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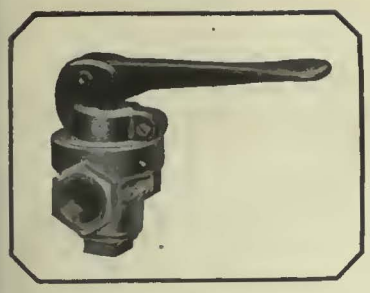
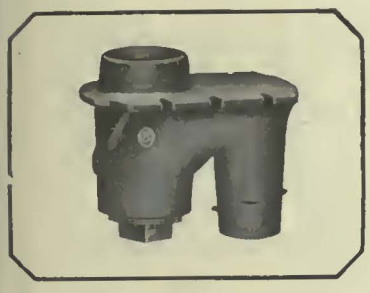
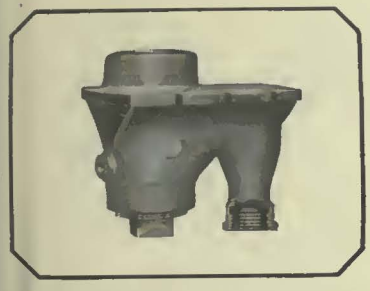
ELECTRIC RAILWAY JOURNAL



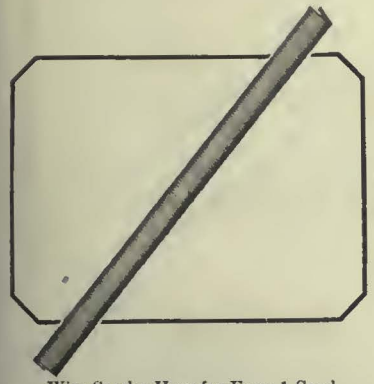
Diaphragm Type of O-B Sander Valve, supported by air pipe line. Also furnished with bracket for fastening to car panel.



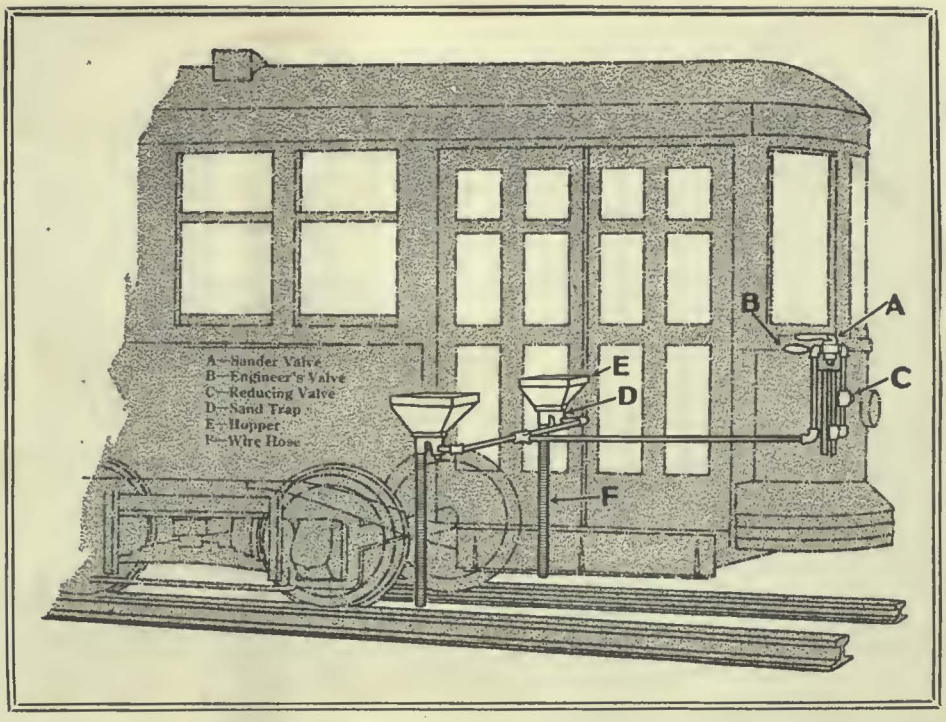
Sand Trap (Form 1) having spout fitted with studs to hold wire sander hose of 2-in outside diameter.



Sand Trap (Form 2) having inside of spout threaded to take 1-in. standard pipe.



Wire Sander Hose for Form 1 Sand Trap. Attaches to outside of the Trap spout.



You Find O-B Sanders On the Modern Cars

IT is only consistent that in specifying equipment for new cars, Master Mechanics demand an Air Sander that compares most favorably with the cost-reducing abilities of other modern car equipment.

By specifying the O-B Air Sander, they meet the five major requirements for this part of the car's equipment:—efficient operation, air conservation, convenience in use, and years of practically attention-free, reliable service. These are assured by O-B care and skill in design and manufacture.

An important feature is the flexible bronze diaphragm between Sander Valve Stem and Plunger. This prevents air leakage around the plunger stem when in use and eliminates the need of packing, making operation easier.

A typical installation is shown above. An arrangement suitable for any type car will be submitted without obligation, on request.

Ohio Brass Company, Mansfield, O.
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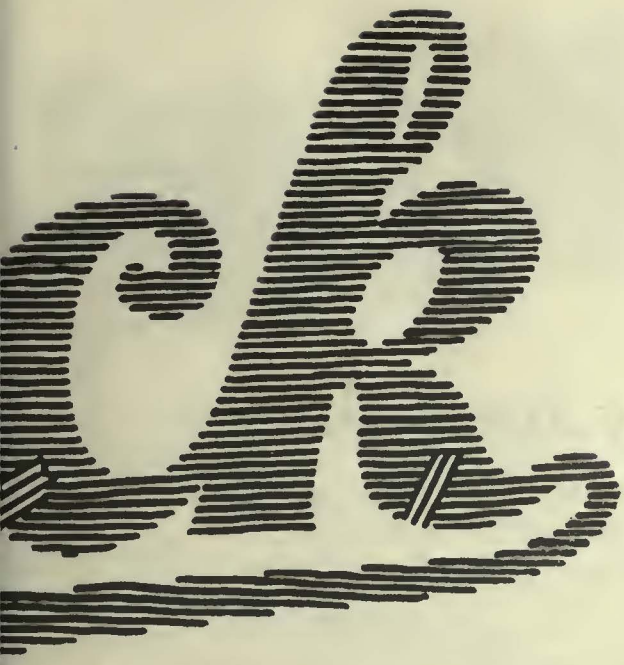

Mack-Made Buses

25-Passenger City Type
29-Passenger City Type
25-Passenger Parlor Car
25-Passenger Suburban Type
29-Passenger Suburban Type
25-Passenger Gas-Electric
29-Passenger Gas-Electric

Mack builds good will for the Nashua Street Railway Company—

Editor's Mail Bag

To the Editor of the Telegraph:

I wish to express at this time, to the Nashua Street Railway Co., and its employes, my heartiest appreciation and thanks for the splendid service they have given us this winter through their city bus lines. We who live off from the car lines certainly appreciate this service, and the kind and courteous treatment we receive from the conductors of the bus at all times makes it a pleasure for us to ride with them.

Considering the exceptionally bad traveling of the last month or two the bus drivers have done wonderful work in keeping so nearly to schedule time and route, and I feel that a word of thanks and appreciation is due them for the splendid service they have rendered to us.

A Satisfied Patron of the North Circuit Bus Line.

Letters to newspaper editors are not always kicks, as the above clipping proves. Courteous treatment and intelligent operation of buses breed good-will and profits for the street railway companies that depend on Mack buses to augment their service.

In order to be profitable and build good will, bus performance in all kinds of weather and on all kinds of roads must be dependable, whether it is on feeder routes, serving outlying communities, or city service in place of trolley cars.

The author of the letter to the editor of the Nashua Telegraph appreciates the courteous and dependable service of the Nashua Street Railway. Mack did not make the driver but it *did* produce a bus which maintained schedules and routes under adverse conditions. Pleasant personality and courteous treatment from drivers are not in the picture when a bus is falling down on the job.

Macks stay on the job from one end of the year to the other—and they certainly do have regular, old-fashioned winters in Nashua.

MACK TRUCKS, INC.
INTERNATIONAL MOTOR COMPANY
25 Broadway, New York City

Over one hundred direct MACK factory branches operate under the titles of: "MACK MOTOR TRUCK COMPANY," "MACK-INTERNATIONAL MOTOR TRUCK CORPORATION," and "MACK TRUCKS OF CANADA, LTD."

The Mack Bus

Seats that satisfy the public—

To satisfy the public is to sell more rides on both car and bus. For you get not only those who have to ride but also those who might not otherwise ride.

Backed by half a century's seat-making experience, Hale-Kilburn Seats satisfy both rider and operator. Correct design assures comfort on the longest trip. Sound construction guarantees simplicity, minimum weight, and long, hard wear.

Our catalog describes and illustrates the various types for car and bus. *Write for a copy.*

Typical bus seat

No. 901 Double Chair—a graceful, comfortable double chair with divided back and spring cushion pads.

Typical car seat

No. 392-EE—the finest type of interurban car seat with extra high three-part head-roll and mahogany capped armrest.

HALE-KILBURN COMPANY

***General Offices and Works:* 1800 Lehigh Avenue, Philadelphia**

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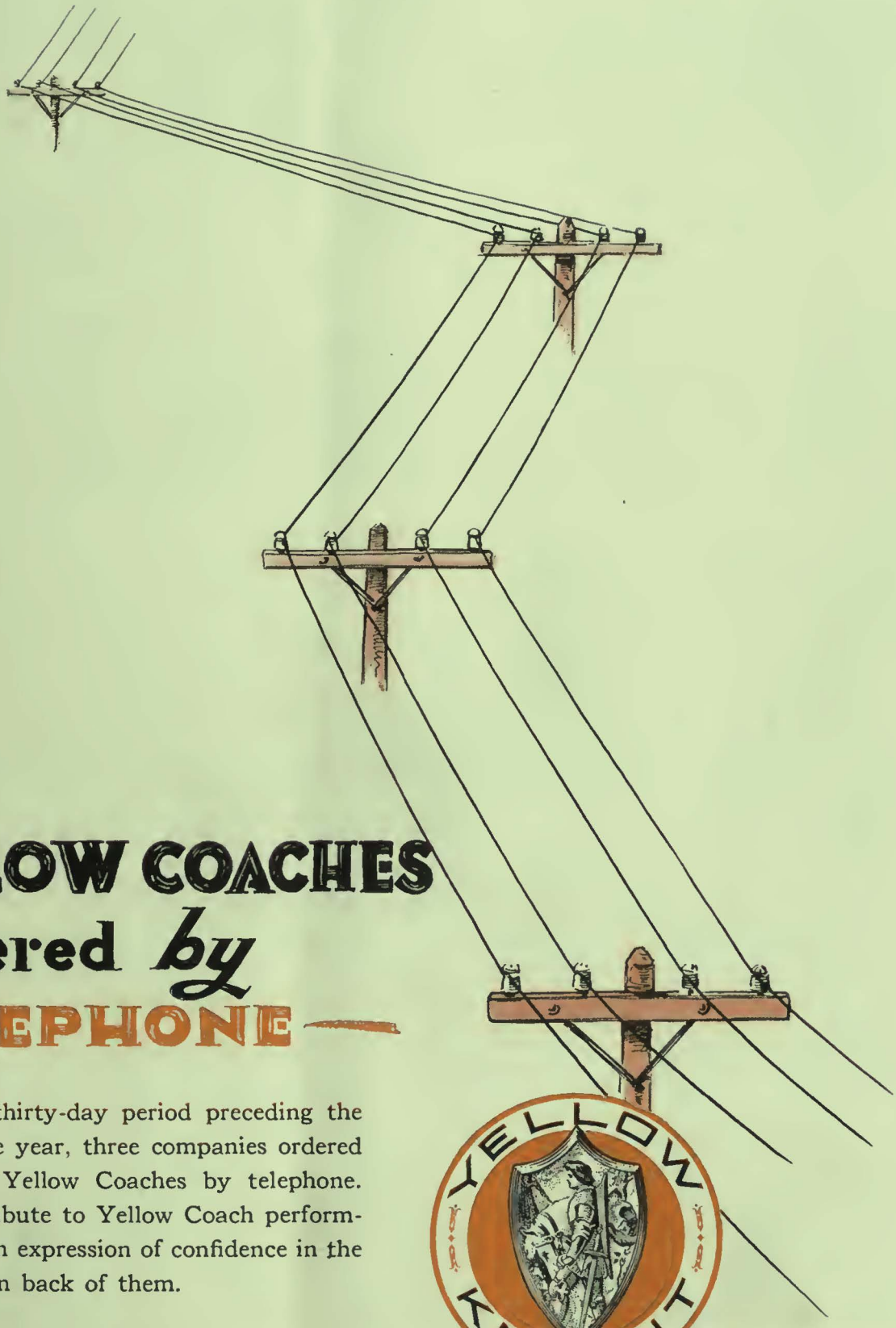

YELLOW COACHES ordered *by* TELEPHONE—

During a thirty-day period preceding the close of the year, three companies ordered thirty-five Yellow Coaches by telephone. Another tribute to Yellow Coach performance and an expression of confidence in the organization back of them.

YELLOW KNIGHT

Confi

Philadelphia
Rural Transit
Company

dence

first—Belief in Yellow Coaches hen—Knowledge that they are *Right*

IT means something when the Philadelphia Rural Transit Company *telephones* an order for twenty-five Yellow Gas Electric Parlor Coaches. This company operates Yellow Coaches exclusively. Their experience with their large fleet of Yellow Coaches gave them confidence to order more—*by telephone.*

Likewise, the Charleston Interurban R.R. Company, of West Virginia, *used the phone* as the quickest means to order six.

And from Canada, the Montreal Tramways Company expressed their confidence over the telephone by an order for four.

Only the strongest faith in Yellow Coach performance, expressed in low-cost, profitable miles, could thus cause these three companies to initiate their orders over the wire. The only salesmen involved in these transactions were Yellow Coaches themselves.

If you are interested in *low-cost, profitable miles*, our organization stands ready to point the way. Surveys are based on revenue-earning experience and guided by a scientific analysis of transportation conditions. Operating experience governs factory production. It influences the design of every part. It dictates the selection of material. It prepares Yellow Coaches to perform their part in the bigger thing which we have to sell—

—a complete transportation system for a business.

Building Yellow Coaches from this viewpoint builds that confidence that shows so clearly when orders are given over the telephone.

YELLOW COACH *plus* GENERAL MOTORS

What this alliance means to you

FIRST, Financial stability of organization back of the product—a guarantee over the years against losses arising from "orphan equipment."

SECOND, Substantial economies in engineering, manufacturing and merchandising operations, in which you share.

GENERAL MOTORS represents the greatest manufacturing organization in the world; an organization backed by unlimited technical resources.

Coupled with our own vast operating experience and the famous Yellow Knight Sleeve Valve Engine, the combination which welds together unlimited knowledge of motor vehicle transportation and manufacture offers you a security which guarantees profitable returns on your investment.

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Safety Cars for Atlanta

Georgia Railway and Power Company has made Atlanta a member of "the 400" by providing a superior class of transportation service. This city, together with 400 others, will now enjoy the distinct advantages afforded by the Safety Car.

Forty Safety Cars are now serving Atlanta, and to enhance further an already efficient transportation service, sixty additional Safety Cars are now in the process of construction for early September delivery.

Atlanta is one of the most recent cities that have found, in the wake of Safety Car adoption, a steady stream of increased public satisfaction, stimulated by a safe, constant, adequate, transportation service, unprecedented economically.

SAFETY CAR DEVICES CO.
OF ST. LOUIS, MO.

Postal and Telegraphic Address:
WILMERDING, PA.

CHICAGO SAN FRANCISCO NEW YORK WASHINGTON PITTSBURGH

It is a safety car if equipped with our standard Safety Car Control Devices

Equipped with
WESTINGHOUSE AIR BRAKES

Safeguarding the men of tomorrow

Westinghouse Automotive Air Brakes:

—provide ample retarding force for safe control.

—operate by mere touch of hand or foot and relieve driver fatigue.

—are ideal for application to all wheels.

—insure equalized braking forces, which eliminate skidding dangers.

—make possible shorter stops and maintenance of faster schedules.

—reduce brake maintenance costs.

Where the lives of children are concerned, the element of safety, always an essential factor in successful highway transportation, is of prime importance.

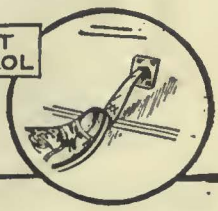
In providing a vehicle for this service which will take the boys and girls to school and back again quickly, cozily and comfortably, do not overlook the matter of adequate brake control.

Westinghouse Air Brakes insure safe operation of buses while they thread their way through city traffic, speed along the boulevard, swing around dangerous curves, or coast down long steep hills.

If *you* operate buses that carry school children, have them so equipped that you will enjoy the satisfaction of having provided the proper safeguard for young America.

WESTINGHOUSE TRACTION BRAKE CO.
Automotive Division, Wilmerding, Pa.

WESTINGHOUSE
Automotive AIR BRAKES



Promote those new cars!

When the industry's twenty-eight thousand new cars are put in operation, passengers will expect every convenience.

Promote good will among the riding public by using the ever reliable Faraday Passenger Signal Systems.

Write for complete information

ELECTRIC SERVICE SUPPLIES CO.

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FARADAY CAR SIGNALS

No. 19587
Vibrating Bell

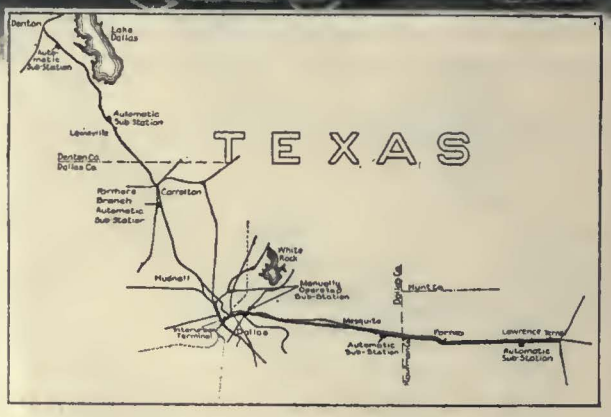
No. 19403
Buzzer

Type A
Push Button

Type B
Push Button

Faraday Car Signal Systems are made for every requirement—high or low voltage systems, buzzers, vibrating bells or single stroke bells, resistance panels, flush or surface type push buttons.

Greater attractiveness and better performance are essential to increased revenue and reduced expense. Both are being achieved by those progressive companies which are operating modern cars.



Three years' operation proved the value of one-man light-weight cars on the Texas Interurban Railway

To meet the requirements of modern rolling stock as exemplified by light-weight, high-acceleration cars, the General Electric Company manufactures motors, control, air brake apparatus, and many smaller items of car equipment. The notable achievements of modern cars thus equipped are written in scores of lowered-maintenance records, and attested by many repeat orders.

Operating costs per car-mile, 1925

Maintenance of way and structure	2.9 cts.
Maintenance of equipment	1.0 cts.
Power	6.2 cts.
Conducting transportation	5.8 cts.
General and miscellaneous	11.6 cts.
Total	27.5 cts.

Modern equipment used

Weight of cars complete	31,530 lb.
Motors (4-35 h.p.)	GE-265
Control (single-end)	G-E type K-35
Air Brakes—G-E straight air with emergency feature	
Compressors	G-E type CP-27B

11-72

GENERAL ELECTRIC

Electric Railway Journal

Consolidation of Street Railway Journal and Electric Railway Review

Published by McGraw-Hill Publishing Company, Inc.

CHARLES GORDON, *Editor*

Volume 67 New York, Saturday, May 8, 1926 *Number* 19

Traffic Police Officers Discuss Street Congestion

ONE whole session of the railway sectional meeting of the Southwestern Public Service Association at Galveston was devoted to traffic problems—not by operators, but by policemen. Lieutenants and captains of traffic squads from a half dozen cities of the Southwest told of traffic problems in their own localities. The railway executives listened.

This is the first time that such a representative group of traffic officers has been gathered together at a railway convention. The results were interesting in that the unanimous opinion of these speakers was that the parked automobile constitutes the greatest nuisance.

It was the unanimous consensus of opinion that officers of the traffic police be invited and welcomed into all meetings of this kind. W. W. Holden, chairman of the railway section, is to be congratulated in getting together such a group. Now if the industry can get together a representative group of merchants and show them the facts—how the arteries leading to their places of business are being clogged—perhaps some drastic action will be possible.

Terms of Cleveland Franchise Made More Liberal

CLEVELAND has modified its Tayler service-at-cost grant. These modifications are very important. They cover practically all the suggestions contained in the report of the Greater Cleveland transportation committee, but they do not include the suggestion of President Stanley of the Cleveland Railway for an increase in the dividend rate from 6 per cent to 7 per cent. That, however, is not regarded as an insuperable barrier considering the other changes that have been made. Maximum fares are made 10 cents instead of 6 cents, and the fare barometer is made $500,000 as a minimum and $1,000,000 as a maximum. The new fare base is particularly significant in that Cleveland started with a 3-cent rate. The removal of the barrier imposed by the former 6-cent maximum fare indicates the growing appreciation of the need for street railway rates that will permit improvement and extension of service. Thus the working out of the original service-at-cost plan in Cleveland is beginning to establish the proper cost of local transportation.

These and other phases of the matter, notably the occasion for the modification of the plan, were the subject of articles in the JOURNAL for April 3 and May 1. Present interest, however, is more in the probable effect of the changes than in a detailed consideration of them. Briefly, it is expected that the changes will permit the company to push car lines and bus feeders into new, developing territories and enable it to better the service on existing lines. To carry out these plans it is estimated that between $3,000,000 and $5,000,000 will be needed. That is very significant.

Basically the ideas behind the Cleveland grant are sound. That fact led more than a dozen other cities to adopt similar grants, but only in a few cases have these grants stood the test of time, and in at least one of them the case has been hopelessly muddled, principally because of the stupidity of the local governing body. Reference is made to the failure of some of these modified grants to work successfully only to emphasize how difficult is the general adoption of any such plan. That, however, is a subject in itself. Perhaps the most persistent criticism of grants of this kind was the so-called "lack of incentive to economical operation" based on the idea that all economies work to the benefit of the car riders rather than the stockholders. The committee made a special effort to develop information that would prove or disprove this criticism. Evidence was lacking to justify the contention. As the Greater Cleveland Transportation Committee and as economists see it the Tayler grant probably represents the most important step that has ever been taken toward reconciling the demands for adequate transportation service with a natural desire for profits for those who undertake to furnish such service. The two things are difficult to reconcile, but they are not necessarily incompatible.

Appreciation of the Annual Report as Public Relations Material

REPORTS of financial operation for the year 1925 now being received indicate the growth in appreciation of the value of the annual statement as a means toward bettering public relations. Accountants and others might be inclined to say that many of these statements are not all that they purport to be. Certainly some of them leave much to be desired, particularly those of the holding companies in which statements are grouped. But much of the mystery about the items that go to make up these statements is being removed by the tone which such reports as those of the Chicago Rapid Transit Company, the Illinois Power & Light Corporation and the Virginia Electric & Power Company, to mention just a few, have assumed.

Particularly noticeable is the change in form and contents of the Virginia statement. This year's report is not only different in size from the ones rendered in recent years but the method of treatment has been altered radically. True, some of the tables of operating statistics available in previous years are missing, but each of the items in the statement of earnings, the balance sheet and the recapitulation of funded debt is made readily understandable. This does not detract from the value of the report to the man accustomed to reading these documents, but the man in the street no longer has to resort to legerdemain to find out what the figures are all about.

Wider distribution of securities among the public is undoubtedly accountable for this decided change in the aspect of many of these formerly formidable documents,

but whatever the reason, the change is certainly a good one from the standpoint of better public relations. Both the Chicago report and the Illinois report are elegantly illustrated as well as clear and informative. Elegance is a matter of taste. There are certain things, however, which the accountant or the engineer expects to find in every report. He is entitled to be informed within reason. This does not mean that any of the things highly desirable to be there have been omitted from any of the reports which have been mentioned. It merely means that after all an annual report, just like a person, should not become ornate at the possible sacrifice of substance.

Public Utilities Better Understood in Dallas

IT IS with a sense of gratification that the industry reads of the solution of the Dallas franchise situation. The Dallas Railway is allowed to charge a 7-cent fare with a 6-cent token rate. There are two important features involved. The increased fare will of course allow a much-needed increase in revenue, but of greater importance is the fact that the company has been successful in inducing the public of that city to appreciate the value of its local transportation system.

This has not been clear sailing, but is a result of continued effort on the part of the management extending over several years in the rendering of a high-grade service. Since Dallas has continued to grow rapidly for several years, this has not been an easy accomplishment. City growth means new investment for new cars and line extensions, and new money does not flow in channels blocked by strangling limitations of earning capacity.

Texas does not have state public utility regulation, hence the burden falls on the local communities to regulate their own utilities. Often misunderstanding and injustice arise from such conditions because of the relatively less experience of local bodies in handling such matters. The advantages accruing from this decision will be mutual. The city will receive the needed extensions and the company will be in position to finance the necessary funds in a satisfactory manner.

