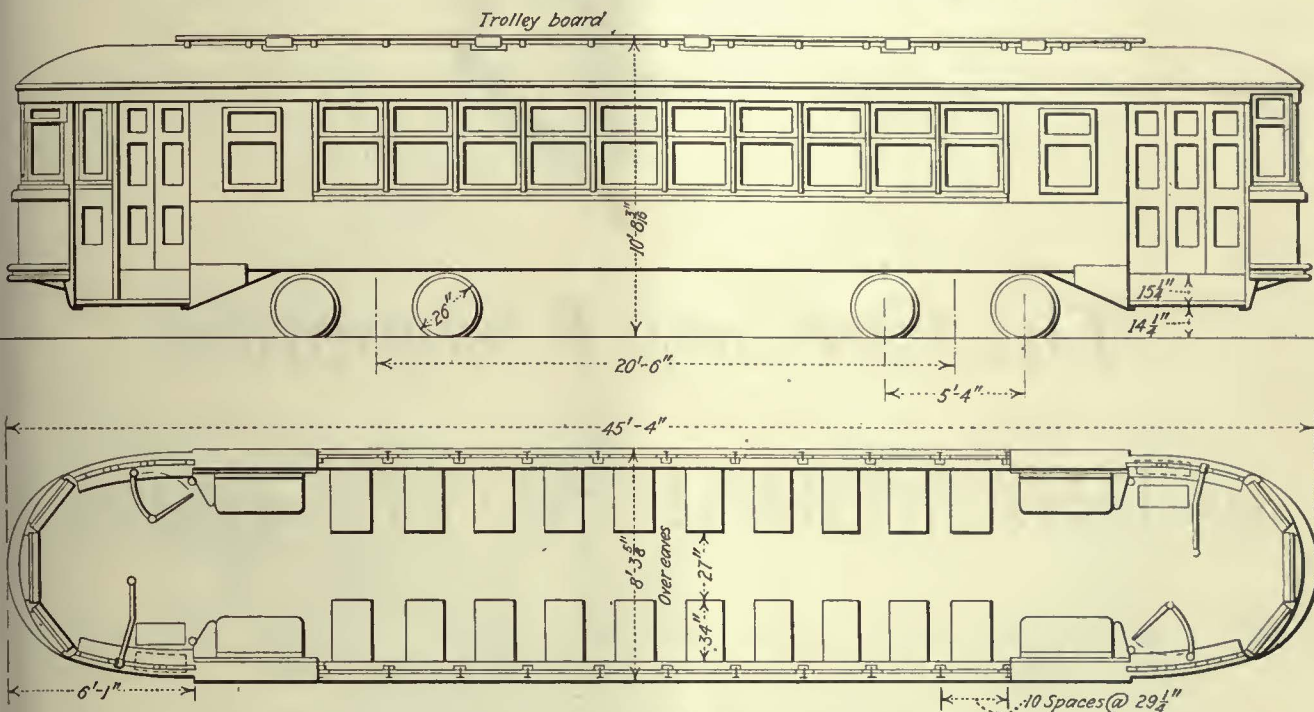
UNITED STATES RUBBER COMPANY, New York, has announced to the trade an important addition to its line, the Usco Junior.

DELTA-STAR ELECTRIC COMPANY, Chicago, Ill., announces the purchase of the Electric Connector Company, Minneapolis, Minn., manufacturer of compression connectors. The connectors will be made now in the Chicago factory.

MALCOLM S. SIMPSON, Suite 1401 Starks Building, Louisville, Ky., has been appointed as direct sales representative for the Morton Manufacturing Company (railroad division) in the territory surrounding Louisville and including those electric railway systems located in that territory.

GENERAL WHEELBARROW COMPANY, Cleveland, Ohio, announces that the name of the Akron Barrow Company, Cleveland, has been changed to that of General Wheelbarrow Company. The announcement states that the old name is geographically wrong for a Cleveland company; also, that need was felt for a name which would be broader, more inclusive and indicative of the scope of its business. The renamed company will remain under the same management.

Atlanta does it again!



Orders 40 more cars equipped with "Peacock" Staffless Brakes—

Reg. U. S. Pat. Off.



"Peacock"

Reg. U. S. Pat. Off.

Staffless Brakes

CONTINUING its modernization policy the Georgia Power Company, Atlanta, Ga., has just placed in service forty one-man, city type, double-end cars, with a passenger seating capacity of 48.

Built by the Cincinnati Car Company, these new cars are all steel, over 46 ft. long. The exterior color scheme is green and cream while the interior trim is a natural cherry.

May we tell you of the many advantages of "Peacock" Staffless Brakes which led this company to specify them again?

National Brake Company

890 Ellicott Square, Buffalo, N. Y.

Canadian Representative

Lyman Tube & Supply Co., Ltd., Montreal, Can.



This Growing Recognition of INDUSTRIAL ADVERTISING

Within one year McGraw-Hill Publications have gained 500 industrial advertisers and 3,000 industrial advertising pages. Now 3,500 advertisers are using 48,000 pages annually in McGraw-Hill Publications to help industry buy more intelligently.

* * * *

A study of this growth shows that old and new advertisers alike are recognizing more and more the business-building value of Industrial Advertising. It shows, too, that their advertising agents and bankers are recognizing its fundamental soundness—its minimum of waste.