So there is reason for congratulation when a company can successfully come to so satisfactory an agreement as that just reached in Dallas.

Transportation Men Can Help in Solving Street Traffic Problem

COMING into a city of medium size some time ago, one of the passengers on an interurban car had occasion to catch a railroad train with but a limited time to spare. Naturally he asked the interurban conductor if he would be able to make the connection. Imagine his surprise when the conductor advised confidentially that if he wanted to be sure of getting to the station in time to catch his train, he should get off and walk, as that was much the quicker. The conductor's answer seemed all the more surprising because there was no unusual traffic block, but only the normal slow movement on the city thoroughfare.

Sadly enough, the condition illustrated by this experience is not unique. To a great extent it may be duplicated in nearly any large city. It is not confined to the street cars nor to street-car streets. Frequently the best conditions for vehicle operation will be found on streets where car lines operate. In New York, for example, it is well known by experienced vehicle drivers that the best running time, whether in buses or automobiles, may be made on those streets with car lines. Of course, the running time even on those streets is still much slower than is desirable if the traffic of the city is not to be choked.

Herein lies one of the greatest problems confronting the transportation man. The automobile and the truck are here to stay. Let there be no doubt about that. The best thing, then, is to regulate their movements—and even more important, the conditions under which they stand still—so that they will not interfere with common-carrier vehicles. The time is rapidly approaching when parking must be restricted sharply, if not eliminated entirely. Loading of trucks in such manner as to block the thoroughfares must also be prohibited.

In all of this development the transportation operator can play a leading part. He can show the public the need for proper traffic regulation. He can demonstrate that the loss to the community is due to catering to the few who cause the most of the trouble. He can do a large share in molding public opinion so that it will be seen that regulation will help the community more than it helps the transportation company, and that in the end it will mean lower fares and better service if it is made possible to move traffic with dispatch.

Success of Bus and Car Depends on Fitting Them Together

IT IS becoming more evident daily that responsible bus manufacturers who have studied the situation carefully do not advocate the wholesale replacement of electric railway lines with buses. Setting aside all considerations of carrying capacity or street congestion, students of the subject are agreed that such replacement would be a bad thing for the development of the bus itself. Should the new vehicle become burdened with the responsibility of rendering mass transportation service at minimum rates, the possibilities for applying it in the various forms of preferential service for which it is inherently so well adapted would be seriously limited.

But upon railway men lies the responsibility for finding the place of the bus and developing such service in proper relation to rail lines. An important step in this procedure involves developing the railway itself to a modern standard of performance and service. Once the street car is brought up to a state of development that exhausts its possibilities, then the place of the bus will become increasingly clear. Until that is done, there is danger of putting the bus into service for which the car is better adapted, while at the same time possibilities for the bus that offer opportunities for profitable operation will be overlooked.

Replacement of obsolete car equipment with rolling stock that fits modern public demand is an important step in giving the railway a new standing before the public. Notable progress is being made in several instances, but there is room for much more. Results accomplished by many properties that have replaced obsolete cars with modern equipment show that such action is not only desirable but profitable. New cars literally pay for themselves in reduced operating cost and increased riding. The public judges the entire standing of the railway by the appearance of its cars.

When old, dilapidated and awkward-looking equipment is continued in service, the public welcomes the advent of new, shiny-looking buses, even when such service is not justified by the needs of the community. When a railway is stampeded into hasty substitution of buses for cars, the bus as well as the railway suffers in the long run.

There is no stronger argument for relief from franchise burdens and paving costs than a group of spick-and-span new cars. Even a few sample cars to show the public what may be expected under improved conditions has in several notable instances brought enthusiastic co-operation from the public. Relief from paving charges would go a long way toward paying the cost of new cars on many properties.

The future of the local transportation industry depends on fitting the two vehicles together in such a way as to get the best results from each. To enter bus operation in a half-hearted manner under the pressure of public demand is fatal to success. To substitute the bus for a run-down railway property in the hope only of making a losing proposition less costly, is after all only a temporary expedient. The ultimate success of the industry depends on using both vehicles under conditions that will permit each to stand on its own feet financially.

When Club and Courtesy Coalesce

"CLUBBING WITH COURTESY," a philosophy advocated recently by a police chief before a somewhat startled audience, is not a contradiction in terms. Railway men certainly would not have been astounded by it. To them this qualification of courtesy is as essential as cleanliness and efficiency, and very often eclipses the other two in importance. From the time the apprentice becomes part of a railway personnel, up through the various stages of his career, he has heard the doctrine of civility preached persistently and consistently to every man in the organization; he has often been an eyewitness to the good results of a "soft answer turneth away wrath" and occasionally a beneficiary in dollars and cents of his own acceptance of this cabala. To club with courtesy is somewhat difficult, but not so difficult as courteously and almost simultaneously to collect fares, issue transfers, answer foolish questions, aid an elderly lady off the car and a crippled customer on, announce the stops, ask the seemingly stubborn crowd to "move up, please," pacify the irascible and smile all the time. It would appear that the conductor returns clubbing with courtesy.

One wonders if he doesn't now and then give vent to his discouragement when he sees that the desire to please isn't so contagious as the good book would have him believe. However, for the many times he thinks his courteous consideration has passed unnoticed there is always the one outstanding incident when he sees in the agitated passenger an excess of sanity over shrewishness, and it is to such an employee's credit that the beginning of a new friendship is directly ascribable.

No railway property is operating today without its ideals of civility as well as those of service and safety, and no new year is greeted by a utility management without the hope that "it can be made a banner one for civility." With this purpose in view it broadcasts courtesy from its house organs and its cars, encourages essays on "the most courteous act," and offers extra rewards for the 100-per-center in politeness.

Beneath the surface of this commander's "clubbing with courtesy" idea lies a thought of more intrinsic value than subsequent humorous comments would lead us to believe. "Club" and "courtesy" are not diametrically opposed. Clubbing is merely an extreme case of chastement or coercion, which has always synchronized with courtesy when deft handling was coupled with a worthy intention. "Clubbing with courtesy" is not incongruous. It only seems so. Somehow, this politeness paradox must be recognized.

No Parking in This Block

"MAIN STREET" of the average so-called single-industry town forms a "bottleneck" which can boast of rush-hour traffic congestion approaching metropolitan city conditions. Tourist travel helps to aggravate the difficulty. This precious stretch of highway was due for a repaving in a certain city, and the people painfully looked forward to "when Main Street gets torn up." But their troubles never happened. When the railway began its work it relaid both tracks and paved its part of the street without hindering its service. But that wasn't all. A sign was placed at each end of the block bidding automobiles not to park. Then a surprising thing was discovered. The railway tracks were necessarily exclusively available to the street cars, and the rest of the street was kept open for the traffic that wanted to move. Night-time conditions lasted all day long. The efficiency of this block hadn't been so high in years.

There was a demonstration here of the effect of a day-after-day line of parked automobiles in reducing the capacity—no, the output—of a city street. In addition to the paving burden carried by many properties there has come the parking evil; one cutting down net earnings, the other keeping down gross revenue. Both crept into existence as a sort of by-product of changing conditions.

Automobile parking as a hindrance to the improvement of necessary car schedules has become a condition that limits the performance of the average city railway. The industry is beginning to take up the subject seriously, as evidenced by the prominent place given to it on a recent convention program. Several companies now provide "uptown" parking areas to reduce travel by automobile in the congested districts, thus literally co-ordinating the private automobile with their railway service. This is real progress. That electric railways may capitalize even the "ugliness of parked automobiles in city streets" has also been suggested. Merchants are finding by actual investigations that the number of their buying customers is not dependent on the number of automobiles parked near by; that their store business is not necessarily in proportion to their street congestion. This is encouraging.

Will Rogers has aptly visualized the parking problem of the automobile owner in a word picture of the business man who, after looking a couple of hours for a place to park and having found one, walked past his own home on his way downtown. This "philosopher in cap and bells" can find food for thought in the paradox of parking idle automobiles on the most used space in a city space that is dedicated to the public good and set apart for the business of transportation. So can electric railway operators. So can city officials.

Atlanta Successfully Solving Its Local Transportation Problems

The Company's Contribution Is Improved Service Through Modern Cars and Buses—The City Eliminated Jitneys and Has Approved Request for Fewer Stops—By This Co-operation Atlanta Is Entering a New Transportation Era

ELECTRIC railway history has been made in Atlanta during the last five years. By a combination of circumstances it has been a city where solutions had to be found for a number of serious local transportation problems. The situation was met in a courageous spirit and with the firm belief that there could be no successful substitute for the electric railway system; hence that its preservation and improvement were as important to the city as to the owners of the property.

Final results are not yet available because the program of rehabilitation is still under way. However, enough has been accomplished to show that while the railway in Atlanta is not yet on an entirely self-supporting basis, it is serving the public of that city far more efficaciously and efficiently than it has for many years. Particularly gratifying have been the results obtained by the change from old to modern cars. Atlanta will always be handicapped to some extent in its transportation by its irregular topography and the narrowness of many of the principal downtown streets, but great advances have been made toward better local service during the past two years, and others are under way.

Alanta Also Has a Flatiron Building. It Is at the Corner of Broad and Peachtree Streets

The improvements outlined were initiated none too soon for the needs of the city. Atlanta is growing rapidly and next to New Orleans is the largest city in the states which lie south of the southern boundaries of Virginia, Kentucky and Missouri. The population of Atlanta in 1910 was 154,836, and in 1920 it was 200,616. Within the 7-mile zone the population in 1920 was 228,762.

As with other large cities in this country, the electric railway system in Atlanta suffered from the high cost of labor and materials during the war. The financial results in 1920 and 1921 were fairly good, but earnings began to fall off in 1922 until the net in 1924 was less than 77 per cent of that in 1921. All through this period the railway company was alive to the difficulties it was facing, and tried whatever means it could to help the situation. A fare change from 5 cents to 6 cents in April, 1919, and from 6 cents to 7 cents in October, 1920, failed to give relief. The company decided that to begin litigation for a fare high enough to pay an equitable return would injure its public relations and do more damage than good. Instead, it decided upon a course of informing the public of what was causing the financial difficulty, hoping in this way to reach a more desirable solution.

Negotiations with City

Among the first steps in this program of informing the public was a petition presented by the company and filed with the Mayor and General Council of the city on May 11, 1923. In this petition the company specifically stated that it attributed its poor financial condition to the fact that automobiles had taken part of the natural growth of the street railway business, that unregulated jitney competition had been making a heavy inroad on the company's revenue, and that intolerable conditions and poor methods of controlling street traffic and unlimited parking were causing the railway considerable expense because of the delays in operating cars. In addition to these handicaps the greatly increased cost of materials and labor caused operating expenses to rise from a fraction over 50 per cent of the gross revenue in 1909 to 72 per cent of the gross revenue in 1922.

At that time the company stated there was a great need for improvement to the street railway system; new track and new cars were required, and the addition of a high-class bus transportation system would be necessary to supplement the street railway. But the company declared it would be unable to effect these improvements which were necessary to keep pace with the city's growth unless it had a reasonable opportunity to earn a fair return.

This petition was followed by another one on Dec. 1, 1923, when the company suggested the definite remedies which are outlined below:

1. Complete elimination of jitneys from streets upon which street cars are operated.

2. Renewed and effective enforcement of regulation of street traffic.

3. A 10-cent cash fare on street cars; tickets to be sold at the existing rate of 6⅔ cents. In other words, car riders who bought tickets would pay no increase in fare.

4. A 2-cent charge for transfers.

5. Reasonable revision in the operating routes of the cars in the interest of more efficient operation.

6. Elimination of unnecessary car stops to effect quicker street railway service.

7. Relief to the extent necessary from paving charges and gross receipts taxes.

This petition also said that "the above changes, only to the extent necessary, are asked for the purpose of putting and keeping the street railroad on a living basis in the interest of the public and as a simple act of justice to the owners who built and paid for the system."

This petition was followed by a series of public meetings in which representative citizens expressed their views and offered definite suggestions for a means of settling this difficulty. It was finally decided that the most satisfactory solution would be to have an impartial investigation made of the entire local transportation situation by disinterested, outside experts of national reputation. The company agreed to pay the expense of such a survey of the city. The city of Atlanta, through its special traction committee, selected the Beeler Organization of New York for this work. This organization began work in the latter part of February, 1924, and submitted its report to the City Council on Dec. 16 of the same year. Abstracts of this report were published in the issues of this paper for Jan. 10, Jan. 24, and Jan. 31, 1925.

This report was accepted by both city and company as a basis for the important changes which have followed. The example thus set of teamwork in behalf of better transportation conditions and service is a notable one. Specifically, the greater part of the recommendations in this report have been carried out, or will be shortly. Thus, part of the rerouting proposed has to await the construction by the city of certain new viaducts. Authority for wider spacing of car stops to an average of about six per mile in the outskirts of the city and eight in the central district has been approved by the City Council, but must still receive the sanction of the Public Service Commission. The Mayor of Atlanta has recently appointed a committee to consider the following requests of the company: The elimination of paving charges; a reduction in the gross receipts tax, and a change in fares from the present 7-cent cash fare with three tickets for 20 cents to a proposed 10-cent cash fare with three tickets for 20 cents, and if this is not enough, an increase in the ticket rate to three for 25 cents.

A Great Many of the Streets in Downtown Atlanta Are Narrow and Lined with Tall Buildings

Principal Changes Made

Briefly, the principal improvements made in whole or in part during the past two years to improve transportation conditions in Atlanta may be enumerated as follows:

1. Elimination of jitneys.

2. Purchase of a number of modern double-truck, one-man cars for city service and improved rolling stock on the interurban lines.

3. Addition of a fleet of motor buses which are used in co-ordinated service with the trolleys.

4. Construction of island platforms at a number of points in the center of the city.

5. Correction of an anomalous fare situation on two suburban lines, due to the fact that because of an ancient franchise the through fare has been 5 cents, or less than the local city fare in Atlanta.

6. Better control of traffic at congested intersections.

7. Rerouting of certain lines to obtain better service and faster and more economical operation.

8. Elimination of a few parallel lines.

An effort will be made in this issue to cover all the points mentioned above with the exception of that of improved rolling stock. That story is so important and carries so many suggestions to other companies that it will be made the subject of a separate article. In a later issue, also, an account will be given of some very interesting features of transportation practice of the company, as carried out under the direction of William M. Casey, superintendent of transportation.

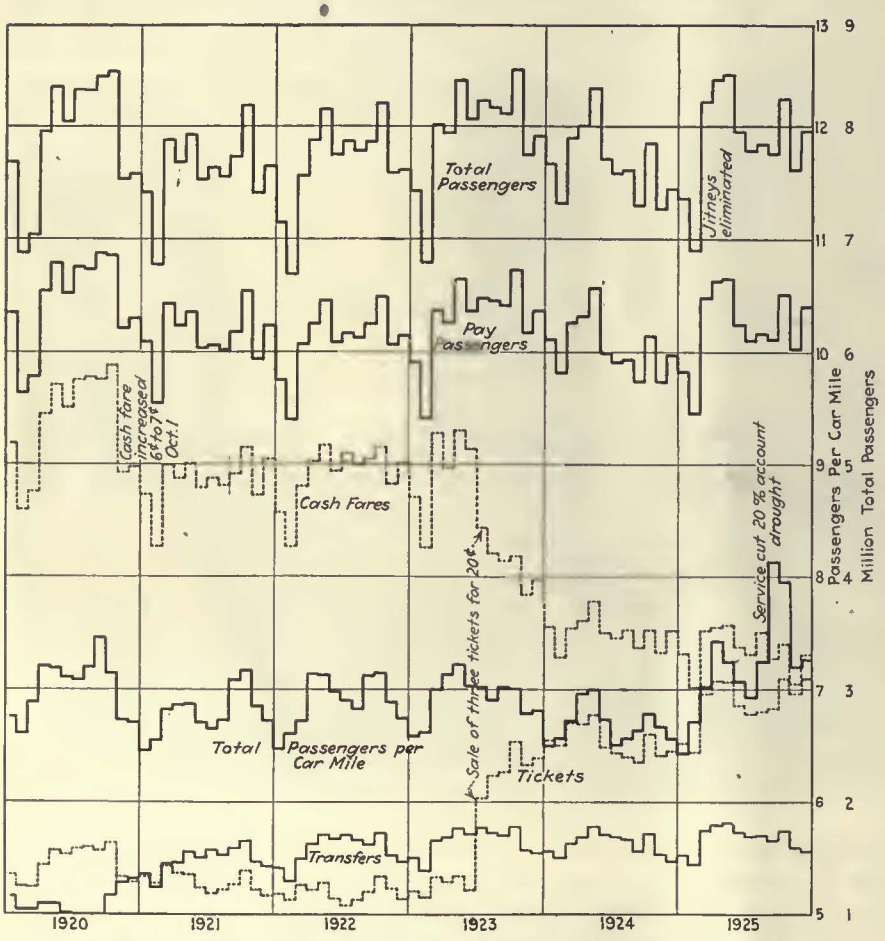


Chart Showing Classification of Passengers and Passengers per Car-Mile per Month for Last Five Years

Prior to April 14, 1919, the fare in Atlanta was 5 cents. On this date it was increased to 6 cents. On Oct. 1, 1920, it was increased to 7 cents cash, with fifteen tickets for one dollar. On July 1, 1923, the ticket rate was changed to three for 20 cents. These city rates do not apply on certain suburban lines where an extra charge is made or on two others where a low rate had to remain because of an old agreement.

Elimination of Jitneys

One of the first steps in the improvement of Atlanta's transportation was the abolition of the jitneys. This was accomplished very simply by a vote of the City Council not to renew any jitney licenses when they expired on March 1, 1925. It is estimated that during 1924 from 6 to 9 per cent of the total revenue passengers carried in the city traveled by jitneys and that their passenger revenue for that year was about $500,000. In practically every case these lines were competing directly with the street railway lines.

It was found that in most cases the railway service was sufficient to handle the jitney patrons and that they could be cared for with very little increase in car service. In return for the elimination of the jitneys the company agreed to put in several bus lines, as will be mentioned later in this article.

The elimination of the jitneys was followed by an increase in traffic on the car lines as shown by the gain in passengers carried from an average of about 7,670,000 per month in 1924 to an average of about 7,880,000 in 1925 and also by the much better form of the passenger line during the latter part of 1925, as given in the accompanying chart. There was also a great improvement in traffic conditions on the streets in Atlanta, as the jitneys paid very little attention to traffic regulations, and while they were on the streets were a continuous menace to the safety of persons walking or riding in other vehicles. There have been fewer street accidents and less street congestion in Atlanta.

Parking and Traffic Regulations at Crossings

Most of the streets in the downtown district of Atlanta are so narrow that the regulation of parking is an important matter. At present there are very few parking restrictions in the city. Where parking is not permitted the curbs are painted red, but this color will be changed to yellow so as to be more conspicuous. In an effort to improve conditions the Safety Council of Atlanta, with an associated committee of the national engineering associations, is making a study of the whole subject of street regulation and parking. The department stores have been asked by this joint committee to find out how many customers come to their stores. The City Council is considering prohibiting parking on one side of two main north and south and of two main east and west thoroughfares.

Traffic at the most congested crossings is now controlled by traffic signals which work synchronously, but their net result has been to slow down traffic. The average speed of the electric railway cars in the central business district is slightly under 5 m.p.h., whereas with traffic control under individual traffic officers, the average running time was 6.7 m.p.h. The period of the synchronous signals originally was 55 seconds for the main streets and 50 seconds for the side streets, with a four-second interval. This produced such a great slowing up of traffic that these times were cut to 30 seconds and 25 seconds respectively with a four-second interval. This shortening of the time interval

has improved conditions somewhat, but the passage of a car through the central business district still takes 25 per cent more time than before the synchronized system was introduced. A study is now being made of the co-ordinated system of crossing signals used in Chicago.

The construction of island platforms has helped the loading problem in the center of the city and has also undoubtedly helped to speed up vehicular traffic as there is now less interference between pedestrians and vehicles. Six of these island platforms have already been built at important loading points and the company has an application for permission to construct three more.

Twenty-five Buses Now in Operation

The Georgia Railway & Power Company now has 25 buses, the latest purchased being Fageol gas-electric, with longitudinal seats on the upper deck. This upper deck is covered by an adjustable awning.

The first bus line to be operated by the company

Gas-Electric Double-Deck Buses at a 10-Cent Fare Have Been Added to Supplement the Car Service

was one already in service, serving a real estate development. At the time the City Council decided to abolish jitneys the company agreed to take over these buses from the real estate company and continue to operate them. These buses, which are Mason Road Kings, do not run to the center of the city but are used as feeders to the car lines. They operate from the terminus of the car lines through the real estate developments. On these a 5-cent fare is charged where a transfer to the street railway is not wanted, but a 10-cent fare is charged when a transfer ticket is requested. This transfer ticket is accepted as cash fare and transfers to other lines are given on its presentation.

The gas-electric coaches operate to the center of the city and on these a straight 10-cent fare is charged with no transfers. The seating capacity of these buses is 60 passengers, 21 on the upper deck and 29 downstairs. The bodies are painted an attractive shade of red with cream from the middle upward. The seats on the lower deck are of leather upholstery.

Six-cylinder Hall-Scott engines are used, connecting with G. E. generator and exciter units. The driving equipment consists of two G. E. motors mounted on the chassis. The transmission in the rear consists of two underslung worm drives, and no differential is used. The controller has five points: Reverse, neutral, series, parallel, and regenerative braking. In addition, all coaches are equipped with Westinghouse air brakes, pneumatic door engines and all other modern safety features.

Air pressure is obtained by a special compressor pump geared to the engine and connected to two service reservoirs and is transmitted to the rear wheelbrake drums through two diaphragms supported on the rear axle housing and connected to the operating levers. Soft steel shoes expand on application of the air pressure against the inner side of the brake drum. The emergency brake, which is operated by hand, uses the same brake shoes and brake drums as the air system.

One-man operation is used on the buses, and all passengers enter at the front door. Both front and rear doors are used as exits, and both are operated from the driver's seat, though the rear door also can be operated from that end of the bus. The stairs leading to the upper deck are inclosed and passengers for both decks enter through the front door.

Operators for the buses were selected from street car trainmen of good record and long experience. They are paid 5 cents per hour more than the street car trainmen and are instructed in their duties at a special school conducted under the direction of the superintendent of employment and instruction.

The rule is followed of "a seat for every fare," and no standing is permitted on either deck under any conditions. The buses do not stop after the seating capacity is filled except to discharge passengers. Smoking is permitted on the upper deck. Because of climatic conditions in Atlanta, comfortable riding on the upper deck may be expected for eleven months of the year.

All of the buses are operated by the Atlanta Coach Company, a subsidiary of the Georgia Railway & Power Company, which is planning to build a garage to house 30 buses at a cost of about $55,000.

Forward-Looking Policy Justified by Results

It is satisfactory to be able to report that the liberal forward-looking policy followed by the company is showing results in greater revenue and lower operating costs. With the other improvements proposed it is expected that the railway, while not a bonanza, will pay a reasonable return on the investment.

The revenue during the last six months has shown an average increase of about 10 per cent.

The principal reductions in operating expenses have

come from (1) rerouting, (2) use of modern cars, (3) improved schedules and (4) Economy meters.

All of the proposed rerouting, as explained, has not yet been put in force, because much of it has had to await the completion of two viaducts to be built across the railroad cut which divides downtown Atlanta. Nevertheless, some rerouting had been carried out and some trackage has thereby been made unnecessary and so has been taken up. It is estimated by the company that the rerouting already adopted has effected an annual saving of 627,706 car-miles. This, at 26 cents a car-mile, amounts to $173,203.

The saving from the company's recent one-man cars will be discussed more fully in a later article on this subject. It is sufficient here to say that the total savings from the 60 new cars ordered, in lower maintenance, power and transportation expenses, together with that gained through their larger capacity, increased speeds and reduced accidents, is estimated to be yearly $210,142. This represents about 25 per cent of the cost of the cars.

The gain from improved schedules comes principally from higher speed and better car loading during the non-rush hours. The latter point is illustrated by the very marked improvement in the "passengers per car-mile" line in the chart on page 794, although much of this improvement can also be attributed to the larger cars now used. Perhaps the best way of illustrating the gain made is to cite the greater expense which would have resulted with the same traffic if the conditions of earlier years had prevailed. Thus, if the 1925 passengers had been hauled under average 1923 carload conditions, 140,000 additional car-hours would have been required, which at 1925 platform expenses would have amounted to $152,000. In this comparison, 1923 is taken instead of 1924, since the conditions of 1924 were unusual because of jitney competition. Again, if the 1925 passengers had been hauled under 1923 speed conditions, 80,600 additional car-hours would have been required, amounting at 1925 costs to $86,700. This gain was not all net, as part of it came from larger cars and part of it from higher speeds, the cost of both of which should be deducted from the gross gain mentioned to secure the net gain. Thus, the better loading on larger cars, it is estimated, cost $33,000, whereas the net gain would be shown by the deduction of this figure from the gross gain or $152,000, making the net gain $119,000. In the same way, the increase in speed cost $39,000, which, deducted from the gross gain $86,700, gives a net gain of $42,700.