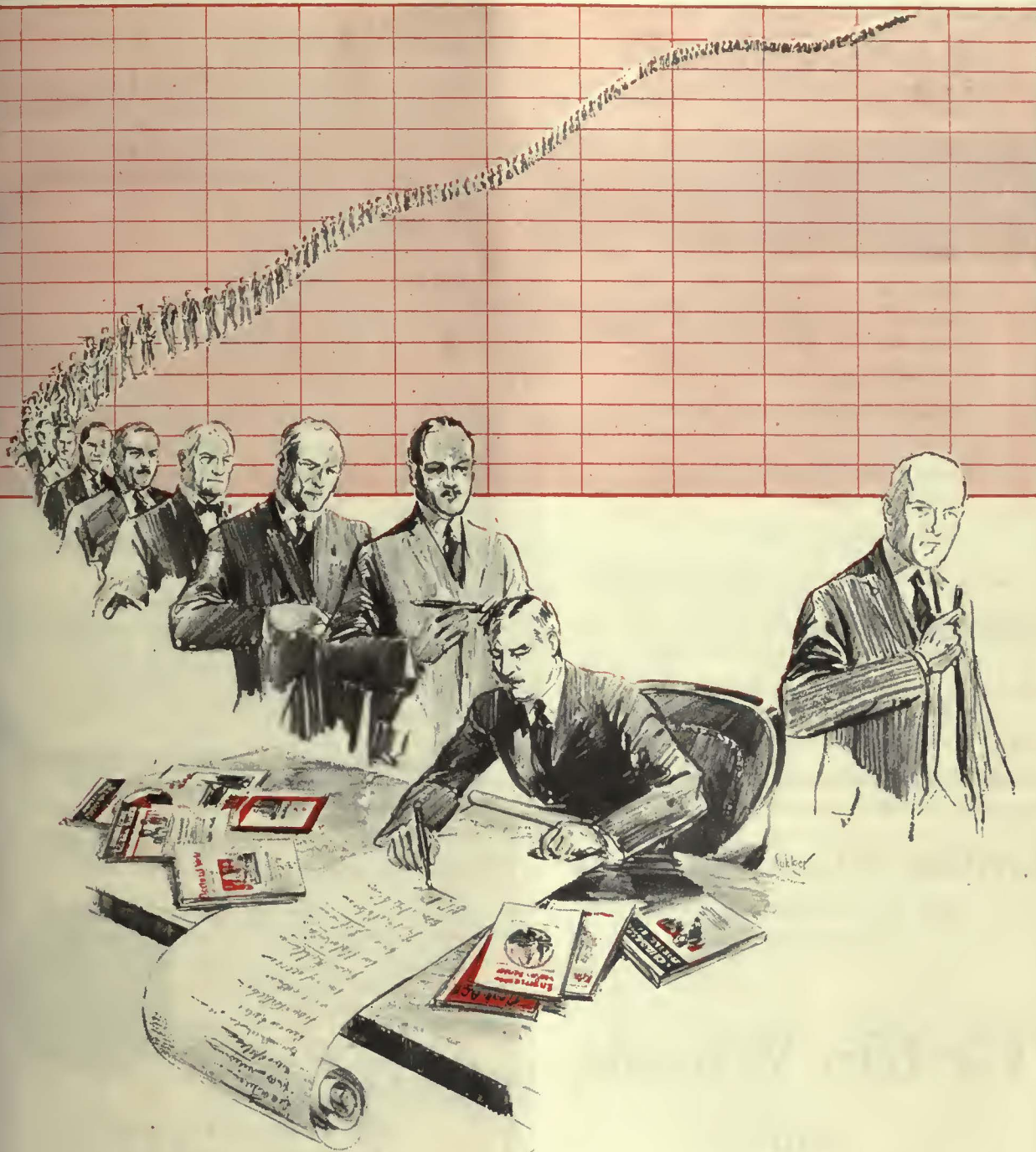
* * * *

Among these 500 new McGraw-Hill advertisers are a number of good sized concerns, who, after searching investigations, have discovered the importance

of authoritative industrial publications to the men who buy or influence the buying of what they have to sell. These concerns are using specialized Industrial Advertising for the first time—with continuous schedules in McGraw-Hill Publications.

* * * *

Many of these 500 new McGraw-Hill advertisers, however, are newcomers to the industrial field. Their capital is limited. Their advertising schedules are consequently small. But—in their ranks are the industrial leaders of another generation. Tomorrow—bankers, lawyers and advertising agents will sense with pride their good fortune in serving them. For they are starting out no differently than today's leading industries who were little advertising fellows in McGraw-Hill Publications 10, 20 and 40 years ago.



McGraw-Hill Publishing Company, Inc., New York, Chicago, Philadelphia, Cleveland, St. Louis, San Francisco, London Publishers of

McGraw-Hill Publications

Electrical
 ELECTRICAL WEST
 ELECTRICAL WORLD
 ELECTRICAL MERCHANDISING

Construction & Civil Engineering
 ENGINEERING NEWS-RECORD
 CONSTRUCTION METHODS

Industrial
 POWER
 AMERICAN MACHINIST
 INDUSTRIAL ENGINEERING
 CHEMICAL & METALLURGICAL ENGINEERING

Catalogs and Directories

McGraw-Hill Electrical Engineering Catalog
 McGraw-Hill Electrical Trade Catalog McGraw Central Station Directory
 Keystone Coal Mining Catalog McGraw Electric Railway Directory
 Keystone Metal Quarry Catalog Metal Quarry Directory
 Keystone Coal Buyers Catalog Coal Field Directory
 Bonbright Survey of Electric Power & Light Companies in the U. S.

Radio
 RADIO RETAILING
Transportation
 BUS TRANSPORTATION
 ELECTRIC RAILWAY JOURNAL

Mining
 COAL AGE
 COAL AGE NEWS
 ENGINEERING & MINING JOURNAL

Overseas
 INGENIERIA INTERNACIONAL
 AMERICAN MACHINIST
 (EUROPEAN EDITIONS)

4,000 PAGES USED ANNUALLY BY 3,500 INDUSTRIAL ADVERTISERS TO HELP INDUSTRY BUY MORE INTELLIGENTLY

ELECTRICAL INSULATION

MICANITE and **EMPIRE**
INSULATOR

Micanite and Super-Micanite Sheets, Commutator Segments, and Commutator Rings.

Micanite Tubes and Washers

Linotape, Seamless or Sewn Bias
(Yellow or Black Varnished Tapes)

Empire Oiled Cloths and Papers
(Yellow or Black)

Compounds, Varnishes, Etc.

Send for catalog and helpful booklet on Commutator Insulation and Assembly

MICA INSULATOR COMPANY

Largest manufacturers in the world of mica insulation.
Established 1893.

New York: 68 Church St. Chicago: 542 So. Dearborn St.
Cleveland Pittsburgh Cincinnati
San Francisco Los Angeles Seattle
Works: Schenectady, New York. Victoriaville, Canada; London, England

Why



Le Carbone? Carbon Brushes?

Reason No. 7

They are brushes which, for many years, have demonstrated that brush troubles are by no means "necessary evils." When the right "Le Carbone" Carbon Brush is selected for the purpose, trouble with brushes becomes an unknown occurrence.

They talk for themselves

W. J. Jeandron

Factory Terminal Bldg.,
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

Griffin Wheel Company

410 North Michigan Ave.
Chicago, Ill.

Griffin Wheels

with
Chilled Rims
and

Chilled Back of Flanges

For Street and Interurban
Railways

FOUNDRIES:

Chicago
Detroit
Denver
Cleveland

Boston
Kansas City
Council Bluffs
Salt Lake City

St. Paul
Los Angeles
Tacoma
Cincinnati

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.

Lorain Special Trackwork Girder Rails

Electrically Welded Joints

THE LORAIN STEEL COMPANY

Johnstown, Pa.

Sales Offices:

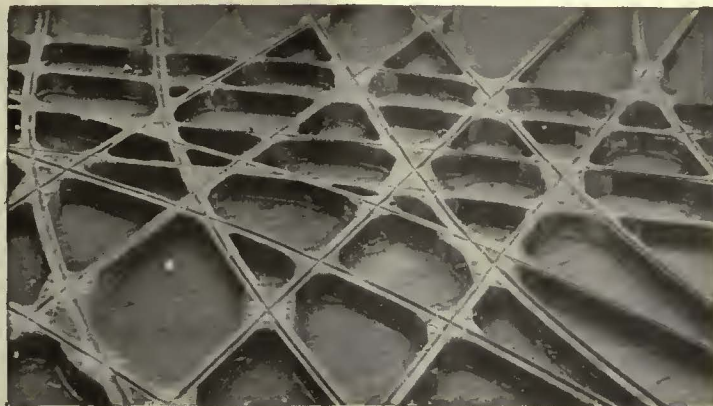
Atlanta Chicago Cleveland New York
Philadelphia Pittsburgh Dallas

Pacific Coast Representative:

United States Steel Products Company
Los Angeles Portland San Francisco Seattle

Export Representative:

United States Steel Products Company, New York, N. Y.



Forty-Five Years' Experience and the best of modern facilities are responsible for the excellence of Buda Trackwork

THE BUDA COMPANY

HARVEY, ILL.



Send us your inquiries

Arc Weld Rail Bonds

AND ALL OTHER TYPES

Descriptive Catalogue Furnished

American Steel & Wire Company

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



**MORE-JONES
TROLLEY
WHEELS
AND
HARPS**

WE MANUFACTURE various types of trolley equipment. The quality of metal, conductivity, resistance to friction, effect on overhead, shape and size of wheel groove, have all been carefully worked out and perfected. In addition to the highly specialized V-K Oilless Trolley Wheels and Harps, More-Jones make the most complete line of lubricated trolley wheels and harps to meet all requirements. Let us quote you.