It is too early yet to state the exact benefit to be expected from the use of Economy meters, with which all of the double-truck cars are equipped. During the first month a saving of about 7 per cent was obtained. This corresponds to somewhat more than $40,000 a year. As the instruction of the platform men progresses, this gain should increase.

GAINS IN FUTURE CHANGES

Other gains hoped for by the company to place the railway on a self-supporting basis are elimination of paving charges, a reduction in the gross receipts tax, and an increase in fares. The new schedule of fares requested by the company, as explained, is an increase of the cash fare from 7 cents to 10 cents plus an increase of the ticket rate from three for 20 cents to three for 25 cents if necessary.

The city has no control over the fares on the two suburban lines mentioned. Up to within a few months these lines presented the anomaly of charging a fare of only 5 cents, or 2 cents less than that on the local city lines. The public service commission was powerless to correct this situation and the courts refused to do so because of a clause contained in an old franchise.

About six months ago the company was able to effect an arrangement with the authorities of the principal city on one of these suburban lines, College Park, by which an increase in fare to 7 cents was obtained. It is hoped that the public in Decatur, the principal city on

In Cold Weather Awnings Are Not Used on the Upper Deck

the other suburban line, will realize, as have the people in Atlanta, that their true interests lie in allowing the railway serving their community to have a living fare.

PUBLIC INDORSES COMPANY'S POLICY

It is generally difficult actually to appraise the real sentiment of the public in regard to policies followed by a public service corporation. Of course, it is usually easy to sense general approval of markedly conspicuous improvements like the addition of new, well-furnished cars. But conditions differ when the addition of new cars is accompanied with increase in fare, change from two-man to one-man operation, elimination of jitneys, requests for skip-stop service, still higher fares, relief from paving charges and other changes which really mean better service to the public, but whose immediate public benefit is not quite so apparent as the new cars. However, in Atlanta there is striking evidence that the public of Atlanta stands back of and indorses the efforts of the Georgia Railway & Power Company to rehabilitate its city system and put it on a paying basis. This is shown in many ways, but perhaps no more significantly than by the following incident:

Last year the *Georgian-American*, one of the Hearst chain of newspapers, announced it would present a cup to "Atlanta's most valuable citizen," and the responsible duty of selection was assigned to representatives of the city's leading civic organizations and of the city and county governments. This committee, after an exhaustive consideration of the subject, awarded the cup to H. M. Atkinson, chairman of the board of the Georgia Railway & Power Company, for the reason that: "He did more during the year in establishing a new industrial era in the region of which Atlanta is the center; more in promoting a higher standard and happier conditions of living, and was more directly responsible for Atlanta's steady growth, through the creation and operation of one of the greatest transportation systems in the country, than any other single agency."

In its report the committee cited, among other improvements made during the year by the Georgia Railway & Power Company, that it had purchased 60 new street cars of the most modern type, had established motor bus lines, operating fifteen new modern double-deck motor coaches, and had greatly improved practically all existing street railway lines.

There is no doubt that the chief officer of the local railway system often is a city's most valuable citizen. But it is none the less satisfactory to have this fact recognized during the lifetime of that citizen and that it should receive such general approval, as was the case in Atlanta.

New Uniforms for Trainmen a Cleveland Innovation

RALPH W. EMERSON, general manager of the Cleveland Railway, saw no reason why new uniforms should be adopted only when the type of vehicle should be changed. Besides, he never could understand why blue, one of the hardest colors to keep clean, should have been adopted in the first place.

For this reason he experimented with several types of uniforms, had samples of each made up, dressed up a few conductors and motormen in the different sample suits and sent them around to the various stations so that the trainmen might vote on the types they preferred. Decision was made, after this vote, for the same general design or cut, made up, however, from gray whipcord cloth, with nickel buttons.

The company has arranged to have these suits made by one manufacturer and sold by one retailer. The uniforms will be adopted gradually as the trainmen require new suits. On each new uniform the company absorbs a certain portion of the cost of the uniform, and also gives the trainman a new cap, reducing the cost of the new outfit to the trainmen to about $25.

To help in the maintenance of the uniform in a neat and tidy manner, the company has installed two tailoring shops, one at the Superior station and the other at Dennison. Pressing, mending and repairs of uniforms are done without charge to the trainmen.

Freight Development on Aurora-Elgin Line

Active Solicitation Has Brought Much Local Business —Shipments Are Interchanged with Eight Steam Railroads—L. C. L. Business Increased

DEVELOPMENT of freight business in the last three years on the Chicago, Aurora & Elgin property has been rapid. Freight revenues in the twelve months ended Nov. 30, 1925, were $311,188, as compared with $126,546 in the year ended May 31, 1922, an increase of 146 per cent during a period of approximately three years and six months. Car load freight earnings increased from $71,980 in the twelve months ended May 31, 1922, to $237,204 in the twelve months ended Nov. 30, 1925, an increase of 230 per cent, while less than car load earnings in the same period increased from $54,566 to $73,984, an increase of 36 per cent. This increase in freight revenues is in part accounted for by the rapid growth of the territory, but is largely the result of the intelligent and unremitting work of the management.

In consequence of close co-operation established with the real estate interests and municipal officials the traffic manager of the railroad was notified immediately of any construction work in the territory. When the municipal officials of a town decided to construct a concrete highway, that fact, along with the name of the successful contractor, was communicated to the traffic department, which at once got in touch with the contractor for the purpose of arranging to have all construction material shipped over the Aurora-Elgin. In most cases the municipal officials have been willing to co-operate by indicating to the contractors that they would be glad to have the local line favored. In the same way the real estate interests and suburban developers, before the beginning of each construction season, almost without exception have been willing to advise the traffic manager of the number of houses which they contemplated erecting and the names and addresses of the contractors who would handle the work. These shippers of material have been canvassed to secure the resultant freight business.

With the rapid growth of the suburban communities along the line came coal and lumber yards, builders' supply depots, gasoline distributing stations, etc. The traffic department of the railroad was energetic in calling attention to the possibilities for the establishment of such enterprises and in arranging to have them located adjacent to the Aurora-Elgin line. In many

cases this was done upon land owned by the company, which was leased at a rental rendering a reasonable return upon the value of the property and usually with stipulations in the lease requiring the lessee to ship all or a stipulated proportion of his freight over the electric railroad. From time to time the railroad has built temporary sidings and team tracks for the purpose of accommodating road contractors or others having occasion for a limited period of time to ship a large amount of freight to some particular point.

The Elgin branch of the company's system runs through a country underlaid in large part with gravel. Prior to the organization of the present company several gravel companies had established plants on this branch. A substantial part of the increase in car load earnings has been the result of the activities of the traffic department in co-operating with these gravel companies in the extension of their sales as well as in fostering the establishment of other gravel enterprises upon this branch of the company's system.

Interchange of freight is made between the Chicago, Aurora & Elgin Railroad and the following steam railroads: Baltimore & Ohio, Chicago Great Western, Soo Line, Indiana Harbor Belt, Chicago & Northwestern, Elgin, Joliet & Eastern, Illinois Central and Chicago, Burlington & Quincy. In addition the company interchanges freight with the Elgin & Belvidere (which, in turn, connects with the Rockford & Interurban, making possible a through route from Chicago to Rockford), and with the Aurora, Elgin & Fox River Electric Company. A daily freight service is now operated in both directions between Rockford and Chicago.

The company is a member of the Central Freight Association, having the same status therein as the other railroads operating in the same territory. Joint tariffs are in effect covering practically every class of commodity moving in this territory. Through these interchange connections the Aurora-Elgin has been able to build up a profitable business as a terminal road in distributing car load freight to the various communities which it serves.

The following figures show the make-up of the more important classes of car load business and the growth in the revenues during less than three years time:

	Year 1922	Twelve Months Ended Sept. 30, 1925	Per Cent Increase
Coal	$14,849.18	$19,617.17	32
Gasoline	12,672.12	19,553.30	54
Coke	836.24	4,045.21	384
Crushed stone	5,527.57	10,419.55	89
Cinders	8,981.30	14,280.08	59
Sand and gravel	32,172.45	143,099.89	345
Cement	177.25	5,289.96	2884
Lumber	132.87	979.41	637

The growth in the volume of car load freight has required the expansion of the interchange facilities with practically every steam railroad with which connections are made and the enlargement of practically every team track siding in the suburban belt. All of the interchange business is handled in standard steam railroad equipment, which is rented on a per diem basis. A large part of the company's local business is also handled in steam railroad equipment, similarly leased. The growth in car load business has been particularly gratifying to the company because it is more profitable than the average run of l.c.l. business. Car load freight is handled entirely by electric locomotives. Less car load freight is handled principally by motor express cars.

In 1924 an arrangement was effected with the Chicago Tunnel Company under which the facilities of this underground system of freight delivery to a large part of the wholesale and retail district in Chicago was made available for the use of Aurora-Elgin shippers. The advantages to department stores, retail establishments, wholesale houses, etc., in shipping freight to points in the Aurora-Elgin territory over the Tunnel route and thence over the Aurora-Elgin—particularly the advantage of over-night delivery as compared with the slow movement of freight by the steam railroads—was called to the attention of shippers by personal letters, printed literature and personal canvasses by representatives of the traffic department. The volume of business handled in this manner is growing. The company is gratified at the progress which it has made in the development of l.c.l. business in the face of the rapid expansion in the network of improved roads throughout the territory which it serves and the growing use of private motor trucks in door-to-door deliveries.

For the purpose of taking care of the rapidly expanding l.c.l. business, new freight stations have been erected in Aurora and Elgin and the existing freight stations at a number of other points have been enlarged. The rapid growth in business has since required the enlargement of the Aurora station and the installation of an additional team track. In connection therewith and as a means of improving the passenger service out of Aurora, the company purchased a substantial area of land lying between the Fox River and North Broadway and relocated its line upon private right-of-way, taking approximately ½ mile of track out of the street. This materially reduced the liability to accidents through collisions with vehicles and increased to some extent the ability to make fast schedules, while giving additional space for the enlargement of freight facilties and taking care of future requirements with respect thereto.

New Passenger Stations for North Shore Road

TWO new passenger stations are planned for the Chicago, North Shore & Milwaukee Railroad, one at Mundelein and the second at Winnetka.

The Mundelein station will conform with the standard design recently adopted for North Shore Line stations, green tile roof, tapestry brick, white stone trimming, combining beauty of design with permanency of construction and providing every modern convenience for the public.

The Winnetka station, work on the foundation of which has already begun, will be at one of the most important business locations and will be built flush with the street on two sides and the track on a third. Because of the dimensions of the lot it will not be rectangular, but will conform in other details with the other stations.

Cement platforms to accommodate longer trains have already been completed at the Winnetka station site. These new platforms will also eliminate the blocking of the principal street of the village by trains stopping at the station.

The interior walls of the stations are to be of the same materials as the exterior, with terrazzo marble floors and green marble borders and base. The interior woodwork will be of forest green oak and the decorations light in color to provide maximum reflected light.

The Mundelein station will cost approximately $50,000. It will be ready for business by June 1, 1926.

Energy Saving Campaign Nets $110,000 in Seven Years

Seattle Municipal Street Railway Has Reduced Energy Consumption from 4.48 Kilowatt-Hours per Car-Mile to 3.62—Charts Showing Records of Individual Motormen Are Used to Good Effect—The Clerical Work Is Not Burdensome

By S. E. Goodwin
Supervisor of Power Seattle Municipal Street Railway

IMMEDIATELY after the acquisition by the city of the street railway lines in Seattle in April, 1919, it was decided to equip 380 cars with Economy meters and institute an energy-saving campaign. During the time meters were being installed two instructors, picked from the ranks, were sent out to ride with the motormen and point out the habits and practices through which energy was being wasted and to demonstrate methods of saving it. The men were shown by stopwatch tests over measured track lengths that by proper acceleration and braking a car can be allowed to coast a large portion of the distance and arrive at the starting point in as short a time as if full power had been kept on up to a point where it was necessary to make an application of the air brakes.

Diagrams were posted at the carhouses showing two methods of bringing a car to a stop. In one the motorman keeps his controller in the full multiple position almost to the stop, then throws power off and immediately applies the air, often stopping too suddenly for the comfort of his passengers. This is one of the most wasteful practices that has been observed in street railway operation.

The other method is to accelerate quickly, throw off the power after the car has attained proper speed and then coast down to a low speed from which a stop can be made quickly by application of the air. This not only saves energy but reduces wear on brake shoes without loss of time.

Bulletins are posted from time to time directing special attention to coasting wherever possible, proper feeding of controller, correct manner of braking, explanation of electrical terms and other matters of energy-saving interest.

Motormen are required to fill out record cards of the type shown in an accompanying illustration. Meter readings at start and finish of run and leaving times at each end of line are recorded on the card. Mileage and kilowatt-hours are then figured and charts made up in the general office and sent out to the various carhouses.

Several methods of notifying motormen of their ratings have been tried, but the one now in use, the colored line method, originally developed in San Diego and used also by the Denver Tramway, has proved most satisfactory. Charts are posted each week show-

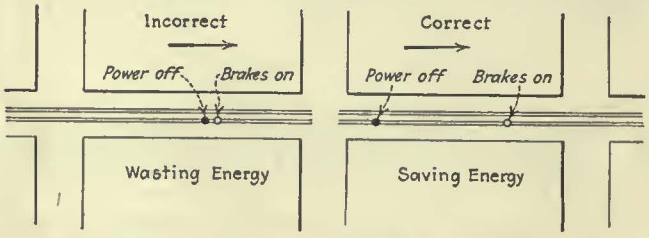
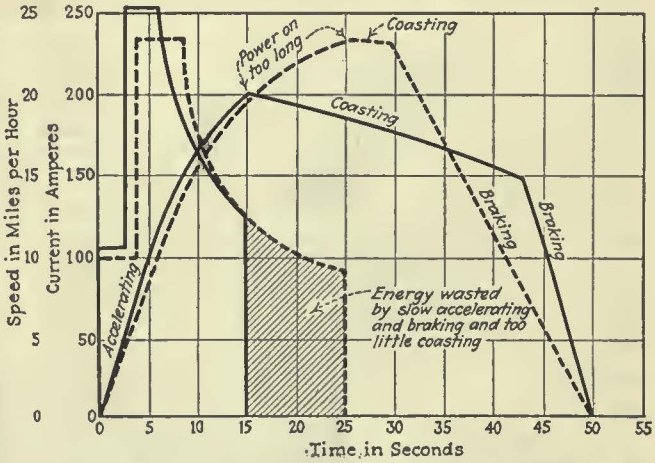


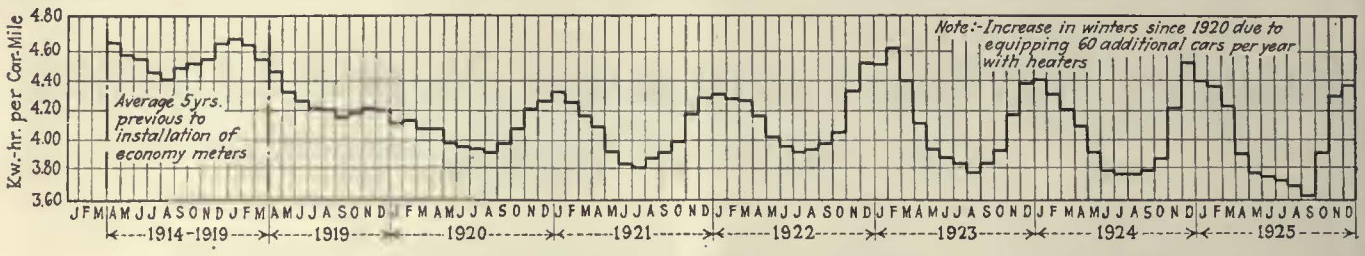
Diagram Posted in Carhouse to Show Motormen Right and Wrong Methods of Stopping Cars



Speed Time Energy Curves Used to Illustrate to Motormen the Principle of Energy Saving Possible with Increased Coasting

RESULTS OF ENERGY-SAVING CAMPAIGN, SEATTLE MUNICIPAL STREET RAILWAY

	Capital Charges			Operating Charges				Saving			
Year	Interest	Depreciation	Total	Instruction and Cash Prizes	Clerical and Stationery	Maintenance	Total	Kilowatt-Hours per Car-Mile	Miles	Gross Saving	Net Saving
1919	$ 428	$1,083	$1,511	$3,145	$4,350	$1,095	$8,590	0.096	11,774,219	$11,303	$1,202
1920	1,083	1,444	2,527	1,785	5,334	1,572	8,691	0.261	15,231,039	39,753	28,535
1921	1,083	1,444	2,527	.....	4,062	1,690	5,752	0.211	14,788,174	31,203	22,924
1922	1,083	1,444	2,527	.....	3,520	1,610	5,130	0.082	14,761,383	12,104	4,447
1923	1,083	1,444	2,527	.....	3,560	1,650	5,210	0.103	15,412,447	15,875	8,138
1924	1,083	1,444	2,527	.....	3,680	1,690	5,370	0.149	15,383,290	22,921	15,024
1925	1,083	1,444	2,527	.....	3,550	1,725	5,375	0.247	15,294,249	37,777	29,875
Total	....	.....	$16,673	.....	$28,060	$11,032	$44,118	.....	.....	.....	$110,145
Per meter			$43.87	.....	$73.84	$29.03	$116.10	.....	.....	.....	$290
Per meter per year			$6.49	$1.98	$10.93	$4.30	$17.20	.....	.....	.....	$43



Energy Consumption at Switchboard 1914-1925

ing individual records on three or four lines, the period between postings of the same line averaging six weeks. A typical chart is reproduced herewith. Heavy vertical lines represent the average energy per car-mile at the car and the individual records are shown by horizontal shafts, blue areas to the left indicating energy saved and red areas to the right showing energy wasted. The purpose of the chart is to make the men whose records appear on the right of the average line improve their work. Those whose records indicate wasteful use of energy are given special instruction. There are three groupings for each line, day runs, swing runs and trippers and night runs. When two or more types of cars are used on the same line the individual kilowatt-hours are adjusted to correspond to the energy consumption of a standard type.

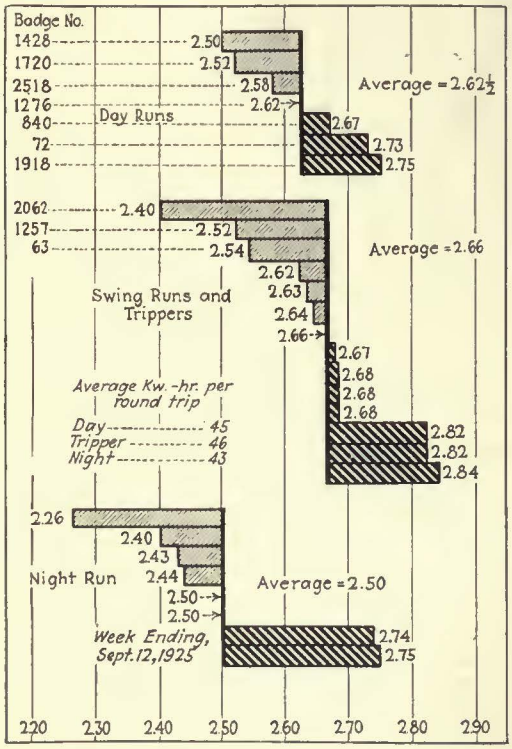
Substantial Savings Effected

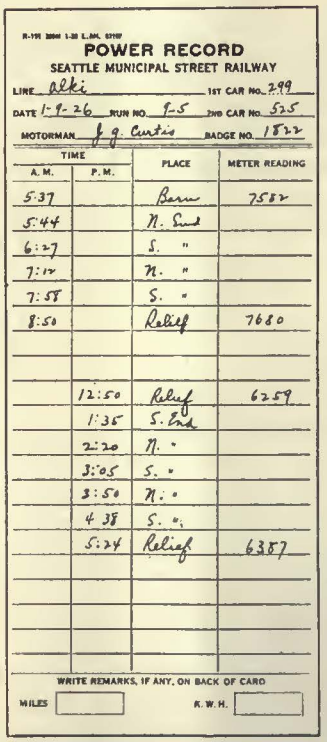
Yearly savings are calculated on the average of two years immediately preceding the start of the energy saving campaign. This base is 4.316 kilowatt-hours per car-mile at the switchobard. This is lower than the five-year average because of certain abnormal years prior to 1917. Due to a decrease in passengers per car-mile since 1919, a normal decrease in energy consumption has followed and a compensating factor has been allowed. An adjustment has also been made because of the electric heaters added to 60 cars in 1920.

A graphical record of kilowatt-hour consumption per car-mile for each month since April 1, 1919, as compared with the average five years previous to the city's taking over the lines is presented on this page. It will be noticed that despite the extra heating each winter during the past five years the peaks are not as high as that of the 1915 to 1919 average and the valleys show a steady decline. In September, 1925, the consumption per car-mile was 3.62, as against 4.48 the average September consumption for the five years previous to installing Economy meters.

Yearly savings in dollars and cumulative savings are shown in other charts. These show an average yearly saving of more than $16,000 for the seven-year period 1919-1925 inclusive and a cumulative saving of approximately $110,000.

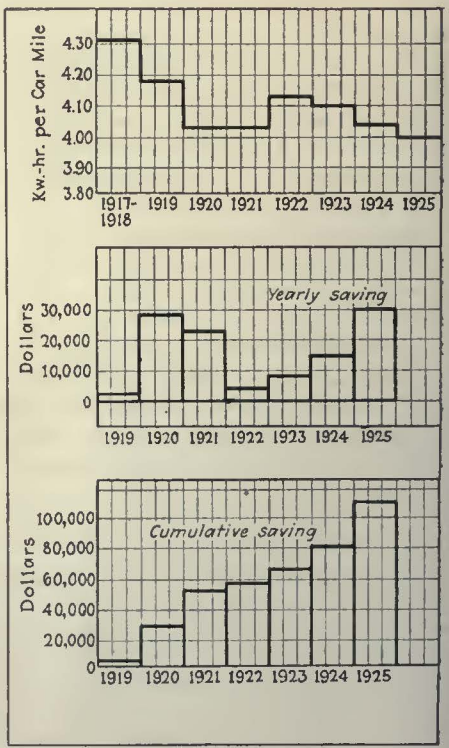
Since the adoption three months ago of the colored line method of advising motormen of their individual records, the results accomplished in energy saving have been particularly encouraging. Moreover, the superintendence overhead is small. Since 1920 the office force has consisted of a supervisor of power and two assistants, whose duties, other than energy saving, occupy about half of their time.




POWER RECORD
SEATTLE MUNICIPAL STREET RAILWAY
LINE Alki 1ST CAR NO. 299
DATE 1-9-26 RUN NO. 9-5 2ND CAR NO. 525
MOTORMAN J. G. Curtis BADGE NO. 1822

TIME A.M.	TIME P.M.	PLACE	METER READING
5:37		Barn	7582
5:44		N. End	
6:27		S. "	
7:17		N. "	
7:58		S. "	
8:50		Relief	7680
	12:50	Relief	6259
	1:35	S. End	
	2:20	N. "	
	3:05	S. "	
	3:50	N. "	
	4:38	S. "	
	5:24	Relief	6387

WRITE REMARKS, IF ANY, ON BACK OF CARD
MILES
K.W.H.



At Left, Chart Comparing Individual Energy Consumption Record of Motormen. In Center, Seattle Motormen Are Required to Fill Out Cards Showing Meter Readings at Start and Finish of Run and Leaving Times of Trips. At Right, Reduced Kilowatt-Hour Consumption per Car-Mile Has Resulted in Substantial Savings

Middlesex & Boston Bus at Lexington on the Original Route Running from Concord to Arlington

Bus Service Expanded in Middlesex

Substitution of Buses for Cars on Three Routes by the Middlesex & Boston Street Railway Has Resulted in Increased Riding—Present Operation Is More Regular and More Flexible than that Formerly Given on Single-Track Lines—Equipment Has Been Standardized

COMPLYING with a request made by the cities of Waltham and Newton, the Middlesex & Boston Street Railway, Newtonville, Mass., during the past year has substituted buses in place of cars on three of its lines. Prior to the change on these lines the railway had already undertaken bus operation on two of its routes. Experience obtained during the fifteen months of operation of the first two routes and during the shorter period since the new routes were established indicates that the change will result in improved transportation service and will benefit both the public and the company.