National Bearing Metals Corporation
St. Louis, Mo.

**"MORE-JONES
QUALITY PRODUCTS"**

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

Design and Construction
Examinations Reports Appraisals
Industrial and Public Service Properties

NEW YORK BOSTON CHICAGO

THE BEELER ORGANIZATION

Transportation, Traffic, Operating Surveys
Better Service—Financial Reports
Appraisals—Management

52 Vanderbilt Ave.

New York

SANDERSON & PORTER ENGINEERS

PUBLIC UTILITIES & INDUSTRIALS

Design Examinations Construction Reports Management Valuations

CHICAGO NEW YORK SAN FRANCISCO

ENGELHARDT W. HOLST

Consulting Engineers

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

683 Atlantic Ave., BOSTON, MASS.

ALBERT S. RICHEY

ELECTRIC RAILWAY ENGINEER

WORCESTER, MASSACHUSETTS

REPORTS - APPRAISALS - RATES - OPERATION - SERVICE

LINN & MARSHALL, Inc.

Financing — Engineering — Management

PUBLIC UTILITIES

ELECTRIC RAILWAYS — MOTOR BUSES —
GAS — ELECTRIC

25 Broadway, New York City

C. B. BUCHANAN W. H. PRICE, JR. JOHN F. LAYNG
President Sec'y-Treas. Vice-President

BUCHANAN & LAYNG CORPORATION

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

BALTIMORE Phone: NEW YORK
1004 Citizens National Hanover: 2142 49 Wall Street
Bank Bldg.

DAY & ZIMMERMANN, INC.

ENGINEERS

DESIGN - CONSTRUCTION - REPORTS
VALUATIONS - MANAGEMENT

NEW YORK

PHILADELPHIA

CHICAGO

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

KELKER, DELEUW & CO.

CONSULTING ENGINEERS

REPORTS ON

Operating Problems Valuations Traffic Surveys

111 W. Washington Street, Chicago, Ill.

McCLELLAN & JUNKERSFELD

Incorporated

ENGINEERING AND CONSTRUCTION

Examinations—Reports—Valuations

Transportation Problems—Power Developments

68 Trinity Place, New York

Chicago

St. Louis

E. H. FAILE & CO.

Designers of

Garages—Service Buildings—Terminals

441 LEXINGTON AVE.

NEW YORK

WALTER JACKSON

Consultant on Fares and Motor Buses

The Weekly and Sunday Pass—Differential

Fares—Ride Selling

Holbrook Hall 5-W-3

160 Gramatan Ave., Mt. Vernon, N. Y.

THE BABCOCK & WILCOX COMPANY

85 LIBERTY STREET, NEW YORK

Builders since 1868 of
Water Tube Boilers
of continuing reliability

BRANCH OFFICES

- BOSTON, 89 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., Magnolia Building
- HONOLULU, H. T., Castle & Cooke Building
- PORTLAND, ORE., Gasco Building



WORKS
Bayonne, N. J.
Barberton, Ohio

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

BRANCH OFFICES

- DETROIT, Ford Building
- NEW ORLEANS, 344 Camp Street
- HOUSTON, TEXAS, Electric Building
- DENVER, 444 Seventeenth Street
- SALT LAKE CITY, Kearns Building
- SAN FRANCISCO, Sheldon Building
- LOS ANGELES, Central Building
- SEATTLE, L. C. Smith Building
- HAVANA, CUBA, Calle de Aguiar 104
- SAN JUAN, Porto Rico, Royal Bank Building

THE P. EDWARD WISH SERVICE

50 Church St. NEW YORK Street Railway Inspection DETECTIVES 131 State St. BOSTON

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

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

Hale and Kilburn SEATS

Better Quality Seats
For Cars and Buses

Hale-Kilburn Co.
1800 Lehigh Ave., Philadelphia, Pa.

RAILWAY UTILITY COMPANY

CAR COMFORT WITH HEATERS
UTILITY REGULATORS
VENTILATORS

2241-2247 Indiana St.
Chicago, Ill.

Write for
Catalogue

1528 Broadway
New York, N. Y.

"Bates Poles Outlive the Bond Issues that Buy Them"

BATES POLES AND STRUCTURES

BEST
Bates Expanded Steel Truss Co.

General Offices and Plants
EAST CHICAGO, INDIANA, U. S. A.

Transmission Line and Special Crossing Structures, Catenary Bridges

WRITE FOR OUR NEW DESCRIPTIVE CATALOG

ARCHBOLD-BRADY CO.

Engineers and Contractors SYRACUSE, N. Y.

INDUSTRIAL GASES

OXYGEN
ACETYLENE



HYDROGEN
NITROGEN

Quick shipment and low prices also on cylinders, valves, torches, regulators and supplies.

International Oxygen Co., Main Offices: Newark, N. J.

Branches: New York Pittsburgh Toledo

UNA RAIL JOINTS

DYNAMOTORS WELDING ROD

UNA Welding & Bonding Co.
Cleveland, Ohio.



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



Boyerized Parts:

- Brake Pins
- Brake Hangers
- Brake Levers
- Pedestal Gibs
- Brake Fulcrums
- Turnbuckles
- Center Bearings
- Side Bearings
- Spring Post Bushings
- Spring Posts
- Belster and Trussom
- Chasing Piston
- Manganese Brake Heads
- Manganese Trunk Parts
- Bushings
- Brone Bearings
- McArthur Turnbuckles

Can be purchased through the following representatives:

- Economy Electric Devices Co., 13 W. Van Buren St., Chicago, Ill.
- F. F. Butler, 903 Menard Bldg., San Francisco, Cal.
- W. F. McKeown, 54 First Street, Portland, Oregon.
- J. H. Denton, 1338 Broadway, New York City, N. Y.
- A. W. Arlin, 519 Delta Bldg., Los Angeles, Cal.

Bemis Car Truck Company
Springfield, Mass.

AMERICAN BRIDGE COMPANY

EMPIRE BUILDING—71 BROADWAY NEW YORK, N. Y.

Manufacturers of Steel Structures of all classes particularly BRIDGES AND BUILDINGS

ALSO STEEL BARGES FOR HARBORS AND RIVERS, STEEL TOWERS FOR ELECTRIC TRANSMISSION, HEROULT ELECTRIC FURNACES, ETC.

SALES OFFICES:

NEW YORK, N. Y. Philadelphia, Pa. Boston, Mass. Baltimore, Md.	PITTSBURGH, PA. Cincinnati, Ohio Cleveland, Ohio Detroit, Mich.	CHICAGO, ILL. St. Louis, Mo. Denver, Colo. Salt Lake City, Utah	Pacific Coast Representative: U. S. Steel Products Co., Pacific Coast Dept. San Francisco, Cal. Los Angeles, Cal. Portland, Ore. Seattle, Wash.
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Export Representative: United States Steel Products Co., 30 Church Street, New York.




STEEL CROSS TIES

insure a permanent, repair-free track. Temperature variations, water or decay will not affect it. Steel Cross Ties are now being used in practically all new work where economy and permanency are the chief considerations. If you are interested in "low-maintenance-cost" track, send for a copy of our booklet—Steel Cross Ties.

CARNEGIE STEEL COMPANY
General Offices · Carnegie Building · 434 Fifth Avenue
PITTSBURGH PENNSYLVANIA



1836



COLUMBIA

Railway Supplies and Equipment

Machine and Sheet Metal Work

Forgings
Special Machinery and Patterns

Grey Iron and Brass Castings

Armature and Field Coils.

The Columbia Machine Works and M. I. Co.
265 Chestnut St., corner Atlantic Ave.,
Brooklyn, New York

SPECIAL TRACKWORK

of all
CONSTRUCTIONS

At points of severe service, use Special Trackwork of the famous Tisco Manganese Steel.

WM. WHARTON JR. & CO., INC.
Easton, 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

SEARCHLIGHT SECTION

USED EQUIPMENT & NEW—BUSINESS OPPORTUNITIES

UNDISPLAYED—RATE PER WORD:

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

POSITIONS VACANT

ASSISTANT general manager, man preferred who has held similar position and who from experience would be able to entirely manage property within few months. Position is in Latin American country. Therefore, knowledge of Spanish desirable. Bus operating experience also desirable. In first letter, give full details, experience and salary expected. P-44, Electric Railway Journal, Tenth Ave. at 36th St., New York City.

HELPER in car barn, G.E. equipment, Westinghouse air brakes. State age, references and wages expected. The Cortland County Traction Company, Cortland, N. Y.

POSITIONS WANTED

CORRESPONDENCE solicited with managers that are in need of an experienced equipment supervisor, one who has proven that he can maintain all types of cars and busses in an attractive and reliable condition at minimum of cost, a good organizer, a man who is loyal and one that works in harmony with all departments, references, past and present employers. PW-40, Electric Railway Journal, 7 So. Dearborn St., Chicago, Ill.

POSITIONS WANTED

MASTER mechanic with twenty years' experience on different types of car equipment, also with experience in power house and track maintenance, wants a position with a small or medium size trolley system. Best of references. Ready to go anywhere at once. PW-45, Electric Railway Journal, Tenth Ave. at 36th St., New York.

POSITION as superintendent for a small trolley system, wanted by a man with experience in the different branches. Several years in charge of power plants, car equipments and tracks. The last eight years in full charge of a 38 car trolley system. Best of references. PW-46, Electric Railway Journal, Tenth Ave. at 36th St., New York.

TRACK foreman out of work, is looking for a position. Broad experience. References furnished. PW-47, Electric Railway Journal, Tenth Ave. at 36th St., New York.

WOULD like to correspond with any company needing a high-grade official in any capacity, in city or interurban railways. Can manage any or all departments in the most efficient manner. PW-33, Electric Railway Journal, Guardian Bldg., Cleveland, O.

Available as Manager or Superintendent

Electrical engineer, Member A. I. E. E., with a background of responsible executive employment in electric railway operation (surface and rapid transit) and in association with prominent manufacturers of electric railway and power equipment.
This knowledge and experience should be particularly valuable to an operating or holding corporation that needs a better understanding of its railway and power equipment.
Now employed, desire to change.
Preliminary correspondence for confidential exchange of additional information is invited.
PW-43, Electric Railway Journal
Tenth Ave. at 36th St., New York City.

One Insertion

of a

"Searchlight" Ad

is often all that is necessary
to locate a buyer.

FOR SALE

15 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.

Bus Bargains



For Quick Disposition

- 6—Union McKinnons, Parlor Car Type 19 Pass.
- 3—Fageols, Street Car Type. 29 Pass.
- 3—Macks, Street Car Type.. 20 Pass.

f. o. b. Chicago

All in first class condition—dual rear tires—some with extra tires

Hyman-Michaels Co.

431 Peoples Gas Bldg.,
CHICAGO
Phone Harrison 1100

If there is anything you want—

or something you don't want that *other* readers of this paper can supply—or use—advertise in the



Somebody is always looking for something to meet certain business needs. Some men in charge of plant operations may be in the market for good used equipment—others may have just what they want, to sell. Some may require a man of unusual quali-

fications for a particular position—that man may be another reader of this paper!
Put the Searchlight Section to work for you under any of the following classifications—to fill your business needs.

Agencies Wanted
Agents Wanted
Auction Notices
Buildings For Sale
Business Opportunities
Civil Service Opportunities
Contracts To Be Let

Contracts Wanted
Educational Courses
Employment Agencies
Exchanges
For Rent Items
Franchises
Industrial Sites

Miscellaneous Wants
New Industries Wanted
Partners Wanted
Patents For Sale
Patent Attorneys
Plants For Sale
Positions Vacant

Positions Wanted
Property For Sale
Receivers' Sales
Representatives Wanted
Salesmen Wanted
York Wanted
Etc., Etc., Etc.

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
Westinghouse Air Brake Co.

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

Armature Shop Tools
Columbia Machine Works
Elec. Service Supplies Co.

Automatic Return Switch
Stands
Ramapo Ajax Corp.

Automatic Safety Switch
Stands
Ramapo Ajax Corp.

Axles
Bemis Car Truck Co.
Bethlehem Steel Co.
Brill Co., The J. G.
Carnegie Steel Co.
Cincinnati Car Co.
St. Louis Car Co.
Standard Steel Works
Westinghouse E. & M. Co.

Babbitt Metal
National Bearing Metals Corp.

Babbitting Devices
Columbia Machine Works & M. I. Co.

Barges, Steel
American Bridge Co.

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

Batteries, Dry
Nichols-Lintern Co.

Bearings and Bearing Metals
Bemis Car Truck Co.
Brill Co., The J. G.
Cincinnati Car Co.
Columbia Machine Works & M. I. Co.
General Electric Co.
National Bearing Metals Corp.
St. Louis Car Co.
Westinghouse E. & M. Co.

Bearings, Center and Roller
Side
Cincinnati Car Co.
Columbia Machine Works
Stucki Co., A.

Bearings, Roller
Timken Roller Bearing Co.

Bells and Buzzers
Consolidated Car Heating Co.

Bells and Gongs
Brill Co., The J. G.
Cincinnati Car Co.
Columbia Machine Works & M. I. Co.
Elec. Service Supplies Co.
St. Louis Car Co.

Benders, Rail
Railway Trackwork Co.

Bodies, Bus
Brill Co., The J. G.
St. Louis Car Co.

Body Material, Haskelite and Plymetl
Haskelite Mfg. Corp.

Boilers
Babcock & Wilcox Co.

Bond Testers
American Steel & Wire Co.
Electric Service Supplies Co.

Bonding Apparatus
American Steel & Wire Co.
Elec. Service Supplies Co.
Ohio Brass Co.
Railway Trackwork Co.
Una Welding & Bonding Co.

Bonds, Rail
American Steel & Wire 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.)
American Bridge Co.
Bates Expanded Steel Truss Co.
Columbia Machine Works
Elec. Ry. Equipment Co.
Elec. Service Supplies Co.
Hubbard & Co.
Ohio Brass Co.

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

Brake Shoes
American Brake Shoe & Foundry Co.
Bemis Car Truck Co.
Brill Co., The J. G.
St. Louis Car Co.

Brake Testers
National Ry. Appliance Co.

Brakes, Brake Systems and Brake Parts
Bemis Car Truck Co.
Brill Co., The J. G.
Cincinnati Car Co.
Columbia Machine Works & M. I. Co.
General Electric Co.
National Brake Co.
St. Louis Car Co.
Westinghouse Tr. Br. Co.

Brakes, Magnetic Rail
Cincinnati Car Co.

Bridges, Steel
American Bridge Co.

Brushes, Carbon
General Electric Co.
Jeandron, W. J.
LaCarbone Co.
Westinghouse E. & M. Co.

Brushholders
Columbia Machine Works

Buildings, Steel
American Bridge Co.

Bulkheads
Haskelite Mfg. Corp.

Bunkers, Coal
American Bridge Co.

Buses
Yellow Truck & Coach Co.

Bus Lighting
National Ry. Appliance Co.