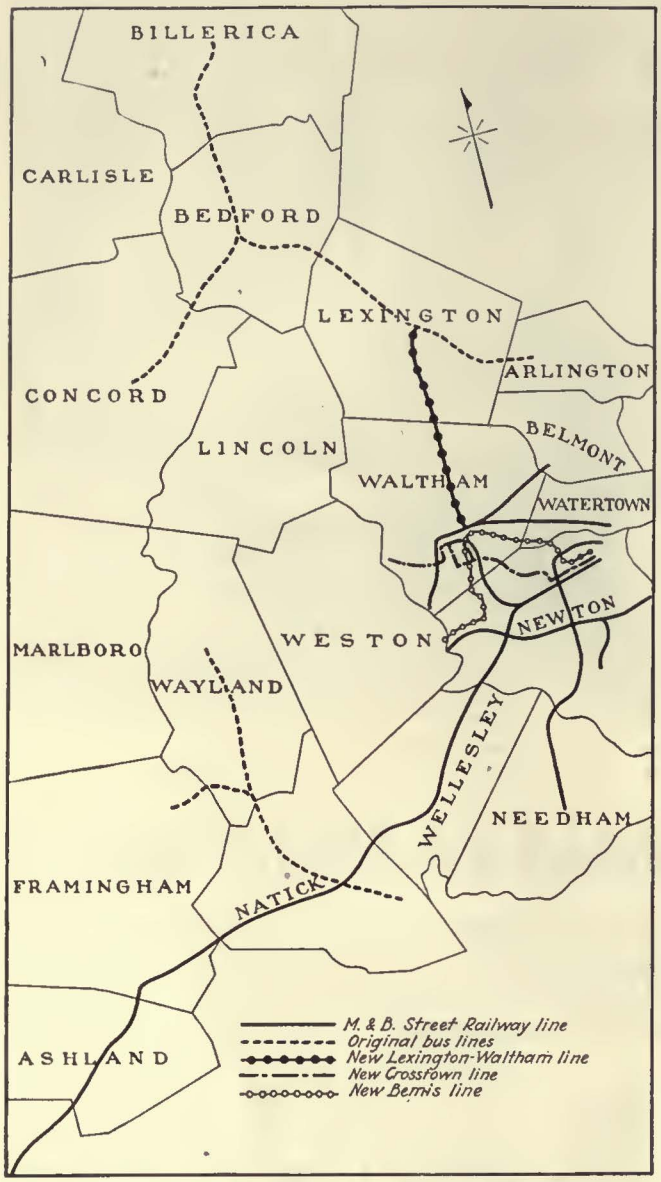
Bus operation was first undertaken by this railway during the latter part of 1924, as told in ELECTRIC RAILWAY JOURNAL for Dec. 6, 1924, p. 955. The original lines were from Concord and Billerica to Arlington along a route 17 miles in length, and from Wayland and Framingham to Natick along a route 10 miles in length. Both of these bus routes replaced single-track car lines.

During the summer of 1925 the company had to suspend car service on the line between Lexington and Waltham due to the construction of a new sewer, necessitating the temporary removal of the railway track from the street. On July 16 the company inaugurated bus service along this route to take the place of the suspended car service. This has proved so satisfactory that bus operation has been continued since the completion of the sewer construction work.

Following the successful establishment of bus service in these instances, the cities of Waltham and Newton suggested to the company that a similar substitution should be made on other lines. A route from Newton Corner to Waltham, known as the Crosstown line, and another from Newton Corner to Auburndale via Waltham, known as the Bemis line, were considered by the management as the logical ones upon which to try the experiment.

Figured Gray Mohair Upholstery Gives a Pleasing Appearance to the Bus Interior

In many respects the bus operation on the three routes described has proved more pleasing to the public than the former car service. Schedule speed is the same as that formerly operated



New Bus Routes Between Newton Corner, Waltham and Auburndale and Between Lexington and Waltham Have Recently Been Established by the Middlesex & Boston Street Railway in Addition to the Original Routes from Concord and Billerica to Arlington, and from Wayland and Framingham to Natick

by the cars, but headways are more regular than it was possible to operate on these long single-track lines. A summary of the routes now operated, with their length, schedule speed and number of buses required, is given in an accompanying table. Plans for changing over other routes from cars to buses during the present year are under consideration by the company.

All bus lines operated by the Middlesex & Boston Street Railway are now carrying more passengers than were carried by the car lines which they have replaced. Fares are the same as the old car fares, 10 cents per zone with free transfers. Substitution was made at the beginning on the basis of one bus for one car, but it has been found necessary to augment the bus service so that on some lines the bus mileage is now approximately 30 per cent greater than the car mileage used to be.

Operating cost has thus far averaged somewhat under 30 cents per bus-mile, with operating revenue slightly in excess of that figure. Depreciation, included in the foregoing cost figures, is calculated on a basis of four years of life for the buses. Each bus averages about 40,000 miles per year, making the total life thus calculated 160,000 miles.

The railway has standardized its bus equipment, using White chassis and Bender bodies. It has ten buses seating 23 passengers, two seating 25, and 22 seating 29, making a total of 34 vehicles. Seventeen of the latest buses are upholstered in gray figured mohair, as shown in an accompanying illustration. A number of other interesting features have been incorporated in the design. Wireglass is used in the rear windows to do away with the need for protecting rods. Cloudy glass is used in the upper window sash. This prevents the sun shining through the windows into the eyes of passengers and renders window curtains unnecessary. Straps for standees, while not included in the original design, have now been installed at the request of the public. The company has also standardized on Seiberling tires.

Buses are housed in three garages, at Waltham, Lexington and Natick. These are parts of the existing carhouses. The old pits have been filled in and concrete flooring laid. Of these the largest, at Waltham, is now housing sixteen buses. The second largest is at Lexington, from which thirteen buses are operated, and the smallest is at Natick with five buses. The amount of service operated varies slightly from time to time, depending on weather conditions, etc., but it is the practice to have nearly all of the buses on the road in the rush hours.

BUS ROUTES OF MIDDLESEX AND BOSTON STREET RAILWAY

Route Between	Date Established	Length, Miles	Speed, M.P.H.	Number of Buses
Concord, Billerica and Arlington...	September, 1924	17	13	10
Wayland, Framingham and Natick.	September, 1924	10	10	5
Lexington and Waltham.....	July 16, 1925	5	13	3
Newton Corner and Waltham.....	January 10, 1926	5	12	9
Newton Corner and Auburndale...	March 14, 1926	7	9½	7
Total.....		44		34

During the severe snow storms of the past winter the buses were able to give somewhat better service than the cars. This was due to a large extent to the harmful effect of automobile traffic packing the snow in the grooves of the rail. Car headways operated by the Middlesex & Boston range from fifteen minutes to one hour. These were found to be insufficient to keep the track clear with snow falling as rapidly as it did during the February storms. This rapid accumulation also resulted in the stalling of snow-fighting equipment in deep cuts along private rights-of-way, thereby increasing the difficulty of keeping open the rail lines.

Snow removal from the streets on which the buses operate is carried out by the cities, towns and the state of Massachusetts. This is done in return for a license fee of $5 per bus seat. Although the first of the severe storms of the past winter caught both the municipal and railway snow-fighting organizations unaware, it was possible by energetic work to keep the bus routes open at all times.

The Chicago Surface Lines are "horseless." The last ten horses have been sold. They were the remnant of a force which has been steadily decreasing for 80 years. In 1893, the year of the Chicago World's Fair, the lines operated with 10,000 horses. In recent years a few have been kept for trucking or for drawing service wagons into the congested loop.

Depreciation an Important Factor in Baltimore Valuation

Cost to Reproduce New Less Depreciation Used as Basis for $77,000,000 Allowed the United Railways & Electric Company by Maryland Commission — Easements Were Included as an Element of Value

CONSIDERABLE attention was paid in the recent valuation of the United Railways & Electric Company of Baltimore to the items of depreciation and easements. In reaching the final figures, as published in this paper for March 13, 1926, page 459, the majority opinion valued the physical property, overheads, working capital and going value at $70,000,000 and the easements at $7,000,000. In the hearing of the case the United Railways claimed a total valuation of $106,641,360, to reproduce new, less depreciation, which included easements. Clarence W. Miles, people's counsel, conceded a value of $60,577,150, which did not include any allowance for easements. Mr. Miles opposed placing any value on the easements. In this Commissioner Harper concurred. The commission, however, received a ruling from the Attorney-General of the state holding that the easements should be included.

The principles on which the company's and the city's cases were based were given in an article by W. H. Maltbie in the issue of Jan. 9, 1926, page 69.

The majority opinion pointed out that in arriving at the figures the commission had considered the cost to reproduce the property new, the amount of depreciation existing in the property, or its per cent condition as of Jan. 1, 1924, original cost so far as that could be determined, and the par and market value of securities outstanding against the property.

The valuation placed on the various items by the people's counsel, the United and the commission are set forth in the majority opinion with an explanation of how each was arrived at. The individual items are given in the accompanying table, which was included as an appendix to the opinion.

In connection with the item of passenger and combination cars the commission said the people's counsel arrived at his cost of reproduction by applying to the

COMPARISON OF ESTIMATES OF PEOPLE'S COUNSEL AND OF RAILWAY COMPANY WITH FINDINGS OF PUBLIC SERVICE COMMISSION OF MARYLAND AS TO COST OF REPRODUCTION, PRESENT CONDITION AND GOING VALUE, BUT WITHOUT EASEMENTS, AS OF DECEMBER 31, 1923, OF THE PROPERTY OF THE UNITED RAILWAYS & ELECTRIC COMPANY OF BALTIMORE

	Account Physical Property	Cost to Reproduce New			Per Cent Condition			Cost to Reproduce New Less Depreciation		
		People's Counsel	Railway	Commission	People's Counsel	Railway	Commission	People's Counsel	Railway	Commission
502	Right-of-way	$167,576	$745,719	$248,573	100	100	100	$167,576	$745,719	$248,573
503	Other land used in electric railway operations	1,336,380	1,850,662	1,748,417	100	100	100	1,336,380	1,850,662	1,748,417
504	Grading	1,836,582	2,239,931	2,210,453	87.2	100	100	1,600,397	2,239,931	2,210,453
505	Ballast	1,752,803	2,093,940	1,967,588	95	84	80	1,665,163	1,758,910	1,574,070
506	Ties	1,292,828	1,537,461	1,435,507	65	84	80	840,338	1,291,467	1,148,406
507	Rails, rail fastenings and joints	3,422,424	4,050,495	3,849,014	72	84	80	2,464,145	3,402,415	3,079,211
508	Special work	2,514,331	2,993,016	2,814,396	67	84	80	1,684,602	2,514,133	2,251,516
510	Track and roadway labor	3,663,490	4,825,215	4,583,955	65	84	80	2,381,269	4,053,181	3,667,164
511	Paving	2,755,465	3,297,811	3,165,038	80	84	80	2,212,372	2,770,161	2,532,030
512	Roadway machinery and tools	119,842	119,842	119,842	70	70	70	83,889	83,889	83,889
515	Bridges, trestles and culverts	1,307,327	1,281,419	1,281,419	80	82	82	1,045,862	1,046,474	1,050,764
516	Crossings, fences and signs	88,983	97,094	88,983	87	89	87	77,415	86,601	77,415
517	Signals and interlocking apparatus	137,579	153,583	145,897	90	98	95	123,821	150,511	138,602
518	Telephone and telegraph lines	289	305	305	90	90	90	260	274	275
519	Poles and fixtures	1,138,441	1,338,820	1,195,363	85	91.5	90	967,675	1,225,020	1,075,827
520	Underground conduits	189,464	219,723	219,723	95	96	95	179,991	210,934	208,737
521	Distribution system	3,256,822	3,852,902	3,549,645	88	89	88	2,866,003	3,449,118	3,123,688
523	Shops and carhouses	4,207,565	4,441,435	4,350,000	71.3	93	87	2,997,029	4,127,027	3,784,500
524	Stations, miscellaneous buildings and structures	318,324	340,799	335,598	79.7	90.6	85	253,704	308,452	285,258
526	Park and resort property	489,272	608,574	510,877	73.7	90.6	80	360,593	551,190	408,702
529	Other expenditures—Way and structures. Trackless trolley construction	45,676	45,676	45,676	90	90	90	41,108	41,108	41,108
530	Passenger and combination cars	10,527,765	12,009,033	11,486,901	70	90	85	7,369,436	10,824,518	9,763,866
531	Freight, express and mail cars	39,322	52,094	49,829	50	90	80	19,661	46,885	39,863
532	Service equipment	477,729	454,148	487,237	55	80	80	262,751	363,318	389,790
533	Electric equipment of cars	5,747,935	6,087,930	6,087,930	70	90	85	4,023,554	5,479,137	5,174,741
536	Shop equipment	350,596	350,595	350,595	80	80	80	280,477	280,476	280,476
537	Furniture	270,721	270,720	270,720	80	80	80	216,577	216,576	216,576
538	Miscellaneous equipment	153,012	153,012	153,012	65	60	60	99,458	92,007	91,807
539	Power plant buildings	43,325	46,095	45,500	65	93	85	28,115	42,868	38,675
540	Substation buildings	448,061	478,810	473,822	81	93	85	363,891	445,293	402,749
542	Power plant equipment	169,972	169,972	169,972	70	76	70	118,980	127,479	118,980
543	Substation equipment	1,837,859	1,837,859	1,837,859	85	92	90	1,562,180	1,690,830	1,654,073
544	Transmission system	642,083	759,898	718,046	90	90	90	577,875	683,908	646,241
	Total	$50,759,843	$58,804,588	$55,997,692	75.3	88.7	85	$38,272,547	$52,181,743	$47,556,442
	Overheads									
501	Engineering and superintendence	3,299,975	2,940,229	2,799,884	100	100	100	3,299,975	2,940,229	2,799,884
546	Law expenditures	253,799	1,176,092*	559,977	100	100	100	253,799	1,176,092*	559,977
547	Interest during construction	4,587,296	7,393,097	5,072,717	100	100	100	4,587,296	7,393,097	5,072,717
549	Taxes	462,229	462,229	462,229	100	100	100	462,229	462,229	462,229
550	Miscellaneous	2,539,240	1,826,832†	3,589,186	100	100	100	2,539,240	1,826,832†	3,589,186
	Cost of financing	3,166,425	4,476,184	.....	100	100	.....	3,166,425	4,476,184	.....
	Total	$14,308,964	$18,274,663	$12,483,993	100	100	100	$14,308,964	$18,274,663	$12,483,993
	Total of physical property and overheads	$65,068,807	$77,079,251	$68,481,685	80.7	91.4	87.7	$52,581,511	$70,456,406	$60,040,435
	Working capital	1,400,000	2,000,000	1,500,000	100	100	100	1,400,000	2,000,000	1,500,000
	Total	$66,468,807	$79,079,251	$69,981,685	81.2	91.6	88	$53,981,511	$72,456,406	$61,540,435
	Going value	6,506,881	16,000,000	8,560,210	100	100	100	6,506,881	16,000,000	8,560,210
	Grand total	$72,975,688	$95,079,251	$78,541,895	82.9	93	89.2	$60,488,392	$88,456,406	$70,100,645

* Includes administrative and legal expense. † Includes organization prior to construction, $1,764,138; and insurance during construction, $62,694.

original cost of each of the 1,357 used and useful cars a multiplying factor based on the trend of costs given to the trade by the J. G. Brill Company for the period from 1914 to 1924, and on information secured by Robert M. Feustel, consulting engineer, from the Brill company on the trend of prices previous to that date; to the trended cost so secured he added 1 per cent for omissions and contingencies. The commission said that neither the people's counsel's nor the company's estimates include any allowance for several hundred cars of antiquated design still retained by the company, but not used and having no prospect of being used. The company did include the cost of 110 open car bodies which at the date of valuation were being rebuilt into permanently coupled units. The cost trend referred to did not include shop overhead costs of the cars. The company's estimate was based upon the figures furnished by the J. G. Brill Company as to the reproduction cost of these cars, including shop overheads and 15 per cent profit. The commission said that after careful consideration of all the testimony in regard to the value of the used and useful cars and excluding several hundred obsolete cars, it accepted the cost figures presented by the Brill company, with the exception that it reduced the profits from 15 to 10 per cent, which brought its reproduction cost to $11,486,901.

The railway company did not make any separate claim for legal expenses, but made a claim for administrative and legal expenses combined, amounting to $1,176,092, practically 2 per cent of items covering the total of physical property. The commission made an allowance of $559,977.

Under the item of Miscellaneous the commission said:

The company included insurance, organization prior to construction, and legal and administrative expenses. People's counsel included organization prior to construction, and administration during construction, but made no allowance for insurance. If it is considered that of the 2 per cent claimed by the company for legal and administrative expenses one-half of 1 per cent is for legal expenditures, the other 1½ per cent would be for administration during construction.

In the people's counsel's estimate there was included under Miscellaneous an item of 5 per cent, and for purposes of comparison we have divided this so that 2 per cent is for organization prior to construction and 3 per cent for administration during construction.

The following are the estimates of the various items: Organization prior to construction—people's counsel's estimate, $1,015,697; railway's estimate, $1,764,138. The company's figure is 3 per cent of the total physical property, while the people's counsel's figure is 2 per cent of the total physical property.

Administration during construction—people's counsel estimated $1,523,543, the company estimated $882,069. The people's counsel's estimate is based on 3 per cent of the total value of the physical property, while the company's claim is for 1½ per cent of the total value of the physical property. This difference is brought about by the fact that the company, in claiming a general contractor would be employed, figures that the cost of administration during construction would be less with a general contractor than if one were not employed.

Insurance—The company estimated $62.694. This is the actual insurance paid by the company during the year 1923. People's counsel made no allowance for insurance, as he claimed all necessary allowances were made in the base cost.

The total claims for both the company and the people's counsel for this miscellaneous item are as follows: People's counsel's estimate, $2,539,240; railway's estimate, $2,708,-901. The commission has included all the above items and in addition, as provided for in the classification of accounts, has included such expenses and cost of financing as would be incurred by the company as explained in the discussion of costs of financing, no separate allowance has been made elsewhere for this item. The commission arrived at a figure for the miscellaneous account of $3,589,186.

Under working capital, people's counsel claimed $1,400,000 and the company $2,000,000. Both included approximately $1,000,000 as the cost of necessary materials and supplies on hand. The commission allowed this $1,000,000 and approximately two weeks operating expenses amounting to $500,000, giving a total of $1,500,000.

The per cent condition of the completed property, as claimed by the railway, was 91.7. The people's counsel's claim was 81.3. The condition found by the commission was 88 per cent.

For going value the commission adopted the figure of 12½ per cent of the physical property and overheads, not including working capital, or $8,560,210.

The company claimed that the original cost of the property at the time of the consolidation in 1899 was at least $42,621,455. The cost of the net additions since that time have been $25,537,453. The company therefore claimed as of Jan. 1, 1924, that the original cost of the property was at least $68,158,908. People's counsel claimed that the original cost at the time of the consolidation was $32,000,000, and adding the $25,000,000 in additions, that the original cost of the property as of Jan. 1, 1924, was $57,000,000.

After summing up the various elements entering into the determination of a fair value of the property the commission found the fair value of the property, without easements, to be $70,000,000.

The opinion discussed the question of easements at some length. This was the only subject upon which all three members of the commission could not agree. The majority opinion valued these at $7,000,000, bringing the total valuation to $77,000,000.

During the course of the investigation and hearings three subjects which had nothing to do with the valuation came before the commission. These included the rerouting of the street cars, the removal of one-man cars from the Halethorpe line, both of which are being considered by the Baltimore Traffic Survey Commission, and the issuing of a weekly pass at a fixed rate. In regard to the weekly pass the commission stated that it feels it would be unwise to require the railway company to embark on such an experiment. Continuing, the commission said:

Proponents of the weekly pass idea testified that it was "a gamble," that there was no way of checking the results of the pass upon the revenues of those companies in other cities, but their general impression was that it had been helpful.

In view of the testimony submitted, this commission does not feel justified in requiring the company to issue such a pass or ticket, and it would hesitate to approve such a plan if it were proposed by the company, on the ground that it would be a marked departure from the plan of measured service, under which the patron of a utility pays for what he receives, and toward the plan of unlimited service for a fixed charge, or flat rate.

As the period for which the present rate of fare was ordered to remain in force expires with the determination of the present case, and as the rate of fare was not an issue in the valuation proceedings, the commission will, in its order, require the continuance of the present base rate fare of 7½ cents when tickets or fare checks are purchased, or 8 cents cash, until April 30, 1928, with the provision that if any proceedings involving the rate of fare be pending at the expiration of that period, then the present rate will be continued for an additional period of six months unless such proceedings shall be terminated before the expiration of that time.

Ralph Budd Discusses Railroad Electrification

Mountain Grades and Terminals Most Likely Sections for Development—Capital Can Be Obtained if Savings Justify Expenditure

SIGNIFICANT facts regarding steam railroad electrification which will be appreciated by everyone are given in an interview with Ralph Budd, president Great Northern Railway, published in *Electrical World* for May 8. Mr. Budd states his considered opinions on the future prospects for electrification, on the benefits to be derived therefrom and on the conditions that must be met. The questions and answers are presented verbatim:

Q. In what order will future railroad electrification occur most likely—in large terminals, along heavily traveled trunk lines, over mountain grades, etc? Where are the greatest possibilities geographically now?

A. On mountain grades where hydro-electric power is cheap; in terminals which can show large incidental advantages such as enhanced values of real estate; along heavily traveled trunk lines which are approaching the limit of their capacity on present trackage and where more right-of-way will be necessary; also in the eastern part of the country over mountain grades with heavy traffic, especially in coal, which gives uniform high load factor through the year.

Q. What facts must be obtained before such electrification is accepted by railroads?

A. There must be more data based on actual performance as to (a) cost of construction; (b) cost of operation; (c) savings due to electrical operation; (d) incidental advantages, such as enhanced values of real estate, increased efficiency outside of savings in operating cost of traction power.

Q. Are not the cost of electrifying and the difficulty of attracting the necessary capital the obstacles to electrification more than any doubt regarding relative performance of steam and electric equipment?

A. I do not think so. Necessary capital is obtained by railways in large amounts where the saving to be made by the investment justifies it. It is not a question of relative performance of steam and electric equipment, but a question of savings that may be made in operating expenses by reason of electrical installation. Unless traffic is heavy or some of the other conditions in answer to Questions 1 and 2 obtain, it might not be prudent to invest large sums for electrification even though the funds were readily available.

Q. What can the electrical industry do directly or indirectly (through educating the public possibly) to enable railroads to shoulder the financial burden of electrification?

A. The public may be educated to appreciate its interest in having the railroads earn a fair return on the value of their properties, so that they may be able to provide facilities for still better service. Open-mindedness on the part of the large electrical equipment companies as to the type of electrification best suited to each case, rather than always insisting upon a certain type of electrification, would tend to dispel the doubt created in the minds of railway men because of the conflict between the types as advocated by the manufacturers.

Q. In terminal electrification, is it not likely that the value of overbuilding rights made possible thereby will offset the cost of electrification?

A. This point was mentioned in Question No. 1. Circumstances in each case will govern. The New York Central electrification in New York is the outstanding example of the high value of overbuilding rights. In many terminals there would be no such appreciable added value.

Q. For trunk-line electrification what is the maximum limit that fixed and operating charges for electrification can attain per ton-mile traffic per year to warrant consideration by railroads? (Any other basis will suffice.)

A. Operating charges after electrification must be enough less than they were before electrification (or than they would be after other improved operating conditions that might be brought about) to pay interest on the excess cost of electrification and at least 5 per cent per annum additional as a factor of safety.

Q. Should railroads load themselves with the capital expenditure for generating plants, transmission lines and substations and further complicate their already complex problems by generating power, if power can be purchased at a reasonable figure?

A. The answer depends upon whether power can be generated by railroad-owned plants for less than it can be purchased from power companies. The power companies should be able to sell it more cheaply than railroads can make it, but if they are not willing to do so the railroads should not be restrained from making their own power. Such restraint might tend to higher prices, which in turn might discourage railway electrification.

Q. Based on past influences of transportation and electric power on the commercial and industrial growth of communities, is it not possible that trunk-line electrification would increase traffic because of the more reliable and cheaper electric power made available by transmission lines paralleling the railroads?

A. If transmission lines can be built along railroad right-of-way enough cheaper than elsewhere to justify making lower prices for electrical energy, undoubtedly industries would locate where the cheaper power is obtainable, but it does not seem reasonable or feasible to make a lower rate to industries supplied with power from transmission lines along railroad right-of-way than to other customers whose power is supplied by other transmission lines of a like character.

"Telling the World" with Slogans

CAR slogans, displayed in the manner shown in the accompanying illustration, are used by the Kentucky Traction & Terminal Company, Lexington, Ky., for the purpose of telling the public something about the local street railway situation. Slogans have been

One of the "Silent Boosters" Employed by Kentucky Company to Encourage Public Good Will

on the cars for several months and have created a great deal of favorable comment. Considerable pride is taken in the service and rolling stock of the railway by its executives and the publicity which comes through the use of these slogans simply reflects this spirit of enthusiasm. Here are a few of the slogans used:

Rapid, Comfortable Service.
This Car—a Community Asset.
Permanent 17-Hour Service.
America's Best-Equipped Railway Saves Time.
Shop by Street Car.
Our Pride, Your Comfort.
The Pullman of the Streets.
The Road of Originality.
No Parking Worries Here.
Exceptional Riding Comfort.
Ride Here and Save.
We Appreciate Your Patronage.

Small Models Visualize Car Appearance

Some Very Pleasing Effects in Car Construction Have Been Developed by the Grand Rapids Railway Through the Use of Wooden Models Made to Scale — Uniform Bands of the Same Color Carried Completely Around the Cars Give Improved Appearance

USE of small models to visualize the effect produced by various arrangements in car construction has been tried by the Grand Rapids Railway and the Department of Street Railways, Detroit, Mich. Both have obtained extremely gratifying results. It is difficult to obtain a correct idea of the combined end, side and roof effect that will result when cars are placed in service, if drawings alone are used to show the design. While the end or side may have a pleasing effect when considered by itself, a combination of the two is often inharmonious.