Bushings, Case Hardened and Manganese
Bemis Car Truck Co.
Brill Co., The J. G.
Cincinnati Car Co.
Columbia Machine Works
St. Louis Car Co.

Cables (See Wires and Cables)
Cambrie Tapes, Yellow and Black Varnish
Irrington Varnish & Ins. Co.
Mica Insulator Co.
Carbon Brushes (See Brushes, Carbon)
Car Lighting Fixtures
Elec. Service Supplies Co.
Car Panel Safety Switches
Consolidated Car Heating Co.
Westinghouse E. & M. Co.
Car Steps, Safety
Cincinnati Car Co.
Car Wheels, Rolled Steel
Bethlehem Steel Co.

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

Cars, Gas-Electric
Brill Co., The J. G.
General Electric Co.
Westinghouse E. & M. Co.

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

Cars, Passenger, Freight, Express, etc.
American Car Co.
Brill Co., The J. G.
Cincinnati Car Co.
Kuhlman Car Co., G. C.
St. Louis Car 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
Cincinnati Car Co.
Columbia Machine Works & M. I. Co.
National Bearing Metals Corp.

Castings, Gray Iron and Steel
American Bridge Co.
American Steel Foundries
Bemis Car Truck Co.
Columbia Machine Works & M. I. Co.
St. Louis Car Co.
Standard Steel Works

Castings, Malleable & Brass
Bemis Car Truck Co.
Columbia Machine Works & M. I. Co.
St. Louis Car Co.

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

Catenary Construction
Archbold-Brady Co.

Celling Car
Haskelite Mfg. Corp.

Ceilings, Plywood, Panels
Haskelite Mfg. Corp.

Change Carriers
Cleveland Fare Box Co.
Electric Service Supplies Co.

Change Trays
Cincinnati Car Co.

Circuit-Breakers
General Electric Co.
Westinghouse E. & M. Co.
Clamps and Connectors for Wires and Cables
Columbia Machine Works
Elec. Ry. Equipment Co.
Elec. Service Supplies Co.
General Electric Co.
Hubbard & Co.
Westinghouse E. & M. Co.

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

Clusters and Sockets
General Electric Co.

Coil Banding and Winding Machines
Columbia Machine Works & M. I. Co.
Elec. Service Supplies Co.
Westinghouse E. & M. Co.

Colls, Armature and Field
Columbia Machine Works & M. I. Co.
General Electric Co.
Westinghouse E. & M. Co.

Colls, Choke and Klekling
Elec. Service Supplies Co.
General Electric Co.
Westinghouse E. & M. Co.

Coin Changers
Johnson Fare Box Co.

Coin Counting Machines
Cleveland Fare Box Co.
International Register Co.
Johnson Fare Box Co.

Coin Sorting Machines
Cleveland Fare Box Co.
Johnson Fare Box Co.

Coin Wrappers
Cleveland Fare Box Co.

Commutator Slotters
Columbia Machine Works
Elec. Service Supplies Co.
General Electric Co.
Westinghouse E. & M. Co.
Wood Co., Chas. N.

Commutator Trailing Devices
General Electric Co.

Commutators or Parts
Cameron Electrical Mfg. Co.
Columbia Machine Works & M. I. 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
Irrington Varnish & Ins. Co.

Connectors, Solderless
Westinghouse E. & M. Co.

Connectors, Trailer Car
Columbia Machine Works
Consolidated Car Heating Co.
Elec. Service Supplies Co.
Ohio Brass Co.
Westinghouse E. & M. Co.

Controllers of Parts
Columbia Machine Works & M. I. Co.
General Electric Co.
Westinghouse E. & M. Co.

Controller Regulators
Elec. Service Supplies Co.

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

Converters, Rotary
General Electric Co.
Westinghouse E. & M. Co.

Conveying & Hoisting Machinery
American Bridge Co.

Copper Wire
American Brass Co.
American Steel & Wire Co.
Anaconda Copper Mining Co.

Copper Wire Instruments, Measuring, Testing and Recording
American Brass Co.
Anaconda Copper Mining Co.

Cord, Bell, Trolley, Register
American Steel & Wire Co.
Brill Co., The J. G.
Elec. Service Supplies Co.
International Register Co.
Roebbing's Sons Co., John A.
St. Louis Car Co.
Samson Cordage Works

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

Compressors, Car
American Steel Foundries
Brill Co., The J. G.
Cincinnati Car Co.
Ohio Brass Co.
Westinghouse Traction Brake Co.

Cowl Ventilators
Nichols-Lintern 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, Track (See Track Special Work)
Crossings, Trolley
Ohio Brass Co.
Westinghouse E. & M. Co.

Curtains and Curtain Fixtures
Brill Co., The J. G.
St. Louis Car Co.

Dealer's Machinery & Second Hand Equipment
Electric Equipment Co.
Hyman Michaels

Derailing Devices (See also Track Work)
Derailing Switches
Ramapo Ajax Corp.
Destination Signs
Columbia Machine Works & M. I. Co.
Elec. Service Supplies Co.
Detective Service
Wish-Servic, P. Edward

Door Operating Devices
Brill Co., The J. G.
Cincinnati Car Co.

Consolidated Car Heating Co.
National Pneumatic Co.

Doors & Door Fixtures
Brill Co., The J. G.
Cincinnati Car Co.
General Electric Co.
Hale-Kilburn Co.
St. Louis Car Co.

Doors, Folding Vestibule
National Pneumatic Co.

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

Dryers, Sand
Electric Service Supplies Co.
Ohio Brass Co.
Westinghouse E. & M. Co.

Ears
Columbia Machine Works & M. I. Co.
Elec. Service Supplies Co.
Ohio Brass Co.
Westinghouse E. & M. Co.

Electric Grinders
Railway Trackwork Co.

Electric Transmission Towers
American Bridge Co.

Electrical Wires and Cables
Amer. Electrical Works
American Steel & Wire Co.
John A. Roebbing'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
Archbold-Brady Co.
Beeler, John A.
Bibbins, J. Rowland
Bylesby Co., H. M.
Day & Zimmermann, Inc.
Falls & Co., E. H.
Ford, Bacon & Davis
Hemphill & Wells

Holst, Engelhardt W.
Jackson, Walter
Kelker & DeLew
Linn & Marshall Co.
McClellan & Junkersfeld
Richey, Albert S.
Sanderson & Porter
Stevens & Wood
Stone & Webster Co.
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.
Johnson Fare Box Co.
Perey Mfg. Co.

Fare Registers
Electric Service Supplies Co.
Johnson Fare Box Co.

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

Fenders and Wheel Guards
Brill Co., The J. G.
Cincinnati Car Co.
Consolidated Car Fender Co.
St. Louis Car Co.
Star Brass Works
Wood Co., Chas. N.

Fibre and Fibre Tubing
Westinghouse E. & M. Co.

Field Colls (See Colls)
Floodlights
Electric Service Supplies Co.
Floor, Sub
Haskelite Mfg. Corp.

Floors
Haskelite Mfg. Corp.

Forgings
Brill Co., The J. G.
Cincinnati Car Co.
Standard Steel Works

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.

Furnaces Electric, Steel Melting
American Bridge Co.
Fuses and Fuse Boxes
Columbia Machine Works & M. I. Co.
Consolidated Car Heating Co.
General Electric Co.
Westinghouse E. & M. Co.

Fuses, Refillable
General Electric Co.

Gaskets
Westinghouse Tr. Br. Co.

Gas Producers
Westinghouse E. & M. Co.

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

Gear Blanks
Brill Co., The J. G.
Standard Steel Works

Gear Cases
Chillingworth Mfg. Co.
Columbia Machine Works & M. I. Co.
Electric Service Supplies Co.
Westinghouse E. & M. Co.

Gears and Pinions
Bemis Car Truck Co.
Columbia Machine Works & M. I. Co.
Electric Service Supplies Co.
General Electric Co.
Nat'l Ry. Appliance Co.

Generating Sets, Gas-Electric
General Electric Co.

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

Girder Rails
Bethlehem Steel Co.
Lorain Steel Co.

Gongs (See Bells and Gongs)
Greases (See Lubricants)

Grinders, Portable
Railway Trackwork Co.

Grinders, Portable Electric
Railway Trackwork Co.

Grinding Bricks and Wheels
Railway Trackwork Co.

Guard Rail Clamps
Ramapo Ajax Corp.

Guard Rails, Tee Rail & Manganese
Ramapo Ajax Corp.
Wm. Wharton, Jr. & Co.

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

Horns, Trolley
Columbia Machine Works
Elec. Service Supplies Co.
National Bearing Metals Corp.

Star Brass Works
(Continued on page 30)

Used and Surplus Equipment

INDIVIDUAL items of used equipment, or surplus new equipment, or complete plants, are disposed of (and found) through advertising in the *Searchlight* Section of this paper.

This is the section which so effectively aided the Government in selling the many millions of dollars worth of surplus material and equipment accumulated during the war without disturbing the market.

“SEARCHLIGHT”

THE WORLD'S STANDARD

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THE DIFFERENTIAL STEEL CAR CO., Findlay, O.



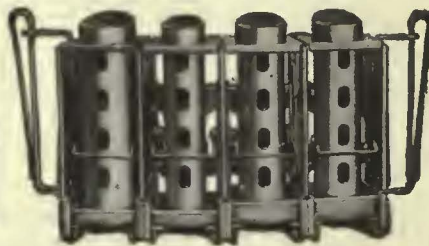
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National Railway Appliance Co.

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Hegeman-Castle Corporation, Railway Exchange Building, Chicago, Ill.

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National Hand Holds	Anderson Slack Adjusters
Genesco Paint Oils	Economy Electric Devices Co.
Dunham Hopper Door Device	Power Saving and Inspection Meters
Garland Ventilators	"Topesald" Lampe
Walter Tractor Snow Plows	Bus Lighting Equipment
Feasible Drop Brake Staffs	Cowdrey Automotive Brake Testing Machine