In Grand Rapids two wooden models were constructed. These were complete in all details, even to interior arrangement. The principal difference in the two models was in window arrangement, one having nine windows in the side of the car body while the other model had but five. As originally constructed the models had all the refinements that were considered essential in a car of most pleasing appearance.

Various changes and additions were made on the first models in order to study the effect. As a result several features have been incorporated that improve the appearance materially. Figs. 1 and 2 show two views of the nine-window model as at first arranged and Figs. 3 and 4 show corresponding views of the model with improvements. The effect that a few small changes had on the appearance is quite pronounced.

In the first arrangement it will be seen that the tops of the doors cut into the letterboard so as to prevent the same width band being carried across the tops of the doors and around the ends. This was overcome by changing the size of the upper door glass panels so as to give a wider frame at the top. The front end of the car was also changed to give the same width band at the top, and a visor was added over the center window. The windows for route signs were also changed and made the same on the two sides of the car. These changes made it possible to carry a letterboard band of the same width and color completely around the car.

The doors as first constructed also interrupted the streamline effect at the drip rail. To remedy this the size of the lower door panels was decreased and a wide band of the same color with black beading on either edge was carried entirely around the car in line with the drip rail. A similar lining up of the band forming the skirt at the sides was also effected. With the latest changes this band has the same width across the lower ends of the doors and around the ends. The width of the rear folding step is also the same as the skirt, the step thus fitting into the streamline effect.

Lining up the glass panels in the doors and at the ends of the car with side sash produces a very pleasing effect. Two headlights are also used. The design of these has been made to harmonize and improve the appearance of the car rather than to detract from it. The buffer arrangement at the front end has also been given much thought, and as a result a serviceable design has been evolved which is not only a protection to the car but also adds to its appearance.

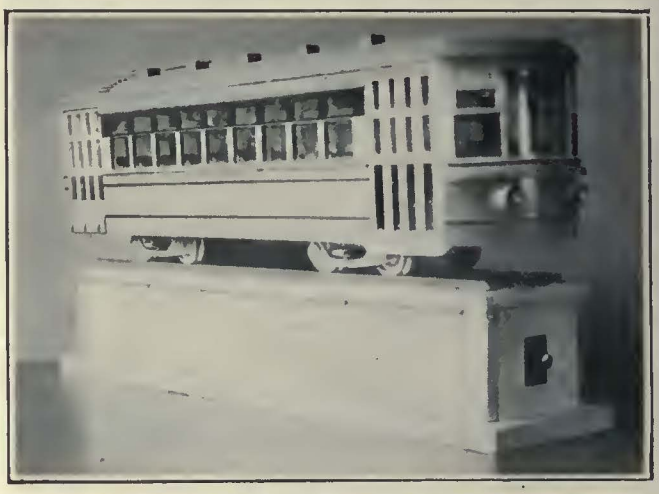


Fig. 1—Three-Quarter View of Model Car as Originally Constructed

The doors break up the continuity of lines along the sides and across the ends of the car and produce an effect that the platforms are an addition to the car rather than a part of it.

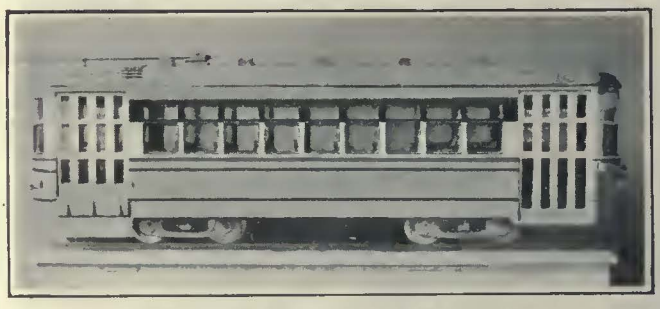


Fig. 2—Side View of First Model Car

The painting effect cannot be judged accurately from the illustration, but a patchwork effect appears to be produced by failure to carry the colors in bands entirely around the car.

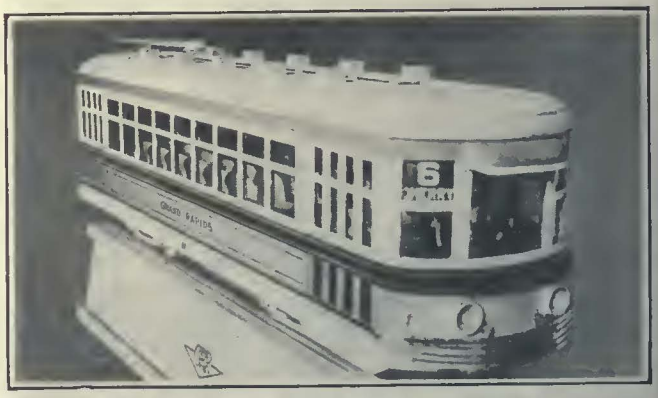


Fig. 3—Three-Quarter View of Model as Changed

Outstanding features of the ends and doors have been brought into alignment with the side arrangement to improve the appearance.

The effect produced by using wide windows, as shown in the second model illustrated in Figs. 7 and 8, is quite surprising. It was expected that the use of five wide

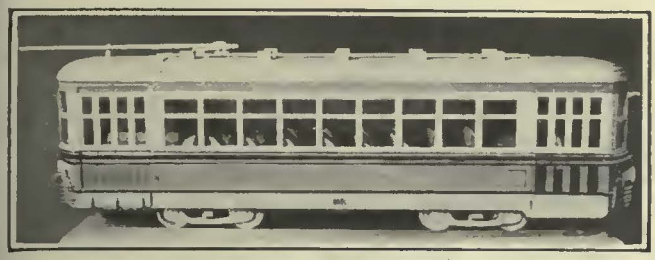


Fig. 4—Side View with Latest Changes
By carrying the same colors in the same width bands across the doors, a longer effect to the car body is produced.

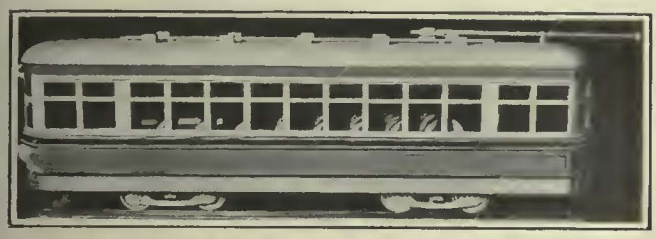


Fig. 5—Late Type Model Showing Side Without Doors
This illustrates some of the particular advantages from single-end cars. In addition to freedom from doors, the windows at the end give a long, rakish appearance.

Fig. 6—End View of Model with All Changes Made
The illuminated dasher with two headlights and the new type of bumper are outstanding features. The arrangement of the side windows so as to provide a large route number and sign should be of particular convenience to the traveling public. The visor is another addition never before tried in car construction.

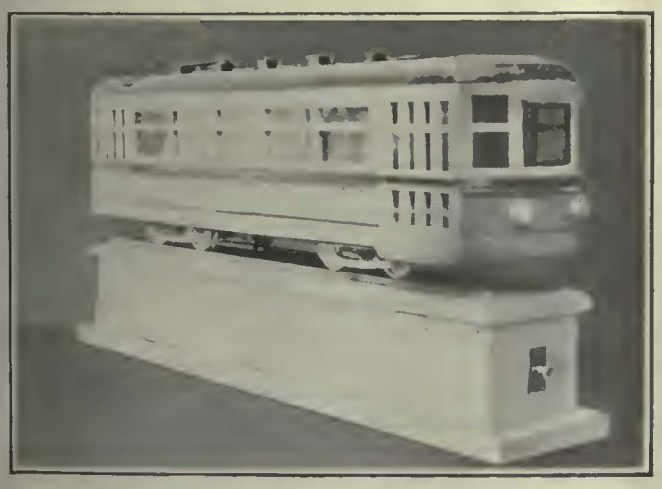


Fig. 7—Door Side of Model Car with Large Windows
While large windows may be an added convenience for passengers inside the car, they detracted from long flowing lines which are now being sought in car construction.

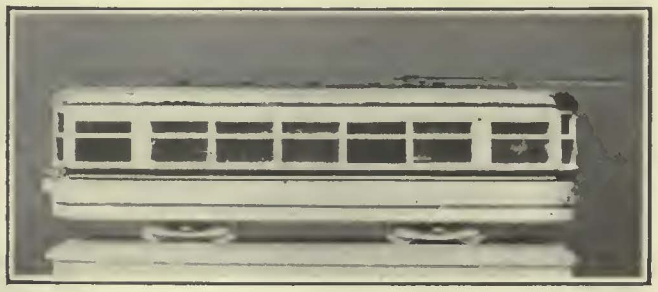


Fig. 8—Large Window Model Showing Side of Car Without Doors
Comparison of this with the narrow window car shows that the wide windows produce a dumpy effect which is not desirable.

windows instead of nine narrower windows in the car body would give a longer appearance to the car. Instead of that, the effect produced is just the reverse. The wide window car has a short, stubby appearance and does not present the long, rakish effect that car designers are now working to realize and which has the greater appeal to the traveling public.

The time and effort spent in making these small-scale models has certainly produced pleasing results. All realize the necessity of improving car appearance in order to obtain the maximum merchandising value from the purchase and use of new equipment. Other railways can profitably take up the use of such models to help determine the car best suited to their requirements and as an aid to producing cars of still greater attractive appearance.

Accidents Decrease and Service Increases in Buffalo

IMPROVED service and greater safety in operation are reported by the International Railway, Buffalo, in the operation of its local lines in 1925, and will be continued throughout this year. B. J. Yungbluth, president of the traction company, explains that during 1925 the number of accidents decreased 7.2 per cent. Serious accidents fell off even more, as shown by the fact that 10.28 per cent fewer persons were injured. For every 100 passengers carried in 1925 the company supplied 3.2 per cent more seats than in 1924, and the percentage was even greater in the three morning and two evening rush periods, when more than 50 per cent of the car riders travel. The percentage of cars on time increased from 75.2 per cent in 1924 to 90.17 per cent during last year.

With reference to crowded city streets, he said this condition was brought about by free parking of empty automobiles, which might cause delay in traction service. He said this condition was beyond the company's control, but the number of delays due to car failures last year showed a steady decrease. In December 36 per cent fewer cars were taken out of service for repairs than a year ago and a smaller force kept more cars in operation.

About 500,000 tokens were required to pay last year's charge for cleaning trolley streets of snow. The company not only maintains its own army of snowfighters but also pays one-third the city's bill for cleaning trolley streets. The company built six new snowsweepers last year, thus bringing the total fleet of snowfighters up to 23 sweepers, 30 plows, three motor plows, thirteen automobiles and three trucks, with an extra force of 350 men.

The Readers' Forum

Electric Railway Industry Challenges Loree Statement

So much interest has been aroused in the statement of L. F. Loree, president of the Delaware & Hudson Company, published in this paper for April 24, page 732, that the following correspondence between A. L. Shapleigh, president of the United Railways of St. Louis, and Mr. Loree is of particular interest. Additional comments by Messrs. Richardson, Buffe and Beeler indicate the reactions of leading electric railway men to Mr. Loree's statement.—EDITOR.

UNITED RAILWAYS OF ST. LOUIS
ST. LOUIS, MO., April 12, 1926.

Mr. L. F. LOREE,
Care of Dr. Daniel Upthegrove,
President Cotton Belt Railroad,
St. Louis, Mo.

Because of the esteem in which you are held and the high position which you occupy, any statements which you make pertaining to transportation matters are given large publicity and carry great weight.

It has been said that you consider St. Louis and Kansas City to be your home cities and therefore I venture to write you in regard to a statement you made April 9 last before the St. Louis Chamber of Commerce, which, though I am sure you did not so intend, may have an unfortunate effect here on our city transportation.

The statement that I refer to was "That six thousand millions invested in street and interurban railways might as well be charged off the books. The automobile has put them in the discard as the steam railroads put the stagecoach in the discard."

Though I have no large financial interest in the street railroads of St. Louis, I serve as president of the St. Louis system and, in company with others, I am striving to give St. Louis the best city-wide transportation possible. I believe we all appreciate the magnitude and aim of your work and realize that if they are to win their fight, the steam roads must have help, as you say, "in every way possible." I believe St. Louis will give you this help. But we, too, have our problem, which is the problem of city transportation, and we believe we have arrived at the correct solution which we are striving to put into effect. That solution is, a co-ordinated system of street cars and buses operated on a service-at-cost basis, similar to the Cleveland plan. Like Cleveland, our city has no subway and, due to the topography of St. Louis, will probably have no such system of great extent for some years. Mass transportation here depends upon surface cars to be practical because of our already congested streets by automobiles and buses. Today the street railroads here carry more than 1,000,000 persons per day—estimated to be more than 90 per cent of the people carried by street cars and buses. Our investigation shows clearly that, for mass transportation in St. Louis, neither the automobile nor the bus can take the place of the street car. Personally I believe that while the automobile and motor bus have superseded some interurban electric railroads, they have not superseded and cannot supersede the street railroads in cities. I believe the problems of the steam roads are more serious in this respect than are those of the city street railroads.

As a former director of the Frisco Lines, and at present a director of the P. C. C. & St. L. Railroad, I am somewhat familiar with the situation.

The steam roads must be preserved, protected and aided. So, too, the street railroads in St. Louis must be protected. Our citizens and bankers must invest more millions of dollars to give St. Louis the best service, and if they must do this, they must have reasonable protection for the return of their money.

In conclusion, I ask you to do us the courtesy to aid us rather than hinder us in our work. The city of St. Louis is about to promulgate and bring to the polls for vote by the people a service-at-cost franchise which will insure that car riders get their service at its cost. Investors and the citizens of St. Louis will be asked to put their money into additions and betterments that are necessary to give St. Louis the kind of service it deserves.

Your statement has already created a feeling of deep concern. I request that you give this matter thought. I understand that you spoke in generalities and had no special reference to the situation here, but your statement was not so taken.

I suggest that a letter from you to the Chamber of Commerce clarifying your position as to St. Louis would not only be appreciated by me but by all those who are genuinely interested in solving the city transportation problems for the mass population.

Yours very truly,
A. L. SHAPLEIGH,
President.

SAN FRANCISCO, CAL., April 19, 1926.

Mr. A. L. SHAPLEIGH,
President United Railways,
St. Louis, Mo.

DEAR SIR: Your letter of the 12th inst. has been forwarded to me here.

It would seem quite clear that, save in exceptional cases, the interurban and small town traction lines will find great difficulty in maintaining themselves as against the automotive vehicles.

On the other hand, it seems equally clear that in the larger cities the street spaces will not permit of the movement of the traffic by this means, nor has any other method yet been suggested that will take the place of the street cars.

When this comes to be generally recognized we may expect relief from many unreasonable burdens, such as street paving, as well as an adjustment of fares to meet increased wages and advances in the cost of materials and supplies.

Never has building activity been greater than now, and with growing suburbs grows the demand for extension of service. When it is found that this cannot be furnished, since capital cannot be further persuaded to embark in these enterprises, then we may look for recognition of the inescapable economic requirements.

I would greatly regret if anything I am reported to have said should be a source of embarrassment to your company. You are quite free to make such use of this letter as you may feel will benefit the United Railways. I wish that company and you every success in your difficult endeavors. Yours very truly,

L. F. LOREE.

CHICAGO SURFACE LINES

CHICAGO, ILL., April 29, 1926.

To the Editor:

The leading editorial in your issue of April 24 headed "The $6,000,000,000 Won't Be Wiped off the Books" is in line with the best thought in the electric railway industry and I desire to compliment you upon the forceful presentation of facts.

Electric railways have long since emerged from the doldrums of the war period. Without the governmental assistance required by the steam railroads and without, in most cases, even a sympathetic attitude on the part of public officials, they have worked out their own salvation.

It is astonishing, therefore, that anyone at this time should make such misleading statements as those credited to Mr. Loree.

The industry is on a sound economic basis. Last year was the greatest year of electric railway history. More passengers are being carried, management is more alert and service is more responsive to public needs than ever before.

To men of vision the future is bright. There is prosperity and usefulness ahead for those willing to adjust themselves to changing conditions.

G. A. RICHARDSON,
Vice-President

KANSAS CITY RAILWAYS

KANSAS CITY, MO., May 1, 1926.

To the Editor:

Permit me to express my appreciation of the editorial in the April 24 issue of the JOURNAL on Mr. Loree's reported statement that the $6,000,000,000 invested in electric railway facilities be charged off as a loss. It is forceful and constructive and reflects the mature, carefully considered judgment of those charged with the responsibility of financing and operating these public service utilities.

Mr. Loree undoubtedly, if given an opportunity to enlarge upon what was evidently a statement *obiter dicta*, would so qualify it and apply it as to give it an entirely different meaning. There are today unquestionably railway enterprises that should probably never have been built, those that changed conditions have rendered obsolete. But by the same token there are steam carriers in the same category. It is as wrong to judge the whole by these sick parts on the one hand as it is on the other.

The very vital necessity of the street railway is the only thing that kept it alive during the period from 1915 to 1920. The industry simply had to carry on because its collapse would have meant disintegration of business values and paralysis of urban life.

There is no especial fetich in motive power or roadway. If the thousands of men who are living daily with the problem thought that their interests and the interests of those they serve could be better served by a change in motive power or a switch from steel to rubber they would recognize the fact. Such a change would not keep them from being in the transportation business. The proof of this is the fact that 300 electric railway companies are using the bus as a tool of their trade, adapting it and co-ordinating it in comprehensive mass transportation plans. But they are continuing to look on the railway as the backbone of the entire service and are spending millions of dollars for new electric equipment and facilities. Surely these men, operators, executives, bankers, are not all wrong. I do not believe the record of the past few years in Brooklyn, in Pittsburgh, in Chicago on the North Shore, and in many other places, would support the statement that the electric railway is through as a proper method of handling mass transportation at the minimum cost.

F. G. BUFFE,
General Manager.

THE BEELER ORGANIZATION

NEW YORK, April 30, 1926.

To the Editor:

Your leading editorial in the JOURNAL of April 24, under the caption "The $6,000,000,000 Won't Be Wiped Off the Books," is timely and has a real message that should be heeded. A large share of the trouble with the traction industry today is that many of the men interested in it are not sold themselves. They have a feeling that something is going to happen, and they hesitate. There is no doubt that something will happen if they hesitate too long. The scriptural quotation "What I feared came upon me" is applicable here.

I have a number of friends who are steam railway men and their attitude generally toward the traction industry is and has always been one of good-natured contempt. They feel sorry for any management that has to subsist by collecting nickels and pennies. All steam railway men may not feel this way, but most of those whom I know do. The fact that traction lines haul ten times as many passengers annually as all the steam railroads is apparently lost sight of.

The universal abolition of traction lines in the near future is no more probable today than the wiping out of all steam railroad passenger traffic business on account of great increase in the use of the automotive vehicle and other competitive methods of travel. The managements, however, that lag behind and do not keep their service up to date will suffer, whether operating traction lines or steam railroads.

JOHN A. BEELER.

P., L. & M. Electric Locomotive Tested

DURING the latter part of 1925 the Oerlikon trial locomotive, type 2BB2, built for the Paris, Lyons & Mediterranean Railway, was subjected to exhaustive tests both as regards running and regenerative braking. This locomotive has an output of 2,400 hp. at 31 m.p.h. and a maximum speed of 68 m.p.h. The trials were entirely successful and the locomotive has now commenced its period of guarantee. The running tests covered the whole range of operation of the locomotive up to the highest speed and maximum load. The trials with regenerative braking were carried out under varied speed conditions and the stipulations of contract satisfied. The latter laid down that the electric braking equipment was to be capable of dealing with a total train load of 300 tons, including a weight of locomotive of 120 tons, on a gradient of 1 in 33, the speed being maintained at 22 to 25 m.p.h. During these tests a current of 600 amp. at 1,500 volts was fed back into the system with the train traveling at 25 m.p.h.

The method of regenerative braking evolved by the Oerlikon Company for these direct-current locomotives is very simple. The same controller handle which serves for starting up and running is also used for braking; the driver has only to know what grouping of motors is required for the speed at the time.

Maintenance Notes

Air-Operated Chuck Used with Drill Press

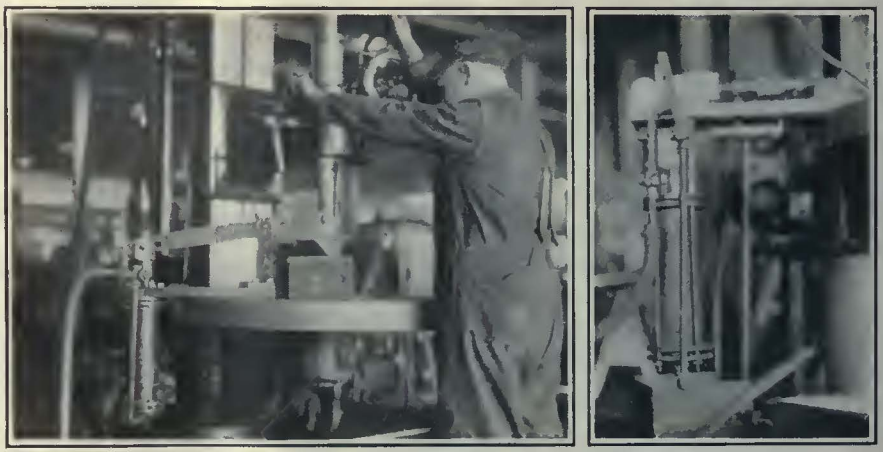
CLAMPING and holding material firmly during drilling often consumes nearly as much time as the drilling operation itself. Many railway shops have equipped their drill presses with hand vises, so that the material may be clamped securely in position without loss of time. An improvement on this method is an air-operated chuck constructed in the shops of the Department of Street Railways, Detroit, Mich., which has been applied to one of the drill presses most used. This has proved an additional time and labor saver over other methods in that work of almost any shape can be clamped quickly and firmly. An accompanying illustration shows the construction.

The mechanism consists of an air cylinder about 4 in. diameter by 15 in. long. The plunger of this cylinder is connected directly to a wedge, which when pushed upward acts through rollers on a horizontal arm to close the jaws of the chuck. In order to provide for different sizes of material, the connecting arm is provided with a screw adjustment in the center, and by lengthening or shortening the rod the opening of the jaws is increased or decreased.

In order to provide a firm clamping for irregular material, the stationary side of the jaw is pivoted at the center, and by providing clearance at the ends this will swivel slightly and so will conform to the shape of the piece which is to be clamped. In ordinary operations air from the shop system is used, which is from 80 to 90 lb. pressure. The connection from the shop line to the cylinder is through a flexible hose and piping with three-way valve. In one position air is admitted to the bottom of the cylinder, so as to force the plunger upward and in the reverse position air is exhausted so as to remove the pressure.

Another air-operated clamping device constructed somewhat along the lines just described is used to hold material to the bed of a drill press during drilling. This mechanism

Air-Operated Chuck and Liquid Circulating System as Applied to a Drill Press in the Shops of the Department of Street Railways, Detroit



At Left, Air-Operated Clamp as Used to Hold Material to the Bed of the Drill Press. At Right, Close-Up of Air Cylinder Used to Operate Clamping Devices

consists of a lever arrangement on one end of which is a small air cylinder, which is attached to the compressed air supply in the shop. The fulcrum of the lever is adjustable to three different positions on the vertical support. The pins of the fulcrum point are also adjustable on the main lever in several positions. The entire apparatus is fastened to the bed of the drill press and can be used in one position on many different kinds of jobs. The fulcrum pin is easily removable and can be changed quite easily.

This arrangement holds the work tightly and avoids the possibility of accidents often caused when mechanics attempt to hold the material by hand, not bothering to use the mechanical clamps and bolts that would otherwise be required.

Another improvement which has been applied to all drill presses and lathes in the Detroit shop is a liquid circulating system for providing a supply of liquid at the cutting tool and material. The circulating system as applied to a drill press is shown in one of the illustrations.

A circulating pump is used to draw the liquid from a reservoir and force it through a flexible tube to the cutting tools. This pump is driven directly from the horizontal shaft of the pulley by adding the necessary pulleys and belt connection. A sheet iron tank 12 in. x 12 in. x 12 in. is provided on the floor to hold the liquid. After discharge at the tool through the flexible tube, the liquid follows grooves and openings in the drill press table and runs by gravity into a pan underneath which is 12 in. x 12 in. x 3 in. deep. From this catch pan the liquid flows by gravity into the supply tank and is then circulated again through the tube to the cutting tool.

This type of circulating system has been applied to all lathes and drill presses and has produced an enormous saving through the ability to speed up machinery so as to take larger and faster cuts.

Motorman's Seat Adjustable as to Height

IN ORDER to provide its motormen's seats so that they can be adjusted as to height in a manner similar to that of old type piano stools, the Erie Railways, Erie, Pa., has threaded the ⅞-in. swiveling rod which forms the pivot for the seat. A square thread is cut on it, three to the inch. The horizontal swiveling

Type of Motorman's Seat Arranged to Provide for Various Adjustments

rest is cut out fork shaped and a hexagonal nut is placed inside the opening. These hexagonal nuts are welded to the fork.

The swiveling arm at the rear of the seat allows for a back and forth adjustment to accommodate various motormen. A spring attachment keeps this in one position except when it is necessary to move to a new adjustment.

Cutting Worn-Out Tires from Wheels

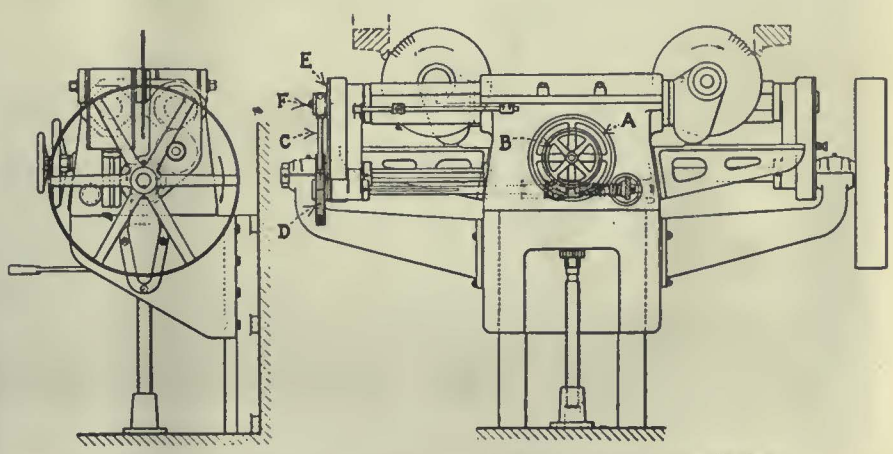
WORN-OUT tires may be removed from the wheels of electric cars or locomotives by a very effective and simple method described in the March 26 issue of *Verkehrstechnik*. The method consists of sawing the tire open at one point. The cut is not carried entirely through the tire, but approximately ¼ in. of material is left at the bottom. This removes any danger of damaging the spider of the wheel. After the saw cut is made a wedge hammered into the cut completes the break and causes the tire to spring off.

A special machine has been developed for making these saw cuts and the work can be carried out on either one or both wheels of a pair at the same time. The machine is designed for pit installation, so that it can be installed in an average electric car shop. It can be driven directly by an individual motor or can be belted to an adjacent transmission shaft if one is available when installed in carhouse pits; however, individual drive is preferable.

To anchor a set of wheels during the cutting operations, grab hooks or tongs are used. Where wheels have openings these clamps may be placed through the wheels, and with solid wheels they are arranged to be applied to the axle. The machine used for cutting has a crosshead which carries the two saws. They are raised against the flanges of the wheels by means of a ratchet mechanism. When in proper position the mechanical feed is set, which automatically takes care of further advancing.

A spring-operated friction clutch is provided between the feeding ratchet wheel and its driving shaft. This stops further movement of the saws automatically if a hard spot in the tire is encountered, and feeding is not resumed until the saw overcomes the increased resistance. Double worm reduction is provided between the driving pulley and the saws.

Saws or milling cutters of 14 in. to 18 in. diameter can be used with the machine, and a small circulating pump is provided to deliver soapy water or other cutting fluid upon the saws. The circulating system also provides for return of the fluid to the collecting sump by gravity and it can then be recirculated through piping and flexible tubing to the cutting tools.



This Saw for Removal of Tires Is Arranged for Pit Installation

New Equipment Available

Floodlight for Electric Railway Yards

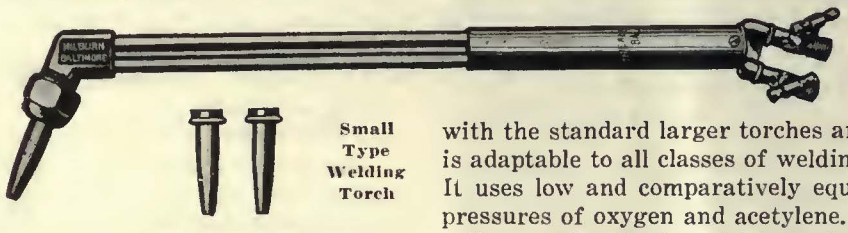
USE of a chromium plated reflecting surface, light weight and airtight construction are the outstanding characteristics of the new cast aluminum floodlight being manufactured by the Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa. This light is said to be particularly well adapted for use in railway yards and industrial plants.

The chromium plated surface of the reflector is an important achievement in lighting equipment as it lengthens the life of the reflector and eliminates the necessity for delicate care essential with other types of surface. High reflecting properties are possessed by the chromium plated surface and at the same time it is of a tool steel hardness. The manufacturers claim that it will neither tarnish nor break and is not subject to water vapor fumes. With this reflector it is possible to wipe off dust with a gritty waste without damage to the surface.

Considerable reduction in weight has been obtained without losing the qualities of sturdy construction. The weatherproof features of the floodlight are obtained by sealing the lamp and reflector chamber and in this way initial efficiency is maintained over long periods of time without large upkeep costs.

Light-Weight Gas Welding Torch

DEMANDS for a small welding torch for work not requiring the usual standard torch have led the Alexander Milburn Company, Baltimore, Md., to perfect the type J-Jr. torch. This is a sturdy, compact design giving a high degree of efficiency and economy. The torch uses the same tips as are supplied with the standard larger torches and is adaptable to all classes of welding. It uses low and comparatively equal pressures of oxygen and acetylene.



Small Type Welding Torch

Due to its light weight, it does not tire the workman to operate it continuously. The supermixing of the gases through a standardized system of multiple mixing assures a complete intermixing of the gases and a uniform flame. The seats of the tips are flat, with annular grooves coinciding with those in the head, the gas passages entering through the annular grooves or rings which separate the gases. The construction of these seating surfaces allow lateral expansion of torch head and tip without distortion and the seats are very easily refaced.

The J-Jr. torch is adapted to gas supplied either from generators or compressed in tanks. It is made of bronze forgings and specially drawn stainless tubing. An angle of 67½ deg. in the head allows a natural position in operating the torch, utilizes the heat to best advantage and protects the operator's hands. The torch is 18 in. long, weighs 25 oz. and has three welding tips.

Elevating Platform Truck for Shop Use

DESIGNED to carry unusually heavy loads, a new elevating platform truck has been placed on the market by the Yale & Towne Manufacturing Company, Stamford, Conn. The truck is of a low-lift type, with features desirable for self-loading. It has a short turning radius. The machine itself being narrow, it is easy to drive in narrow aisles such as are encountered in electric railway shops. Hardened steel steering pivots with bronze bushings and the high-pressure lubrication system reduce friction and make steering easy when carrying full load.

The triple spur-gear elevating mechanism consists of the same unit as that used in the company's K-22 truck. The elevating platform is raised by two large eccentrics, mounted on the hoist unit shaft.

New Type of Low-Lift Truck for Shop Use

Association News & Discussions

Using the Bus to Relieve Congestion*

Efficiency of Passenger Transportation in City Streets Can Be Increased by the Use of Common-Carrier Vehicles in Place of Private Automobiles and Taxicabs

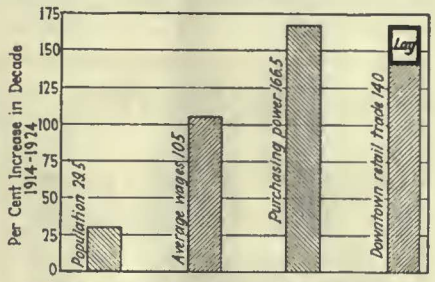
By John A. Miller, Jr.
Associate Editor Electric Railway Journal

MANY plans for the relief of traffic congestion are based on the general theory of providing more roadway area, to be used in exactly the same way that the existing street area is now used. Cutting through new thoroughfares, widening present roadways, arcading sidewalks, double-decking arterial routes and placing the electric railways underground are among the proposals made. Enormous expense would attend the execution of any of these plans, and it is extremely doubtful if permanent relief from traffic congestion would be attained. Experience has shown in a number of instances that new streets cut through to relieve overcrowding on older streets soon become congested themselves, without any marked diminution of traffic on the other streets. On the other hand, by the more intensive use of present streets a far larger volume of traffic could be moved through them without the necessity for huge expenditures on improvements.

The present general practice of using roadway space for the storage of private automobiles is in reality neither a convenience to the automobilist nor a benefit to the merchant. Elimination of parking in congested districts would greatly increase the roadway available for moving vehicles. Use of attractive common-carrier vehicles can be developed to handle a large part of the traffic now using single-passenger or two-passenger vehicles. A material reduction in congestion can thereby be effected without excessive cost. Movement of all traffic will be facilitated to a degree that will be advantageous to the users of public and private conveyances.

Contrary to a prevalent opinion, prohibition of parking in the congested districts is likely to aid business rather than injure it. After the enactment of no-parking ordinances in Pittsburgh retail trade in the downtown district showed an increase in comparision with that of the outlying commercial centers. In a large number of cases analysis would undoubtedly show that the volume of trade in downtown stores has not kept pace in recent years with the development of a community. As an example, let us consider the situation in a certain city of about 500,000 people, with some 250,000 more in the adjacent suburban territory. In 1924 the population of this entire district was very nearly 130 per cent of the 1914 figure. At the more recent date the average individual received wages which were approximately 205 per cent of those received in 1914. From these data we see that the total purchasing power of the district in 1924 was 266½ per cent of that existing before the war.

Investigation of the volume of business of a number of representative downtown retail stores in this particular city showed that in 1924 it was only some 240 per cent of that done ten years earlier. Thus it will be seen that the growth of retail trade in the downtown section lagged far behind the increase in the purchasing power. On the other hand, in the case of one particularly high-grade store, some 3 miles from the business center, the present volume of business is approximately 480 per cent of that done in 1914.



The Volume of Downtown Retail Trade Lags Behind Purchasing Power

A realization of the remarkable increase which has occurred in the outlying commercial centers during the decade may be had from a study of the locations of banks of deposit. In 1924 the number of such banks in the entire area was 49, compared with 37 in 1914. During these ten years, however, only one new bank was opened in the center of the city. All others were in the outlying districts. The zone from 1 to 2 miles from the center showed an increase of four, as did also the zone from 3 to 4 miles.

Figures of this kind do not show with mathematical accuracy the comparative growth of business in the city center and surburban areas. Nevertheless, a bank of deposit is rarely opened in a purely residential section, and its presence may fairly be taken to indicate the existence of a business community. The surprising increase which has occurred in the outlying sections illustrates clearly how business has sprung up there during the past ten years.

Downtown traffic congestion undoubtedly is the most important reason for this process of decentralization. Transportation in public conveyances has become relatively slow and subject to irritating delays. It is a task of considerable difficulty and some danger to drive a private automobile in the downtown streets. As a result, people do their buying near at home. This tendency will increase as congestion increases. Retail merchants, therefore, should favor rather than oppose the elimination of parking on important streets.

If parking of private automobiles in the public streets downtown is forbidden, a question arises as to what can be done with them. One answer might be to provide parking spaces in the centers of the blocks, which are usually not built upon, underneath some of the existing buildings, or in many storied garages. The number of automobiles which could be accommodated in this way is more or less limited, however, and the charges are likely to be rather high.

Establishment of parking spaces on the outskirts of the city and transportation of passengers downtown by public conveyance is a solution that is being tried in a number of cities. Several such parking spaces are operated by the Philadelphia Rapid Transit Company, which carries the automobilists from the outlying sections into the business district by rail. A number of other electric railway companies have undertaken similar schemes. In these cases the charge for parking includes transportation back and forth by street car. An arrangement of this kind not only solves the problem of where to store the private automobiles without wasting valuable roadway area, but it also promotes the efficiency of passenger transportation in the congested district by substituting one large vehicle for many small ones.

Economizing Roadway Space by Use of Large Capacity Vehicles

Substitution of public transportation vehicles of fairly large carrying capacity for individual automobiles carrying on the average not more than two persons can be advantageously made in many instances. For example, de luxe bus service often will prove an entirely acceptable substitute for the use of numerous private automobiles. In Washington, D. C., the Capital Traction Company operates luxurious buses from the high-class Chevy Chase residential district to the shopping district of the city. Fares are higher than on the street cars because of the superior facilities provided. The net transportation expense to the Chevy Chase resident by bus, however, is smaller than when he uses his own automobile, and with existing conditions of congestion the greater convenience of the bus service is marked. This service has proved very popular.

Similar transportation facilities are

*Abstract of a paper published in the proceedings of the American Society of Civil Engineers for May, 1926, page 827, to be presented at a meeting at New York, June 2.

AVERAGE LOADING OF PRIVATE AUTOMOBILES AS SHOWN BY RECENT TRANSPORTATION SURVEYS

City	Duration	Vehicles	Passengers	Passenger per Vehicle
Washington, D. C...	April 30 (in) 15 hr.	100,284	171,051	1.71
	April 30 (out) 15 hr.	92,666	154,394	0.67
	June 4 (in) 15 hr.	114,047	223,000	1.96
	June 4 (out) 15 hr.	112,957	218,988	1.94
Chicago, Ill.....	June 4 1 hr.	2,600	4,700	1.81
Atlanta, Ga.....	June 4 All day	27,540	49,600	1.8
Los Angeles, Cal....	June 4 11 hr.	261,974	393,322	0.50
Detroit, Mich.....	June 4 1 hr.	12,180	21,200	1.74

provided between the Edgewater Beach Hotel and the shopping district of Chicago. Although intended primarily for the guests of the hotel, patronage of this de luxe bus service is not confined to them, but includes residents of the entire fashionable neighborhood in that vicinity. Not only are the buses a cheaper and more convenient mode of transportation than private automobiles or taxicabs would be under these circumstances, but they have come to be considered a more distinguished mode. In other words, it gives one greater prestige to be seen alighting downtown from the 35-cent Edgewater Beach bus than from a taxicab at twice that fare.

More general use of collective transportation vehicles of this kind would go far toward increasing the efficiency with which the available street space is used. Traffic counts made in various cities show that private automobiles carry an average of less than two passengers per vehicle, as shown in the acompanying table. This is equivalent to about 30 sq.ft. or more of street area per passenger. A bus of ordinary size can accommodate comfortably at least twenty persons. Assuming that it would average only three-quarters of a full load, fifteen people would be carried. Under these circumstances about 16 sq.ft. of street area would be required per passenger. Inasmuch as the speed of the bus and the private automobile would be approximately the same in the congested district, the use of the former to replace the latter would double the efficiency with which the existing street area is utilized.

Theoretically an even greater increase in efficiency might be attained by the substitution of the electric rail car, requiring only 3.5 sq.ft. of street space per passenger carried, for the private automobile. In actual practice, however, it is found that the character of the service rendered by these two modes of transportation is so different that it is impracticable to try to replace the automobile by the trolley. Well-operated bus service with commodious vehicles, on the other hand, can be made an entirely acceptable substitute for the use of private automobiles.

Most wasteful of all vehicles used in passenger transportation is the taxicab. Investigations made by the writer at various locations in New York City indicate that the average load is only 0.83 passenger. As this vehicle occupies some 64 sq.ft. of street area, the space required per passenger carried is about 80 sq.ft. When it is realized that there are more than 17,000 taxicabs in New York City, and correspondingly large numbers in other cities, the importance of this cause of congestion is evident.

Surprisingly enough, the greater part of the taxicab movements follow definite routes. In the transportation survey of Washington, D. C., by McClellan & Junkersfeld movements of 324 taxicabs operated by four taxicab companies were analyzed for one weekday. During this typical day 7,924 taxicab movements were studied. Of this number some 5,000 movements were made along only 33 main routes. The three heaviest routes were between the Union Station and the business district, 600 trips; between the Mount Pleasant residential district and the business district, 400 trips, and between Georgetown and the business district, 350 trips.

From these figures we see that in Washington about five-eighths of the taxicab movements are along certain definite routes. Substantially the same condition no doubt prevails in other cities. Why not replace these taxicab movements along definite routes by bus service requiring 16 ft. of street area per passenger carried instead of 80?

Obviously it would not be feasible to try to replace entirely the taxicab by the bus, any more than it would be to try to replace altogether the private automobile. It is clear, however, that so much of both of these kinds of traffic flow along a comparatively few main routes that a real opportunity exists to effect an important improvement in passenger transportation in congested districts by thus using one vehicle of high-carrying efficiency to perform the work now being done by numerous smaller vehicles of low-carrying efficiency.

COMING MEETINGS OF *Electric Railway and Allied Associations*

May 11-13 — Chamber of Commerce of the United States, annual meeting, Washington, D. C.

May 13—Central Electric Railway Master Mechanics' Association, Orlando Hotel, Decatur, Ill.

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

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

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

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

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

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

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

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

Birney Club Hears About Bus Brakes

AN ILLUSTRATED talk on the subject of brakes for buses and motor trucks was delivered at the April meeting of the Birney Club held at the Missouri Athletic Association, St. Louis. The attendance totaled 57, of whom 33 were members and 24 were guests. H. D. Hukill, chief of the automotive division Westinghouse Air Brake Company, was the speaker of the evening.

Greater safety of operation is possible with the air brake, he said, for four reasons: First, there is sufficient flexibility to permit the precise regulation of braking force demanded by the varying conditions of grade, load and road surface; second, the same force is automatically applied to each wheel and equal retardation developed on both sides of the bus, thereby minimizing the danger of skidding; third, it relieves the driver of all fatigue incident to braking, and fourth, it permits the use of metal brakelining, which produces the same effect under all conditions.

The special safety feature designed by Mr. Birney for use on buses may be attached to any standard chassis without in any way disturbing the operation of the original manual braking equipment, he said. One of the early installations of Westinghouse air brakes with metal shoes to bus fleets was that of the Key System Transit Company, where it was found that the total cost of brake maintenance was only 50 cents per 1,000 miles as compared with $3.50 per 1,000 miles for manually-operated fabric brakes in the same service.

U. S. Chamber of Commerce to Discuss City Traffic Problem

CITY traffic will be one of the important subjects discussed at the fourteenth annual meeting of the Chamber of Commerce of the United States to be held in Washington, D. C., May 11 to 13.

A. L. Humphrey, president Westinghouse Air Brake Company, will preside. Elliot H. Goodwin, resident vice-president of the National Chamber, will set forth the main points in the program recently advanced by the Conference on Street and Highway Safety for dealing with the traffic problem.

George M. Graham, vice-president Chandler Motor Car Company, will discuss congestion and accident hazards from the standpoint of the automobile industry, paying particular attention to the problem in the cities.

Frank R. Coates, president American Electric Railway Association, will talk on "Co-ordination of Transportation as a Factor in the Solution of the Traffic Problem."

The relation of the steam railways to the city traffic problem will be dealt with by R. H. Aishton, president American Railway Association.

The News of the Industry

Complications Continue in Columbia

Before many weeks have passed it is more than probable that the clang of the trolley gong, so long a familiar sound in Columbia, the capital of South Carolina, will be replaced by the bark of the bus, for the South Carolina State Highway Commission has given a permit to the Carolina Transit Company to operate buses on streets which they have heretofore not touched.

Months ago, when citizens petitioned that the Columbia Railway, Gas & Electric Company, which operates the railway, be allowed to take up a short stretch of track, it was made known that the railway was losing money—from $6,000 to $8,000 monthly—and that it was only a question of time when operation would cease. The Carolina Transit Company was then organized and some time later was authorized to operate buses in sections not served by the street cars. Jitneys, carrying passengers at 10 cents a head, continued to operate in direct competition with street cars.

In an effort to save the street cars a "zone" system was put into effect in the hope that by this system railway revenues would be increased. But losses increased under this system instead, and now buses carrying 29 passengers each have been allowed to operate on streets served by the railway.

F. K. Woodring, general manager of the Broad River Power Company, which controls the Columbia Railway, Gas & Electric Company, has entered no protest to the operation of the buses. Street car fares may have to be raised. They are now 5 cents in each zone.

The jitneys, mostly cars of a light and popular make, carry only white passengers. The buses and street cars carry whites and negroes.

Meanwhile, Columbia has three systems of transportation—buses, street cars and jitneys. Columbia is a city of about 40,000 people. It cannot support three different transportation systems.

Another Town Assumes Paving Costs

Following a conference between the representatives of the Detroit United Railway and the president of the village of Ecrose, Mich., trustees of the village accepted the offer of the railway to lay double track through the village. It is planned to start work at once.

It is understood that under the agreement the D.U.R. will lay the ties, rails and ballast, and that the village will assume the responsibility for paving between tracks. The terms of the agreement indicate that the estimated cost to the D.U.R. will be $64,000 and that the village's share will be $40,000.

The terms of the agreement were arranged by the Security Trust Company and W. C. Dunbar, receivers for the D.U.R., and A. L. Drum, operating manager for the receivers. It was reported that the company lost approximately $173,000 on the down-river lines, including Ecrose, during the year 1925. It is further reported that the loss is in excess of the deficit suffered by the Peoples Motor Coach Company, a subsidiary, which operates coaches over various lines, including the down-river towns.

Strike in Akron

Men on Akron-Canton-Massillon System and on Interurban Lines Walk Out—The Company Is Fast Restoring Normal Service

MOTORMEN and conductors of the Northern Ohio Power & Light Company operating city systems in Akron, Canton and Massillon and interurban lines connecting Cleveland and Uhrichsville, Akron, Alliance, Warren and Wadsworth refused to take out cars Sunday morning, May 2, following failure to reach an agreement on working conditions and wages. The strike was called by Edward McMorrow, representing the Amalgamated, without notifying the company or the public.

Disagreement came upon two important points:

1. The union demanded a clause in the contract which would require the company to take away the seniority rights of any employee who refused to pay his dues to the carmen's union.
2. The union insisted upon the following wage scale: One-man car operators, first three months 80 cents an hour; next nine months, 82 cents an hour; after one year, 85 cents an hour. Two-men cars, 65 cents first three months, 67 cents next nine months, 70 cents after first year. Suburban operators 1 cent an hour more than these scales. Interurban operators 5 cents more than these scales.

The union representatives also insisted that the word "employee" be written into the contract, thus covering busmen. At the last moment this demand was withdrawn. The union also insisted upon one contract covering the entire property. Heretofore four contracts have existed—one between Akron city trainmen, two with the interurban divisions and one with the Canton-Massillon city divisions.

The company refused the demands of the union. It offered to go ahead another year under the old contract.

Cars were operated by the company Sunday with employees who had dropped out of the union. Most of the city lines were filled on the Sunday schedule basis. On Monday more employees joined in operating cars and on Tuesday all runs were filled by former employees, except Wooster and Bowery.

In Canton approximately 50 per cent of the day service was operating Tuesday. No effort was made the early part of the week to operate cars in Massillon, and no interurban cars are operating. Freight is being handled by truck.

Strikers are picketing all important points in Akron, Cuyahoga Falls and Canton. The company is operating 140 buses in Akron, and this service, coupled with the car service which it has been able to establish, is giving general satisfaction, according to statements made by the big rubber concerns.

Authorities are guarding against outbreaks. Old-time methods of visiting the homes of men who are working for the purpose of getting them to join the strikers have failed. No strike breakers are being imported, but the company began Wednesday to hire men in the regular way. Inexperienced men are being put through training, while experienced men with good records are given runs.

The bus drivers are not a part of the Amalgamated Association. They have an organization of their own and have refused to join with the carmen who are on strike. Additional buses are being received by the company almost daily and are being pressed into service. Public sentiment is with the company.

In a statement issued Tuesday the company said:

> Service will be increased steadily day by day until complete service is established. In rehiring men the company plans to use extreme care. Men accepted for transportation work must come well recommended in filing applications. Preference will be given former employees with good records. Inexperienced men must go through the regular training school and pass examination before being accepted for train service. It is for this reason we ask the car riding public to be patient. Good transportation can only be built up slowly. We intend to build it to a point where it is even better than it was before the strike.
>
> We are informed by loyal trainmen who are working that efforts had been made to intimidate them. Some report that their homes have been visited and attempts made to frighten their families. Fortunately, this intimidation has had no effect. Complaint comes from car riders that they are being annoyed by strike pickets who urged them not to ride the cars. We requested patrons to ignore these pickets.
>
> All cars are manned by men who have been in our employ for some time. The public will find them courteously endeavoring to give good service. They will continue to do so even under the present trying circumstances.
>
> For the present no street cars will be operated after dark. The company does not desire needlessly to expose trainmen who voluntarily work to the limit to aid in supplying service.

Seniority rights for old employees not working ended at noon Tuesday, May 4. The men were notified that they would be accepted only as new employees in the future. The company has absolutely refused to deal any fur-

ther with the Amalgamated Association. This stand is apparently meeting the approval of the public, which has suffered great inconvenience in the past due to the strikes called by representatives of the National Association.

Interurban buses operated by the company are handling traffic between Akron and Cleveland, Akron and Canton, Canton and Massillon, Akron and Wadsworth. Arrangements have been made with the Pennsylvania-Ohio Electric Company to handle passengers by bus from Akron to Kent, Ravenna and Warren.

The present wage scale of the company for two-man city cars operators is 48, 50 and 53 cents an hour according to length of service. One-man car operators receive 4 cents an hour more than this scale. Interurban operators receive 5 cents an hour more than this scale and suburban operators 1 cent an hour more than this scale.