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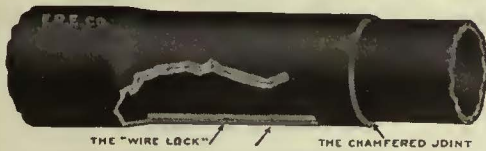
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General Electric Co.
Ohio Brass Co.
St. Louis Car Co.
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Heaters, Bus
Nichols-Lintern Co.
Heaters, Car (Electric)
Consolidated Car Heating Co.
Gold Car Heat. & Ltg. Co.
Railway Utility Co.
Smith Heater Co., Peter
Heaters, Cac, Hot Air and Water
Smith Heater Co., Peter
Heaters, Car Stove
Smith Heater Co., Peter
Helmets, Welding
Railway Trackwork Co.
Una Welding & Bonding Co.
- Holsts & Lifts**
Columbia Machine Works & M. I. Co.
Hose, Bridges
Ohio Brass Co.
Hose, Pneumatic
Westinghouse Traction Brake Co.
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American Steel & Wire Co.
General Electric Co.
National Ry. Appliance Co.
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Irvington Varnish & Ins. Co.
Mica Insulator Co.
Okonite Co.
Okonite-Callender Cable Co.
Westinghouse E. & M. Co.
Insulating Silk
Irvington Varnish & Ins. Co.
Insulating Varnishes
Irvington Varnish & Ins. Co.
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Elec. Service Supplies Co.
General Electric Co.
Irvington Varnish & Ins. Co.
Mica Insulator Co.
Okonite Co.
Okonite-Callender Cable Co.
Westinghouse E. & M. Co.
Insulation Slots
Irvington Varnish & Ins. Co.
Insulator Pins
Elec. Service Supplies Co.
Hubbard & Co.
Ohio Brass Co.
Insulators (See also Line Materials)
Elec. Ry. Equipment Co.
Elec. Service Supplies Co.
General Electric Co.
Irvington Varnish & Ins. Co.
Ohio Brass Co.
Westinghouse E. & M. Co.
Interior Side Linings
Haskelite Mfg. Corp.
Interurban Cars (See Cars)
- Jacks (See also Cranes, Holsts and Lifts)**
Buda Company
Columbia Machine Works & M. I. Co.
Elec. Service Supplies Co.
- Joints, Rail (See Rail Joints)**
- Journal Boxes**
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Brill Co., The J. G.
Cincinnati Car Co.
St. Louis Car Co.
- Lamp Guards and Fixtures**
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General Electric Co.
Westinghouse E. & M. Co.
- Lamps, Arc & Incandescent (See also Headlights)**
General Electric Co.
Westinghouse E. & M. Co.
- Lamps, Signal and Marker**
Elec. Service Supplies Co.
Nichols-Lintern Co.
- Lanterns, Classification**
Nichols-Lintern Co.
- Letter Boards**
Cincinnati Car Co.
Haskelite Mfg. Corp.
- Lighting Fixtures, Interior**
Electric Service Supplies Co.
- Lightning Protection**
Elec. Service Supplies Co.
General Electric Co.
Westinghouse E. & M. Co.
- Line Material (See also Brackets, Insulators, Wires, etc.)**
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Electric Ry. Equipment Co.
Elec. Service Supplies Co.
- General Electric Co.
Hubbard & Co.
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Ohio Brass Co.
Westinghouse E. & M. Co.
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General Electric Co.
St. Louis Car Co.
Westinghouse E. & M. Co.
Lubricating Engineers
Universeal Lubricating Co.
Lubricants, Oil and Grease
Universeal Lubricating Co.
Manganese Parts
Bemis Car Truck Co.
Manganese Steel Guard Rails
Ramapo Ajax Corp.
Wm. Wharton, Jr. & Co.
Manganese Steel, Special
Track Work
Bethlehem Steel Co.
Wm. Wharton, Jr. & Co.
Manganese Steel Switches,
Frogs and Crossings
Bethlehem Steel Co.
Ramapo Ajax Corp.
Wm. Wharton, Jr. & Co.
Meters (See Instruments)
Mica
Mica Insulator Co.
Mirrors, Inside & Outside
Cincinnati Car Co.
Motor and Generator Sets
General Electric Co.
Motor Buses (See Buses)
Motor Trucks
International Harvester Co.
Motors, Electric
General Electric Co.
Westinghouse E. & M. Co.
Motorman's Seats
Brill Co., The J. G.
Cincinnati Car Co.
Elec. Service Supplies Co.
St. Louis Car Co.
Wood Co., Chas. N.
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Bemis Car Truck Co.
Cincinnati Car Co.
Hubbard & Co.
- Oils (See Lubricants)**
- Omnibuses (See Buses)**
- Oxygen**
International Oxygen Co.
- Packing**
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Irvington Varnish & Ins. Co.
- Paints & Varnishes, Railway**
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- Pickup, Trolley Wire**
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Ohio Brass Co.
- Pinion Pullers**
Elec. Service Supplies Co.
General Electric Co.
Wood Co., Chas. N.
- Pinions (See Gears)**
- Pins, Case Hardened, Wood and Iron**
Ohio Brass Co.
Westinghouse Traction Brake Co.
- Pipe Fittings**
Standard Steel Works
Westinghouse Tr. Brake Co.
- Planers (See Machine Tools)**
- Plates for Tee Rail Switches**
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Ohio Brass Co.
- Pole Reinforcing**
Hubbard & Co.
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Bates Expanded Steel Truss Co.
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Hubbard & Co.
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- Poles, Trolley**
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- Poles, Tubular Steel**
Elec. Ry. Equipment Co.
Elec. Service Supplies Co.
- Portable Grinders
Buda Company
Railway Trackwork Co.
- Pothead**
Okonite-Callender Cable Co., Inc.
- Power Houses**
American Bridge Co.
Power Saving Devices
National Ry. Appliance Co.
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Cincinnati Car Co.
- Pressure Regulators**
General Electric Co.
Westinghouse E. & M. Co.
Westinghouse Traction Brake Co.
- Punches, Ticket**
International Register Co.
Wood Co., Chas. N.
- Rail Braces and Fastenings**
Ramapo Ajax Corp.
- Rail Grinders (See Grinders)**
- Rail Joints**
Carnegie Steel Co.
- Rail Joints, Welded**
Lorain Steel Co.
- Rail Welding**
Railway Trackwork Co.
Una Welding & Bonding Co.
- Rails, Steel**
Carnegie Steel Co.
- Railway Safety Switches**
Consolidated Car Heating Co.
Westinghouse E. & M. Co.
- Rattan**
Brill Co., The J. G.
Elec. Service Supplies Co.
Hale-Kilburn Co.
St. Louis Car Co.
- Registers and Fittings**
Brill Co., The J. G.
Cincinnati Car Co.
Elec. Service Supplies Co.
International Register Co.
St. Louis Car Co.
- Reinforcement, Concrete**
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Bethlehem Steel Co.
Carnegie Steel Co.
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- Repair Work (See also Coils)**
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Westinghouse E. & M. Co.
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Cincinnati Car Co.
Elec. Service Supplies Co.
- Resistances**
Consolidated Car Heating Co.
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Westinghouse E. & M. Co.
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- Roofs, Car and Bus**
Haskelite Mfg. Corp.
- Sanders, Track**
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Nichols-Lintern Co.
Ohio Brass Co.
St. Louis Car Co.
- Sash Fixtures, Car**
Brill Co., The J. G.
Cincinnati Car Co.
St. Louis Car Co.
- Sash, Metal Car Window**
Hale-Kilburn Co.
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- Seating Materials**
Brill Co., The J. G.
Haskelite Mfg. Corp.
St. Louis Car Co.
- Seats, Bus**
Brill Co., The J. G.
Hale-Kilburn Co.
St. Louis Car Co.
- Seats, Car (See also Rattan)**
Brill Co., The J. G.
Cincinnati Car Co.
Hale-Kilburn Co.
St. Louis Car Co.
- Second Hand Equipment**
Electric Ry. Equipment Co.
Hyman, Michaels
Shades, Vestibule
Brill Co., The J. G.
Cincinnati Car Co.
- Shovels**
Brill Co., The J. G.
Hubbard & Co.
- Shovels, Power
Brill Co., The J. G.
Side Bearings (See Bearings Center and Side)
- Signals, Car Starting**
Consolidated Car Heating Co.
Elec. Service Supplies Co.
National Pneumatic Co.
- Signals, Indicating**
Nichols-Lintern Co.
- Signal Systems, Block**
Elec. Service Supplies Co.
Nachod and United States
Electric Signal Co.
Wood Co., Chas. N.
- Signal Systems, Highway Crossing**
Nachod and United States
Electric Signal Co.
Wood Co., Chas. N.
- Slack Adjusters (See Brake Adjusters)**
- Steel Wheels and Cutters**
Cincinnati Car Co.
Columbia Machine Works & M. I. Co.
Elec. Ry. Equipment Co.
Elec. Service Supplies Co.
National Bearing Metals Corp.
- Smokstacks, Car**
Nichols-Lintern Co.
- Snow Plows**
National Ry. Appliance Co.
Snow-Plows, Sweepers and Brooms
Brill Co., The J. G.
Columbia Machine Works & M. I. Co.
Consolidated Car Fender Co.
St. Louis Car Co.
- Snow Sweeper, Rattan**
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- Special Trackwork**
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Lorain Steel Co.
Wm. Wharton, Jr. & Co.
- Spikes**
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- Splicing Compounds**
Westinghouse E. & M. Co.
- Splicing Sleeves (See Clamps and Connectors)**
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- Springs, Car and Truck**
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American Steel & Wire Co.
Bemis Car Truck Co.
Brill Co., The J. G.
Cincinnati Car Co.
St. Louis Car Co.
Standard Steel Works
- Sprinklers, Track and Road**
Brill Co., The J. G.
St. Louis Car Co.
- Steel and Steel Products**
American Steel & Wire Co.
Carnegie Steel Co.
- Steps, Car**
Brill Co., The J. G.
Cincinnati Car Co.
- Stokers, Mechanical**
Babcock & Wilcox Co.
Westinghouse E. & M. Co.
- Stop Signals**
Nichols-Lintern Co.
- Storage Batteries (See Batteries, Storage)**
- Strain Insulators**
Elec. Service Supplies Co.
Ohio Brass Co.
Westinghouse E. & M. Co.
- Strand**
American Steel & Wire Co.
Roebling's Sons Co., J. A.
Street Cars (See Cars, Passenger, Freight, Express)
- Superheaters**
Babcock & Wilcox Co.
- Sweepers, Snow (See Snow Plows, Sweepers and Brooms)**
- Switch Stands and Fixtures**
Ramapo-Ajax Corp.
- Switches, Selector**
Nichols-Lintern Co.
- Switches and Switchboards**
Consolidated Car Heating Co.
Elec. Service Supplies Co.
General Electric Co.
Westinghouse E. & M. Co.
- Switches, Tee Rail**
Ramapo-Ajax Corp.
- Switches, Track (See Track Special Work)**
- Tampers, Tie**
Railway Trackwork Co.
- Tapes and Cloths (See Insulating Cloth, Paper and Tape)**
- Tee Rail Special Track Work**
Ramapo-Ajax Corp.
- Telephones and Parts**
Elec. Service Supplies Co.
- Telephone & Telegraph Wire**
American Steel & Wire Co.
American Telephone & Telegraph Co.
- Testing Instruments (See Instruments, Measuring, Testing, etc.)**
- Thermostats**
Consolidated Car Heating Co.
Gold Car Heating & Lighting Co.
Railway Utility Co.
Smith Heater Co., Peter
- Ticket Choppers and Destroyers**
Elec. Service Supplies Co.
- Ties and Tie Rods, Steel**
American Bridge Co.
Carnegie Steel Co.
International Steel Tie Co.
- Ties, Wood Cross (See Poles, Ties, Posts, etc.)**
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Johnson Fare Box Co.
- Tongue Switches**
Wm. Wharton, Jr. & Co.
- Tools, Track & Miscellaneous**
American Steel & Wire Co.
Columbia Machine Works & M. I. Co.
Elec. Service Supplies Co.
Hubbard & Co.
Railway Trackwork Co.
Ramapo-Ajax Corp.
- Towers and Transmission Structure**
Archbold-Brady Co.
Bates Expanded Steel Truss Co.
Westinghouse E. & M. Co.
- Track Grinders**
Railway Trackwork Co.
Ramapo-Ajax Corp.
- Track, Special Work**
Buda Company
Columbia Machine Works & M. I. Co.
Ramapo Ajax Corp.
- Trackless Trolley Cars**
Brill Co., The J. G.
St. Louis Car Co.
- Transfer Tables**
American Bridge Co.
- Transformers**
General Electric Co.
Westinghouse E. & M. Co.
- Transmission Towers & Structures**
American Bridge Co.
- Trucks, Safety Stair, Car Step**
Cincinnati Car Co.
- Trees Wire**
Okonite Co.
Okonite-Callender Cable Co.
- Trolley Bases**
General Electric Co.
National Bearing Metals Corp.
Ohio Brass Co.
- Trolley Bases, Retrieving**
General Electric Co.
Ohio Brass Co.
- Trolley Bases**
Brill Co., The J. G.
General Electric Co.
Westinghouse E. & M. Co.
- Trolley Material, Overhead**
Elec. Service Supplies Co.
National Bearing Metals Corp.
Ohio Brass Co.
Westinghouse E. & M. Co.
- Trolley Wheel Bushings**
National Bearing Metals Corp.
Star Brass Works
- Trolley Wheels (See Wheels Trolley)**
- Trolley Wire**
Amer. Electrical Works
American Brass Co.
American Steel & Wire Co.
Anaconda Copper Min. Co.
Roebling's Sons Co., J. A.
- Trucks, Car**
Bemis Car Truck Co.
Brill Co., The J. G.
Cincinnati Car Co.
St. Louis Car Co.
- Truss Planks**
Haskelite Mfg. Corp.
- Tubing, Yellow and Black Flexible Varnish**
Irvington Varnish & Ins. Co.