A. C. Blinn, vice-president and general manager of the company, on Wednesday issued the following statement after refusing to meet with Amalagamated representatives:

> This company believes car riders on its system have suffered too greatly from transportation interruptions because of the domination of its trainmen by officials of the Amalgamated Association.
>
> As the citizens of this territory know, the trainmen on this system have been called on a strike many times. Often the public has been put to great inconvenience by these strikes.
>
> The company has decided that it will no longer tolerate this domination, and, therefore, will have no future dealings with the Amalgamated Association or its representatives.
>
> We believe the public—and particularly those who are dependent upon the cars—will agree with us that the time has come to end this intolerable domination.

Cars were operating on May 7 on every line of the Akron city system and out of the rush-hour peak of 82 runs, 73 runs were made. The normal basic number required is 65. Thirteen trailers and 219 buses are in use for the emergency. Of the latter number 58 are taking care of interurban travel between Canton and Cleveland. The company is not attempting railway service at night, and it probably will be some time before it does. In the meantime buses are operating at night under six and ten minute headways. The tense condition is somewhat alleviated by the acquisition of new employees and the return of many old ones to service. The situation throughout is quiet. The backbone of the strike appears to be broken.

Electrical Experts Win Confidence at Melbourne

As preoccupied as W. H. Sawyer certainly must be with his general inquiry into the status and scope of the Electricity Commission of Victoria, Australia, and into the working of the state electricity commission acts, he has found time to endear himself to the people of Melbourne. Newspaper comment refers to his intelligent curiosity, his brisk friendliness and one opinion was ventured to the effect that "this sort of man can be more useful to Victoria than a dozen vain and rude ceremonialists." He sees much to be commended in Melbourne and Melbourne instinctively responds to him and the country he represents. By virtue of his being appointed a royal commissioner Mr. Sawyer is empowered to administer oaths, compel the attendance of witnesses and call for documents.

Mr. Sawyer, president of the East St. Louis & Suburban Railway, East St. Louis, Ill., and Herbert W. Eales of the Union Electric Light & Power Company, St. Louis, Mo., left in January for Australia to direct an extensive survey into electrical development for the Victorian government.

New Commission Members in New York Take Office

John F. Gilchrist, Leon G. Godley and former State Senator Charles C. Lockwood took office on May 1 as Transit Commissioners for New York City, succeeding George McAneny, LeRoy T. Harkness and General John F. O'Ryan.

Mr. Gilchrist, chairman of the commission by the Governor's appointment, speaking for himself and his colleagues, said he did not think it wise on assuming office to make any extravagant promises concerning what the commission proposed to do. He said:

> We are new to the problems we will have to consider and must take time to familiarize ourselves with details. The new commission will try to act and not talk.

John Hays Hammond Honored

Government officials, engineers, university representatives and prominent personages here and abroad unanimously gave tribute to John Hays Hammond, leading engineer, statesman and capitalist, on the occasion of his 71st birthday, at a dinner at the Waldorf-Astoria on May 3. Besides being a mining engineer, Mr. Hammond was one of the builders of the Cape electric trams in South Africa. With Henry A. Butters he organized the company that developed the present electrified system in Geneva, Switzerland. They also electrified the lines in Mexico City. Hailed as an internationalist, a broad thinker, a great soldier of fortune, the spirit of metalism, Mr. Hammond listened to a résumé of his career, which has been a source of inspiration for many other dreamers. It was no wonder that when he rose he said that he was overcome by the demonstration in his honor. It was the value of friendship which meant most in life—which he regarded as an opportunity to play a bad hand well. Congratulations were sent by President Coolidge, and Chief Justice Taft expressed an admiration based on 50 years of close association.

On the committee of arrangements were many prominent citizens, among them Chauncey Depew, Coleman Du Pont, Charles Dana Gibson, James H. McGraw, J. E. Spurr and William Howard Taft. All the testimonials expressing good wishes to Mr. Hammond are to be engrossed and bound in several volumes.

Seattle Men Seek Pension System

Railway men of the Seattle Municipal Railway, Seattle, Wash., are planning to present a bill to the next Legislature seeking establishment of a pension system similar to that applying to firemen and policemen. Under the present method, membership in the relief association is not compulsory. Under the former private operation of the railway lines by the Puget Sound Power & Light Company membership in the relief organization was compulsory.

The system cannot be established so as to include all the railway men without an enabling act by the Legislature, the men point out. Under the plan, however, they hope to have established a sick and injured benefit fund, a pension for retirement after a specified benefit. By including all employees of the railway in such a scheme, the men say, an adequate fund could be established.

Review of Commission's Attitude on Taxi Purchase

Chairman Ainey and Commissioners Benn and Shelby signed the document setting forth the findings of the commission in favor of the purchase of the stock of the Yellow Cab Company by the Philadelphia Rapid Transit Company, but Commissioner Martin rendered a minority report. The majority opinion declares that taxicab riders are potential car riders and that the railway has been forced to operate several unprofitable lines as a result of the competition set up in this fashion. Continuing, the commission states:

> The co-ordination of the street car and taxicab service will increase the revenue of the railway and aid it in bearing the burden of operating the city's non-paying high-speed lines; will result in considerable reduction in overhead expenses of the cab company, and will provide a more adequate and convenient distribution of the taxicab service and other transportation facilities.

Commissioner Martin bases his dissenting opinion upon two grounds. The first of these is as follows:

> The ultimate purpose is to create a monopoly of all forms of local transportation in the city, which is not conductive to the public welfare.

The second objection is found in those provisions of the contract which require that the fares and income of the Yellow Cab Company shall be included in any investigation or readjustment of the fares and income of the Philadelphia Rapid Transit Company. Commissioner Martin said:

> The trolley car system and the cab system of transportation is each a separate entity and should stand on its own feet. No sound economic reason is suggested why each separate class of riders should not pay its own bills. There is no reason why street railway fares should be increased to make up an operating deficit of the cab company, nor is there any reason why the taxicab rider should pay an added rate to help out a railway.

No steps for the immediate securing of the remaining taxicab companies in Philadelphia are contemplated by P. R. T. at the present time. Under provisions of the commission's majority order the railway will be required to make the Yellow Cab Company, now incorporated under the laws of Delaware, a Pennsylvania corporation within six months. It was further specified:

> Neither the purchase price nor any valuation filed in the proceedings shall be binding upon the commission in any further proceeding requiring determination by the commission of the value of the property and assets of either the Philadelphia Rapid Transit Company or the Yellow Cab Company for rate-making purposes.

Approval of the purchase by the commission was noted in the ELECTRIC RAILWAY JOURNAL for April 24, page 784.

News Notes

Increase in Pay Asked by Chicago Surface Men.—Employees of the Chicago Surface Lines—approximately 14,000 conductors and motormen—voted on May 3 to ask for an increase in pay of 5 cents an hour and for the establishment at the expense of the company of a $1,000 death benefit and a weekly sick benefit of $20. These demands they will seek to put into a new wage agreement to become effective on June 1.

Increased Fares May Go Before Voters.—It is likely that the question of increased fares and of changed paving requirements will be voted on at a special election to be held in the city of Ironwood. The Lake Superior District Power Company has requested permission to increase fares in Ironwood, Mich., from 5 cents to 8 cents for adults, with adults either having the choice of seven tickets for 50 cents or a 50-ride ticket book, good for 30 consecutive days, for $2.50. School children will be allowed to ride for 5 cents or seven tickets for 25 cents. Release from paving charges is also sought.

Portland Pay Car Robbed.—The pay car of the Portland Electric Power Company, Portland, Ore., was held up at 9 o'clock on Sunday morning, April 18, and approximately $14,000 in cash was obtained by the bandits. The Portland Electric Power Company has posted a reward of $1,000 for the capture of the bandits. The robbery is one of the most daring that has occurred in this city in many years.

Another Step in Franchise Negotiations.—A meeting of the board of directors of the Virginia Electric & Power Company, Richmond, Va., was recently called to act upon formal matters in connection with the company's bid on the new blanket franchise. An agreement to surrender the present franchise, a step necessary before bidding can be made upon the new franchise, was signed and will be presented to the streets committee of the Richmond City Council at its next meeting, so that action on the franchise may be expedited. The agreement also covers the provision for the sale of the power company's traction properties in the remote event that another company should be the successful bidder for the new franchise.

Parking for Philadelphia Shoppers.—A co-operative parking plan evolved by and for the benefit of the Chestnut Street Association in Philadelphia has been put into effect. It provides free parking for patrons of more than 25 stores represented in the association, and utilizes 40 garages in the locality between the Delaware and the Schuylkill Rivers and Pine and Vine Streets. In operation the plan is relatively simple. The driver of the automobile goes to the garage most convenient in the prescribed area which is using the plan. Upon leaving the car at this garage, the patron receives a claim check. The shopper then is free to go where he will and to remain as long as he wishes. At the stores where the plan is being used, the claim check is presented upon making a purchase. The store gives the patron a card, properly stamped and dated, which is presented to the garage owner or employee when the car is to be taken out. This card pays for the storage during the shopping period.

Children Will Show Ideas on Safety.—The Safety Poster Contest, opened in Atlanta's public schools on April 15, and held under the auspices of the Atlanta Safety Council, will continue until May 15. Under rules announced by the council, the contest is open to students of the fourth, fifth and sixth grades. Two prizes are offered for the best posters in each grade, a first prize of $5 and a second prize of $2.50. In addition, a prize of $5 will go to the Parent-Teacher Association of the school submitting the largest number of posters. The contest is held primarily to impress the youngsters with the importance of safety; to influence them to use every precaution to prevent accidents, and to give them an opportunity, through deep study of the subject, to display their originality in the drawings. In last year's contest more than 20,000 posters were drawn.

Foreign News

Transportation Facilities Disrupted in England

Transportation in and around London, England, is practically crippled owing to the general strike. Thousands are walking to work, while others jam the few trams in operation, the many buses and the private automobiles rushed into service. Even horse vehicles have been resurrected.

Transit facilities are improving, however. The central tube in London was running on skeleton schedule on May 5 and volunteers have come forward sufficient in number to warrant the management in announcing that service on most lines will be a reality in the near future. Trains are running after a fashion between most of the important cities and with the promise of more volunteer crews better service is expected.

Conditions appear darker in some localities than in others. In Manchester the tramway employees are solid for continuance of the strike. There transportation to nearby towns is entirely by buses and motor cars. On the other hand, in Portsmouth 50 per cent of the tramway employees who were on strike on May 4 returned to work the following morning when it was announced they would be dismissed if they failed to report for duty.

Manchester Tramway Developments.—Tramway extensions costing approximately £120,000 are now being made in Manchester, England. About £20,000 will be spent on bus purchases.

Electric Trains to Operate Over the Andes.—Work is now in progress on the electrification of the railroad across the Andes Mountains in South America between Argentina and Chile. Electrification of the Chilean section as far as Caracoles, on the Argentine border, is now under way. The cost of this project is estimated at $3,000,000.

Progress in Electrification in Austria.—Electrification of the Austrian Federal Railways is progressing as rapidly as funds are released from the balance of the League of Nations credits set aside for investment purposes. In addition to the 56 electric locomotives ordered last year, most of which are now in operation, 50 more have been ordered and delivery will be made progressively until the end of 1927. The new locomotives have axle loads of 16 tons, the former being adapted to only 14.5 tons. The roadbed is unable to support the heavier type locomotives, but it is planned to reinforce the principal portions of the main lines at a future date, particularly the Vienna-Salzburg line, in order to permit the use of a stronger type locomotive.

New Electric Locomotives in Italy.—Ten new electric locomotives have recently been ordered by the Italian State Railway authorities from the Breda Engineering Works of Milan, as a result of trials on the Rome-Tivoli-Avezzano line. Each engine has a wheelbase of 38 ft. and is fitted with two electric motors, the drive being through gearing and coupling rods to two of the axles. The machine is equipped with a transfer which steps down the 45-cycle current from the 10,000-volt trolley potential to 1,600 volts. The motors can be run either in series or parallel.

One-Way Traffic on Strand.—Part of the Strand in London, one of the world's most crowded streets, will attempt to solve its traffic problem by operating one-way traffic. No vehicles may run on the Strand beginning at Trafalgar Square. They must detour and enter it above Charing Cross station.

Electrification in India.—Calcutta and Madras are following the example of Bombay in promoting schemes of suburban electrification. Areas requiring the most urgent development by means of railway extension, according to the administration's report of 1924-25, are Burma, South India and the coal field area in Bihar and the central provinces.

Railway Superseded by Bus in Liverpool.—Bus service has taken the place of the Waterloo & Crosby Tramways, a 3-mile line on the outskirts of Liverpool, England, following the abandonment of the tramway lines. Top-covered double-deck buses will be operated along this route by a local bus company. When the lease expired for operating the tramways it was proposed that the city of Liverpool should buy the undertaking, but the plan referred to previously did not mature.

British Tramways Association.—The annual congress of Tramways and Light Railways Association will be held at Torquay, England, June 23-25.

Recent Bus Developments

307 Miles of Route in Penn-Ohio Operation

Constant expansion of the bus lines of the Penn-Ohio System, Youngstown, Ohio, has placed that company in the forefront among the railways as a user of the bus. The largest expansion has been that just recently announced in the acquisition of the property and routes of the Cleveland, Warren, Youngstown Stage Company. This added 127 miles to the Penn-Ohio system's routes and eighteen coaches to its fleet, bringing the total number of interurban coaches to 45.

Daily the regular coaches of the system traverse 5,758 miles and extra service and trippers on Saturdays and other big days often run this mileage to more than 6,000. Throughout the "home territory" of the Mahoning and Shenango valleys the bus lines extend and then northwest to Cleveland, west to Akron and northeast to Greenville, Conneaut Lake and Meadville.

Immediately after taking over the operation of the lines the opportunity to give extraordinary service was developed by arranging to take people from Youngstown, Girard, Niles and Warren direct to the Cleveland auditorium for the grand opera performances. Furthermore, seats for the opera were reserved at local ticket offices of the Penn-Ohio for persons desiring this service.

Plans are making for similar service to those desiring to go to ball games in Cleveland and also for those going from towns on the system to Cleveland to take the steamer for lake points.

The company entered the bus field on Aug. 1, 1922, with a service between Youngstown and Warren with a type of equipment that had been specially designed. The coach system now embraces 307 miles of routes.

Receiver Reports Results of Kansas City Bus Operation

The Kansas City Railways, Kansas City, Mo., sustained a deficit of $159,174 in the operation of its bus lines since the service was started last September.

The loss from September to Dec. 31 was $87,852 and from Jan. 1 to March 31, $71,322. Included in the deficit are the upkeep and maintenance of the buses, expenses for trimming trees along bus routes and other miscellaneous factors.

Francis M. Wilson, one of the receivers of the company, said:

> There is no move on to increase fares nor will there be. To increase fares would be both unprofitable and highly deplorable. The company must operate on the present fare, both for street cars and buses.

Mr. Wilson said he believed a saving could be effected by the intensive use of the double-deckers for the rush-hour period.

In making the figures public, Mr. Wilson emphasized that the reorganization group which is to take over the company at the termination of the receivership entertains no ideas of curtailing the bus service. He said:

> On the other hand, the new owners are convinced the service must be increased and Kansas City must be kept at the very front as a bus service city.

Detroit Preparing to Act

Will Exercise Power to Regulate Under Recent Court Decision — Bus Company and City Co-operate

Jitneys are being operated over the streets of Detroit, Mich., under the same regulations as before the decision was rendered by the Michigan State Supreme Court in which it reversed the finding of the Wayne County Circuit Court and upheld the validity of the Detroit ordinance regulating jitney traffic on Detroit streets. The jitney drivers have 40 days from the date of the decision in which to file a petition for a rehearing in the case.

Conferences have been held in which the Mayor, officials of the Department of Street Railways, the Rapid Transit Commission, the Police Department and the Corporation Counsel have participated, but the new regulatory ordinance planned to include jitneys, buses and taxis has not been framed by the Corporation Counsel.

Meanwhile the Highland Park Common Council has amended its city ordinances regulating jitney transportation, increasing the annual fee for jitney licenses from $15 to $25 and placing the jitney drivers under the regulatory control of the Highland Park police. Highland Park is a separate municipality surrounded by the city of Detroit, and the jitney drivers operating the Woodward Avenue route from downtown Detroit run their jitneys into or through Highland Park.

Principles which will govern future relations between the city of Detroit and the Detroit Motor Bus Company were drawn up at a recent meeting attended by representatives of the Rapid Transit Commission, the Street Railway Commission and the Detroit Motor Bus Company. Other meetings are to be held.

The representatives intend to determine the nature of all conflicts between the D.S.R. and the bus company with relation to their effect on service and the possible elimination of interference between the two systems. Also that in regard to the future situation in the city the committee agreed on the desirability of having facilities in strong hands, decentralized as to financial obligation but co-ordinated in service so as to feed to each other and reduce total investment by the avoidance of duplication. This is understood to be preliminary to the acquisition of the bus lines by the city at such a time as it completes its own trunk line system of rapid transit. It was reported that President Evans of the bus company stated that in planning expansion his company would be governed by the future needs of the city.

Competition Not Countenanced

A certificate for the operation of a bus line between Canandaigua and Geneva, via Algonquin and Flint, has been granted by the Public Service Commission. The certificate provides that the petitioners shall carry no through passengers between Canandaigua and Geneva and shall carry no local passengers in the city of Canandaigua in competition with the line of the New York State Railways in that city. The petitioners have operated between Canandaigua and Geneva for five years. The memorandum of the commission accompanying the order points out that while trolley service is probably adequate, there is need for service to accommodate the local traffic along the Turnpike Road.

More Bus Lines for Public Service

Purchase of the Rutherford, East Rutherford and Hackensack Bus Lines, Inc., and the Elizabeth-Linden and Rahway Bus Lines, Inc., by the Public Service Transportation Company, Newark, N. J., was announced by that concern on May 5. The Rutherford line operates between Rutherford and Hackensack and has permits for four buses. The other line runs between Elizabeth and Rahway and has fourteen buses.

Bus Extension in Rochester Planned

Further expansion of the bus system of the New York State Railways in Rochester, N. Y., is indicated by petitions for three new routes filed with the Common Council and a fourth with the State Public Service Commission. The applications were made by the Rochester Railways Co-ordinated Bus Lines, Inc., subsidiary of the New York State Railways.

At a hearing in Rochester before Commissioner Van Voorhis of the state body no opposition was expressed to a proposed line to skirt the northern boundary of the city and provide service to the suburb of Irondequoit on Lake Ontario. Three street car lines, the St. Paul, Clifford and Sea Breeze, would be connected with the proposed bus line. Service will be hourly and three zone fares established, with the highest fare set at 30 cents. Transfers to all trolley lines would be issued.

The three other lines, all in the city, are: Extension of the Emerson Street bus line from Lexington Avenue and Lee Road to the city line; from Lyell Avenue and Glide Street to the city line on the west side, and from Lake Avenue and Latta Road through Latta Road to city line on the north side.

All of these routes would serve newly developed outlying territory and all would act as feeders to trolley lines.

Minnesota Buses to Be Rerouted

Better routings of the interurban buses of the Twin City Motor Bus Company are to go into effect between Minneapolis and St. Paul, Minn., following a decision by the Minnesota Railroad and Warehouse Commission. This decision gives this subsidiary of

the Twin City Rapid Transit Company a present monopoly of the intercity bus service. The change affects the loops in both cities. T. Julian McGill, vice-president, will confer with retail merchants preliminary to a petition before the commission to operate a fleet of twelve-passenger buses on Nicollet and Hennepin Avenue out to Lynnhurst, which is a district south from Fortieth Street. This auxiliary service is planned to begin as soon as the new terminal building is completed, about July 15.

Further Expansion in Vancouver

The British Columbia Rapid Transit Company, Vancouver, B. C., a subsidiary of the British Columbia Electric Railway, has opened a new motor coach route between Vancouver and Chilliwack, a distance of 76 miles. Both freight and passengers will be carried.

The passenger route was purchased from G. L. Hamre, and the freight business from H. A. Thornton, both of whom have been retained in the company's employ. These routes formerly extended only to Abbotsford, but with the opening of a new road to Chilliwack, 20 miles farther, coaches now operate the entire distance.

Four trips daily each way are made by the passenger coaches and two trips by the freight trucks. Passenger coaches terminate at New Westminster, 12 miles from Vancouver, at which point passengers are transferred to other coaches of the company. Two Fageol coaches have been ordered and will replace the old acquired equipment.

The British Columbia Electric Railway operates an interurban railway between Vancouver and Chilliwack carrying both freight and passengers. The new service will cater to less than carload lot freight, leaving the through shipments to the railway.

Boston-Providence Service by New Haven

The Department of Public Utilties of Massachusetts on May 1 approved the application of the New York, New Haven & Hartford Railroad and the New England Transportation Company which is controlled by the railroad, to operate a bus line between Boston and Providence. The line would be operated to provide bus service to Boston for residents of Walpole, Wrentham, Plainville, North Attleboro and Attleboro. Local passengers between Boston and Norwood would not be carried on this line.

Northwestern Indiana Bus Service Under Way

Operation of 25 bus lines in northwestern Indiana, radiating from Gary, Hammond and Michigan City, has been formally started by the Shore Line Motor Coach Company. These coach lines were merged under the new company following the granting of a petition by the Indiana Public Service Commission. All intercity lines formerly operated by the Gary Railways, Farina's Bus Line and B. P. Shearon are included in the consolidation. The Gary Railways will continue to operate the bus routes within the city of Gary. The majority of the stock of the Shore Line Company is owned by the Chicago, South Shore & South Bend Railroad and by the Gary Railways. Charles W. Chase is president of the company. Its headquarters are in Gary. The bus lines will supplement the service of these lines and will act as feeders to them. The Michigan City-St. Joseph-Benton Harbor route schedule has already been changed to meet all through limited South Shore Line trains at the former city.

South Bend Railway Adds to Bus Facilities

Transportation service into sections of South Bend, Ind., which heretofore have had no regular transport of any kind has been provided by the Chicago, South Bend & Northern Indiana Railroad through the purchase of five new 21-passenger street car type Studebaker buses.

The whole southwestern part of the city has been without service because of the cost of crossing the New York Central Railroad tracks, soon to be elevated. A section of the southeastern part of the city also has been without service, though it has developed recently into one of the finest residence sections.

R. R. Smith, vice-president and general manager of the traction system, which covers all of northern Indiana, explained the move thus:

> We selected buses for this new service because of their flexibility and convenience and because development of the city has been so rapid there has been insufficient time for permanency of congestion to be established. As centers of population shift, the buses can follow them much more readily than the costly installation of tracks and roadbed. We already are operating a number of buses of various sizes to supplement our trackage. We keep a completely detailed cost record of their operation and consulted it when we came to buy new equipment.
>
> As a result, we chose the medium-sized equipment. We found that the larger and heavier buses were fully serviceable during only two brief periods a day. During the remainder of the day they were uneconomical. This is not a new discovery; street railroads learned the lesson when they went in for the largest sized cars several years ago. A larger number of medium sized units gives greater flexibility of equipment for handling economically the wide fluctuations in load between rush hours and off peak periods. At the same time the smaller vehicle makes shorter headways practical in the off hours without making operating costs excessive.

New Line Opened.—The Boston Elevated Railway, Boston, Mass., has opened a double-deck bus line operating from the O'Reilly Monument on Commonwealth Avenue to Bowdoin Square. The fare rate will be 10 cents, with transfer privileges at any point.

Referendum Would Postpone Permit Subject.—Demands for a referendum on the bus franchises agreed upon by the Buffalo, N. Y., City Council for the International Bus Corporation, a subsidiary of the International Railway, have prompted the municipal authorities to withhold final action on the agreement until the return to Buffalo of Mayor Frank X. Schwab, who is in Europe. The franchise for two new bus lines and an agreement to allow the International Railway to scrap three trolley lines in the city were approved by a vote of three to one by the Council in committee, but when the grant came up for final approval, strong opposition developed and action was deferred. Petitions for a referendum are now being circulated in the city.

Extended Trip on Buses.—Bus service from the end of the Washington Avenue car line at the city limits on East Second Street, North Little Rock, Ark., to Tie Plant was started recently by the Inter-City Terminal Railway. De luxe buses are used in the service. The Arkansas Railroad Commission granted a permit for the service. The bus fare is 6 cents and a transfer to the street cars 4 cents additional. Transfers from street cars are given at the same rate. With service to Tie Plant, a person may go from any point in Little Rock over the lines of the Arkansas Central Power Company and the Inter-City Terminal Railway to Tie Plant for 10 cents, and 2 cents additional for the transfer at Markham and Main Streets.

Transfer to Traction Control Expected.—Transfer of a bus line from private ownership to traction control is forecast with a petition by the Midwest Transit Company, operating between Indianapolis and Lafayette, asking the Indiana Public Service Commission to permit the Indiana Motor Transit Company, the bus division of the Terre Haute, Indianapolis & Eastern Traction Company, to take over its bus permit. The Mid-West company was the Red, White and Blue Line.