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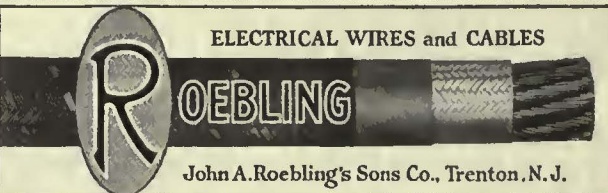
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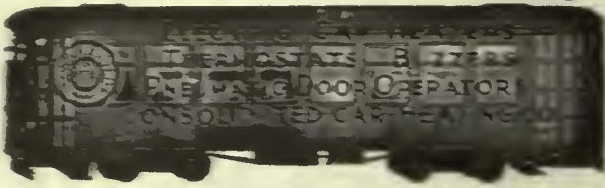
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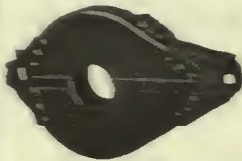
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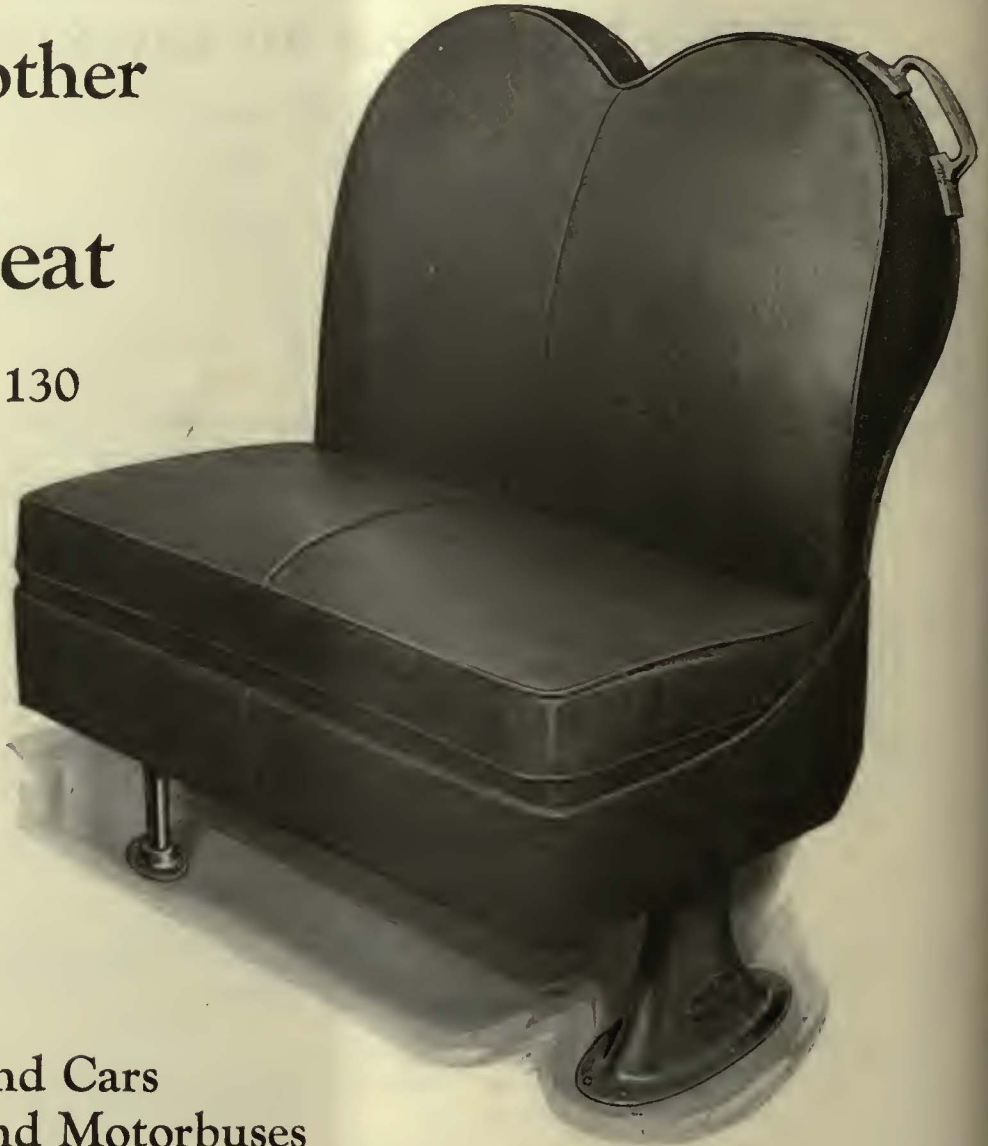
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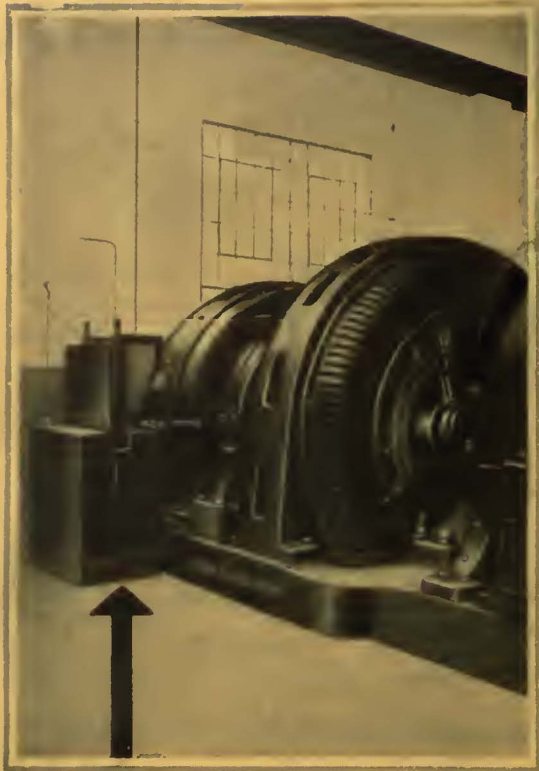
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