Line Started Between Hudson and Framingham.—The Boston & Worcester Street Railway started a bus line between Hudson and Framingham, Mass., on April 19. The line will take in the towns of Marlboro, Southboro and Fayville and the latter town will be the transfer point for Boston or Worcester. The company expects to continue its railway service between Marlboro and Hudson. It is also planned to operate the cross-town system of trolleys in Marlboro for the benefit of industrial workers.

Licenses Renewed and Refused.—The City Council of Westfield, Mass., has renewed three bus licenses of the Springfield Street Railway to operate buses in that city. The application for new bus routes, which the railway has had up many times since they were first requested last September, were again considered, but licenses were refused.

Railway-Bus Schedule for Suburb.—Arrangements have been completed with the Jacksonville Traction Company, Jacksonville, Fla., to maintain a regular railway and bus schedule for residents of Lake Shore, a rapidly developing suburb of Jacksonville. The bus to be used for this service is of the de luxe Pullman type. The schedule is so arranged that it meets all the requirements of the school children and shoppers who live in Lake Shore.

Tourist Bus Arrives in Richmond.—The first of the two de luxe passenger buses purchased by the Virginia Electric & Power Company intended to be rented out to tourists and for use on special occasions has arrived in Richmond, Va. The new bus is named the "Virginia." The buses cost approximately $20,000.

Financial and Corporate

Net in Seattle Cut in Half

D. W. Henderson, superintendent of the Seattle Municipal Railway, Seattle, Wash., has filed his report for 1925 with the Mayor and the City Council. The figures reveal that revenues on the railway lines are decreasing and operating expenses are growing. Passenger car revenue for 1925 was $5,851,959, compared with $6,043,981 for 1924. Operating expenses during 1925 were $5,031,917 and for 1924 $4,807,538. The income statement shows a net of $204,706 for 1925, compared with $557,243 for 1924.

At the close of the year the bonded indebtedness of the department was $13,524,500; of this $11,668,000 remained from the issue of $15,000,000 of bonds issued to cover the purchase of the lines from the Puget Sound Traction, Light & Power Company. The rest of the indebtedness was incurred in making extensions, in the purchase of the Greenwood Avenue line, construction of the Ballard line and other activities. The sum includes $176,000 in warrants issued this year for extensions. Revenue from the buses run as a part of the railway system showed an appreciable gain in 1925, with a total of $57,526, compared with $38,662 for 1924.

$2,119,120 Paid to City by Chicago Surface Lines

The sum of $2,119,120 was paid recently by the Chicago Surface Lines as the city's 55 per cent of the railway earnings during the last fiscal year. Payment was, however, made subject to a stipulation that reimbursement for $260,736 paid out of the account as income tax will be requested by the city. The city contends that the income tax settlement should only be made after the earnings are split. This would leave the city's portion tax free. In that event the tax would be paid out of the company's 45 per cent of earnings.

During the nineteen years of the present franchises the surface lines have paid into the city traction fund a total of $36,474,544. In addition to this, they have paid out $15,197,199 for street paving, $9,741,189 for street cleaning, $5,671,745 for maintenance of paving and $1,889,377 for removals of track and overhead and replacements on account of sewer installations and other underground work in the streets.

Underlying Bonds Offered to Philadelphia Riders

In order to give the car rider another opportunity to invest in the securities of the companies included in its system the Philadelphia Rapid Transit Company, Philadelphia, Pa., for the first time is offering mortgage bonds of the West Philadelphia Passenger Railway. This opportunity presented itself by the maturity on May 1, 1926, of an issue of 5 per cent bonds of the West Philadelphia Passenger Railway. These bonds are being advertised to West Philadelphia car riders through *Service Talks*, the official paper of the Philadelphia Rapid Transit Company, and are being sold through the offices of the company's securities corporation. Bonds of this kind are not usually sold in denominations of less than $1,000, but the present issue is made available in denominations of $100 and $500. The bonds were issued in 1886, at 5 per cent interest, to mature May 1, 1926. They are now extended for 30 years, with interest increased to 5½ per cent. The total issue is $750,000. The bonds available to West Philadelphia car riders represent that part of the issue presented for redemption by those who decided to accept cash instead of taking bonds of the extended issue. The new bonds are callable at 102½ per cent of par.

North Shore Net Up $79,910

Interurban Road Continues to Break Records—1925 Revenue Six Times That of 1916—Skokie Valley Route Ready Soon—47 Limited Trains a Day Between Chicago and Milwaukee

OPERATING revenue of the Chicago, North Shore & Milwaukee Railroad in 1925 was $6,850,165, an increase of $651,178 over 1924. Gross income, after operating expenses, depreciation and taxes, was $1,613,621, an increase of $302,318. Net income after fixed charges was $780,630, an increase of $79,910.

The year 1925 marked the virtual completion of the Skokie Valley route, the new additional main line that will directly connect Libertyville and Mundelein with downtown Chicago and downtown Milwaukee, and the making of large improvements in previously existing properties.

At the time the present management assumed operation of the North Shore Line, in 1916, the road and equipment were valued at $12,251,997. In the intervening period to the end of 1925 a total of $22,089,374 additional was raised from investors and spent for right-of-way, track improvement, stations, cars and other equipment, bringing the value of the road and equipment as of the end of the year up to $34,341,371.

In 1925 a total of 18,229,160 passengers, or an increase of 1,057,975, as compared with 1924, was carried. The main line railroad carried 9,814,594 revenue passengers, an increase of 354,480 over the previous year. It transported 536,095 tons of merchandise, as compared with 333,888 tons in 1924, an increase of 202,207 tons. Its express and milk departments also showed healthy increases. North Shore Line trains operated 10,989,774 car-miles, an increase of 1,107,975 miles over the previous year. This does not include car mileage of city lines.

On the Milwaukee city lines 2,787,742 revenue pasengers were carried, an increase of 175,625. In Waukegan, where the company operates both the street railway and supplemental motor coach service, 4,663,321 passengers were carried, an increase of 352,494. On the motor coach routes, operated as auxiliary to the high-speed electrically operated railroad, 963,503 passengers were carried, an increase of 175,376 over the corresponding year.

The heavy expenditures on the Skokie Valley route, under construction during the year, tended to reduce the net income. The steady growth in business is indicated by a comparison of gross operating revenue per mile of road over the last ten years:

Year	Revenue per Mile	Year	Revenue per Mile
1916	$12,688	1921	$43,528
1917	19,203	1922	48,472
1918	31,798	1923	57,498
1919	33,278	1924	59,962
1920	40,558	1925	63,251

Another interesting sidelight on the growth in the company's business is the fact that in 1925 operating revenue was six times that of 1916.

During the year the company sold $9,950,000, par value, of first and refunding mortgage 6 per cent gold bonds. It retired $60,000 first mortgage 5 per cent gold bonds, $3,500,000 one-year 6 per cent gold notes, $1,276,000 ten-year second sinking fund gold notes, $44,400 fifteen-year 7 per cent second sinking fund gold notes and $941,300 three-year 6½ per cent second sinking

INCOME ACCOUNT OF THE CHICAGO, NORTH SHORE & MILWAUKEE RAILROAD FOR THE YEAR ENDED DEC. 31, 1925

Operating Revenue:		
Passenger and special car revenue	$5,214,009	
Freight and express revenue	1,206,977	
Miscellaneous revenue	429,178	
		$6,850,165
Operating Expenses:		
Way and structures	$508,057	
Equipment	443,425	
Conducting transportation	2,182,664	
Power	579,731	
Traffic	234,805	
General and miscellaneous	1,118,272	$5,066,956
Net revenue from railway operation		$1,783,209
Net auxiliary operating revenue		86,993
Net revenue from operations		$1,870,203
Taxes assignable to railway operations		408,254
Operating income		$1,461,948
Non-operating income		151,672
Gross income		$1,613,621
Deductions from gross income		832,991
Net income		$780,630

STATEMENT OF SURPLUS

Surplus Jan. 1, 1925	$640,216	
Deduct: Sundry adjustments	242,981	
	$397,235	
Net income, Jan. 1 to Dec. 31, 1925	$780,630	
Less: Dividends paid	525,359	
	$255,270	
Sundry credits	81,089	
	$336,359	
Surplus, Dec. 31, 1925	$733,594	

COMPARATIVE INCOME STATEMENT OF CHICAGO, NORTH SHORE & MILWAUKEE RAILROAD

	1916	1920	1924	1925
Operating revenue	$1,157,191	$4,193,669	$6,198,987	$6,850,165
Operating expense	714,887	3,229,048	4,650,030	5,066,956
Net revenue—Railway operation	$442,304	$964,621	$1,548,957	$1,783,209
Net auxiliary operating revenue	.....	.....	800	86,994
Net revenue from operation	$442,304	$964,621	$1,549,757	$1,870,203
Taxes assignable to railway operation	66,038	151,746	298,609	408,255
Operating income	$376,266	$812,875	$1,251,148	$1,461,948
Non-operating income	6,208	10,332	60,155	151,673
Gross income	$382,474	$823,207	$1,311,303	$1,613,621
Fixed charges	237,996	390,196	610,583	832,991
Net income	$144,478	$433,011	$700,720	$780,630

fund gold notes and $203,000 equipment trust certificates.

Additional issues of 7 per cent cumulative prior lien stock aggregating $3,500,000 were authorized. Cash sales of prior lien stock during the year totaled $2,884,800. Quarterly dividends at the rate of 6 per cent on the preferred stock and 7 per cent on the prior lien stock were paid regularly.

With the completion of the Skokie Valley route, the company will own and operate approximately 230 miles of single track. It is significant that all of the right-of-way between Chicago and Milwaukee is entirely owned, except for short distances in a few towns aggregating about 3 miles.

At the end of the year the North Shore Line was operating 47 limited trains daily between Chicago and Milwaukee, in addition to its express and local service. Two additional non-stop limited trains were added during the year, the selection of the names being left with riders. They were named the "Northland" and the "Metropolitan." Three new express trains were also added between Highwood and Chicago. As soon as the double-tracking of the line between Lake Bluff and Mundelein was completed in July, a frequent service was started.

Parlor and dining car facilities on the limited trains continue popular. This is attested by the fact that 79,000 meals were served and 39,000 riders carried in parlor cars.

The rolling stock of the company at the end of the year consisted of 173 passenger cars, 43 merchandise despatch cars, 197 box cars and gondolas, seventeen electric locomotives and work cars and 68 motor coaches and a large number of motor trucks. All of the cars used in the Chicago-Milwaukee service are of steel. To provide for the growing traffic, 20 additional passenger cars and three more diners have been ordered at a cost of $800,000.

The merchandise despatch service is proving as popular as was anticipated. An additional convenience to the public is five merchandise despatch refrigerator cars, which will provide a service of transporting fresh meat, vegetables and other perishables to North Shore communities.

The company's motor coach business is showing a constant increase. The company has 68 motor coaches of improved type, the greater number operating upon eleven regular routes and providing a much-needed auxiliary service, particularly to residents of the countryside. In addition to the regular routes, the chartered coach business has shown a good increase.

Rehabilitation of Connecticut Line Proceeds

Plans are developing rapidly and it is expected the recently organized Danbury & Bethel Traction Company will soon be in a position to take over the old Danbury & Bethel Street Railway, which operates trolleys and buses between Danbury and Bethel, Conn.

Buses are at present co-ordinating with the trolleys with improved results. For the year 1925 the company not only paid expenses, but was able to show a net income of $29,000. This was done with a gross income lower than in 1924.

A. W. Sperry, who is engineering the reconstruction of the Danbury & Bethel company, is confident that operation can be placed on an even higher level. His further plans are said to include operation of intercity bus lines at Danbury.

Change in Control of Nashville Interurban

Control of the Nashville Interurban Railway, Nashville, Tenn., was purchased recently by Gerald B. and Lawrence Howard. The change in control has resulted in a new management to operate the 19-mile line operating between Nashville and Franklin. The present board of directors is composed of two new members, namely, Newton Cannon and Lawrence Howard. The consideration involved in the stock purchase was not stated. The outstanding securities of the line consist of $600,000 of bonds and $600,000 of stock.

Sale of Madison Avenue Surface Line Arranged

At a special meeting stockholders of the New York & Harlem Railroad, New York, ratified a contract of sale of the company's surface lines on Fourth and Madison Avenues to Charles L. Craig. The company's real estate, consisting chiefly of the carhouse site at 135th Street and Madison Avenue, is not included in the sale to Mr. Craig.

P. E. Crowley, president of the New York & Harlem, presented to the meeting a statement showing that the company's surface lines had been operated in 1925 at a deficit of $405,285, compared with a deficit of $85,911 in 1924. For two months ended Feb. 28, 1926, the deficit was $61,744. From Feb. 1, 1920, the date on which the surface lines were returned to the Harlem company by the receiver of the New York Railways, lessee, to Feb. 28, 1926, the total deficit on operation was $857,539.

Traffic, Fare and Wage Figures Reported

The increase in passenger traffic on electric railways was considerably accelerated during the month of March. The number of revenue passengers, including revenue bus passengers, reported to the American Electric Railway Association by 208 companies for the month, as compared with the same month in 1925, was as follows:

March, 1926	828,319,675
March, 1925	809,752,684
Increase	2.29 per cent

The average cash fare in 272 cities of 25,000 population and over was:

	Cents
April 1, 1926	7.6653
March 1, 1926	7.6543
April 1, 1925	7.5220

Average maximum hourly rates paid motormen and conductors in two-man service by companies operating 100 miles or more of single track.

	Average Hourly Rate (Cents)	Index No. 1913=100 (Per Cent)
April 1, 1926	56.63	207.82
March 1, 1926	56.63	207.82
April 1, 1926	56.03	205.61

Chicago Securities Analyzed

Edwin L. Lobdell & Company, Inc., dealers in securities at Chicago, have prepared an analysis of the Chicago traction securities based on the city purchase price for the properties as certified by the Board of Supervising Engineers aggregating $163,508,224 on Feb. 1, 1926. Some statistics are included on the Chicago Railways, the South Side Lines and the Chicago City & Connecting Railways. The pamphlet was prepared in view of the general interest in the subject of protective committees to represent security holders of the Chicago Surface Lines.

Abandonment in Westchester Authorized

Supreme Court Justice Morschauser, upon application of Eugene F. McKinley, counsel for Leverett S. Miller, receiver of the Westchester Street Railway, White Plains, N. Y., has authorized Mr. Miller to discontinue service at 11:30 o'clock on May 31. The railway connects Tarrytown, White Plains, Silver Lake, Greenburgh, Elmsford, Scarsdale and Rosedale. The company has been losing money steadily for years.

It is expected that Mr. Miller, who is president of the New York, Westchester & Boston Railway, will operate a bus system over the route of the railway when the Public Service Commission issues an order allowing the electric railway to abandon completely the different lines. The system includes more than 20 miles of track. Power for operation is purchased.

Mr. Miller was appointed receiver of the company several years ago and was also allowed to increase fare to 10 cents in certain zones.

Loss in St. Louis $236,051

The United Railways shows a decrease in gross revenue of $618,968 for the year ended Dec. 31, 1925. Operating expenses and depreciation were reduced $409,119, but this reduction was not sufficient to avoid a net loss for the year of $236,051 compared with a surplus of $29,988 for the year previous. Taxes were increased more than $38,000 to $1,810,701. This figure is now equivalent to 9.58 per cent of the entire gross. Including taxes the operating ratio in 1925 was 87.3 per cent. The deficit for 1925 is after all operating expense, depreciation, taxes and after setting aside $2,892,515 for interest and miscellaneous fixed charges. The deficit is credited with $1,000 from bus rentals, but the bus operations are not included in this statement.

These figures are taken from an advance copy of the receiver's annual statement issued to the ELECTRIC RAILWAY JOURNAL. Separate statement of the Missouri Electric under the same receivership management shows a deficit of $59,545 after operating expenses, taxes and $35,000 interest charges and after $9,507 deficit from bus operation. This compares with a deficit of $37,940 for the preceding year.

The management has stated that bus competition, coupled with the great increase in private automobile operation, has been responsible for the falling off of gross revenue. The greatest loss of revenue occurred in the early months of 1925. The first three months of 1926 indicate an increase of more than $30,000 in gross revenue, or 0.64 of 1 per cent.

Report Explains Condition of Long Island Subsidiaries

Pertinent facts were brought out in the 44th annual report of the Long Island Railroad, New York, N. Y., with reference to its subsidiary trolley lines.

The Glen Cove Railroad proceedings in voluntary dissolution have been completed and the receiver discharged.

The Nassau County Railway discontinued operations on Dec. 31, 1924. Proceedings in voluntary distribution are under way.

The Long Island Electric Railway and the New York & Long Island Traction Company were sold under foreclosure early this year. The Long Island Railroad was interested in these lines through holdings of securities of its Long Island Consolidated Electric Company and advances made directly to these lines to keep them in operation. These lines were purchased or built to give more service to the public, increase railroad earnings and protect the properties. The use of motors and trucks on improved highways made the electric railways unprofitable. This was the chief reason for the heavy charge to profit and loss of $2,000,000, as the investment has been entirely wiped out through dissolution or foreclosure, and, together with the New York, Brooklyn & Manhattan Beach Railway merger, is largely responsible for the decreases in "investments in affiliated companies" on the general balance sheet. The communities have had the benefit of these lines, but the burden of the losses has been thrown on the Long Island Railroad. It is explained that there is no source to which the stockholders can look for recoupment or to bear at least a part of the large outlays.

Distribution of Ohio Traction Assets

Committees of Security Holders Reach Understanding on Terms for Disposal of Company's Property

Tentative agreement has been reached by the committees representing the preferred and the common stock holders that the division in the distribution of the assets of the Ohio Traction Company, Cincinnati, be placed somewhere between 1-9 and 1-10 for the common stock and between 8-9 and 9-10 for the preferred stock. Letters mailed to the stockholders by the committees declare that no definite figure has been agreed upon as yet, but say that the members of the committees feel that some such figure as that suggested would be equitable.

The committees have extended the date for the deposit of stock to May 10. On April 20 there had been deposited 74,382 shares of the preferred out of 85,000 shares and 79,798 shares of common out of 86,550 shares. The deposits represent 87½ per cent of the preferred and 92$\frac{7}{10}$ of the common. The committees will not adopt a final definite plan until after the last day of deposit on May 10. The letters point out that inasmuch as the deal between the Ohio Traction Company and the Cincinnati Street Railway could not have been concluded without the assent of the common stock and that any reorganization plan may require action by the common stock holders, it was felt that the common stock was entitled to participate in any distribution of the assets. The committees set forth a statement of assets of the Ohio Traction Company and its subsidiaries, the Cincinnati Traction Company and the Cincinnati Car Company, as of Jan. 16, 1926. The total assets are set forth as $9,502,141. This is approximately $112 a share on the 85,000 shares of preferred stock. The assets are made up as follows:

The committees say that as soon as a plan is agreed upon there will be available for distribution practically $1,700,000 in cash, treasury certificates and certificates of deposit. If the other assets are kept intact, there will be available for yearly distribution a substantial income as follows:

Earnings from the Traction Building for the last few years were on an average of about $52,000 a year net.

Earnings of the Cincinnati Car Company since 1922 were as follows, to wit:

1922	$177,737
1923	244,306
1924	319,420
1925	227,481

The dividends from the 86,661 shares of Cincinnati Street Railway stock for the years 1926, 1927 and 1928 will be $216,652 a year and each year thereafter they will be $259,983 a year.

It is very likely that the assets will be held in the name of a single company, presumably the Cincinnati Car Company. If this be the case and considering all the avenues of revenue, the surviving company will have approximately $500,000 a year for distribution among its stockholders. It is planned to list the stock of the new company on the Cincinnati Stock Exchange.

Improvement Shown in Report of New Jersey Company

Combined revenues from railway and bus operations by the subsidiaries of the Public Service Corporation, Newark, N. J., for the twelve months ended March 31 were $29,303,087, an increase of $1,561,064 over the preceding year. Public Service Railway alone showed only a small net income. Operating revenues from buses increased materially, but were not sufficient to prevent a net loss of some $300,000. This, however, was only about one-fourth of the deficit shown for the year ended March 31, 1925. The consolidated statement of transportation operations showed a deficit of $241,544, against an operating deficit of $1,300,759 for the preceding twelve months, the latter not including profit of $2,358,729 from the sale of the Public Service Newark terminal to the Public Service Corporation. Railway passengers numbered 415,729,370, compared with 423,265,883 in the previous year, while the number of bus passengers increased 93,900,699 to 156,302,095.

STATEMENT OF ASSETS OF THE OHIO TRACTION COMPANY

Cash, U. S. Treasury certificates and certificates of deposit		$1,693,168	
Cincinnati Street Railway stock, 86,661 shares (par $50) at $40 per share		3,466,440	
Traction Building—appraised value		1,404,985	
Chester Park property (land and buildings, including the Chester Park car shops) acquired from the Cincinnati Street Railway:			
Appraised value	$757,000		
Less: Leasehold	100,000		
		657,000	
Machinery and operating equipment in the Chester Park shops, appraised value		449,450	
Total Ohio Traction Company			$7,671,043
CINCINNATI TRACTION COMPANY			
Cash in banks and treasury		39,404	
Less: Reserve for unredeemed tickets and wages (estimated)		12,000	
Total Cincinnati Traction Company			27,404
CINCINNATI CAR COMPANY			
Land and buildings owned:			
Appraised value	$176,000		
Less: Leasehold	22,000		
		$154,000	
Good will, patents, etc.—appraised value		371,950	
Other assets—net value		1,277,743	
Total Cincinnati Car Company			1,803,693
Combined total			$9,502,141

Balance of Gross Income in Anderson $289,051

Revenue from operations for 1925 for the Union Traction Company of Indiana, Anderson, Ind., was $2,939,182, compared with $3,339,188 for 1924. Operating expenses were $2,541,873, against $2,656,066 in 1924. The gross income for 1925, including bus operation, was $289,051. These facts were contained in the annual report of Receiver Arthur W. Brady, submitted to the court.

Fifteen steel interurban cars of the most modern design were purchased on a lease plan at a cost of $426,091. These cars were placed in operation about Nov. 1.

The report goes into detail on bus operations conducted by the company and its extension of such service during 1925. Reference is also made to the proposed discontinuance of certain railway lines.

While operation of the lines owned by the Muncie, Hartford & Fort Wayne Railway, Indianapolis, New Castle & Eastern Traction Company and the Muncie & Portland Traction Company has been continued by the receiver and the results of such operation are shown herewith, the leases of these lines held by the Union Traction Company of Indiana have not been adopted or affirmed by the receiver. This operation is only given for the convenience of all persons in interest. The accompanying account shows tentatively the segregation of earnings and expenses of the respective companies subject to the liens of the principal mortgages and also of lines leased to the Union Traction Company.

INCOME ACCOUNT OF THE UNION TRACTION COMPANY OF INDIANA FOR 1925

Revenue from Transportation:	
Passenger	$1,964,583
Baggage	7,425
Parlor, chair and special car	8,285
Mail	4,224
Express	117,542
Milk	17,001
Freight and switching	681,238
Total	$2,800,299
Total revenue from operation other than transportation	$138,882
Total operating revenue	$2,939,181
Operating expenses:	
Way and structures	$571,129
Equipment	332,367
Power	535,600
Conducting transportation	698,672
Traffic	33,413
General and miscellaneous	370,690
Total operating expenses	$2,541,873
Net operating revenue	397,308
Taxes	125,000
Net operating revenue less taxes	272,308
Other income	52,479
Gross income	324,787
Expense of bus operation	35,736
Balance gross income	$289,050

$2,895,937 Available for Charges and Dividends

The Pacific Electric Railway, Los Angeles, Cal., reports to the Railroad Commission its 1925 operating revenue at $19,514,324, compared with $20,729,482 for 1924. The operating expenses, excluding taxes, for 1925 were $15,976,043 and for 1924 $15,932,545, leaving net operating revenue of $3,538,280 for 1925 and $4,796,937 for 1924. During 1925 taxes were $1,181,699 and for 1924 they were $1,082,586. Deducting the taxes leaves operating income of $2,356,581 for 1925 and $3,714,350 for 1924. Adding to the operating income the non-operating income of the company results in a gross corporate income of $2,895,937 for 1925 available for interest, amortization of debt discount, other fixed charges, non-operating expenses, dividends and surplus. The similar amount for 1924 was $4,006,514.

Changes in San Francisco Depreciation Reserve

The Supervisors of San Francisco, Cal., have passed to print and in due course are expected to have in effect an ordinance, long discussed, revising accounting procedure of the Municipal railway, with respect to depreciation reserves.

The present procedure is to set up 18 per cent of gross annual revenue as "depreciation reserve." From this 4 per cent goes to accident and damage claims, and an additional sum, which just now is $201,000 a year, to bond interest and redemption.

The new ordinance segregates these deductions. It makes an amount equal to 3 per cent of total capital assets deductible from gross revenues annually for depreciation reserve after operating expenses, accident and damage claims, bond interest and redemption. The accident and damage reserve is stipulated at 2½ per cent of gross revenues.

As a matter of fact, while the new system will bring the Municipal railway's accounting more nearly into accord with corporate practice, it will not materially alter the present situation except in one respect. It is proposed to start off the new depreciation and accident funds with appropriations of $100,000 each from the present depreciation reserve. This will leave more than $700,000 free for such purpose as the Supervisors see fit. They have already predicted important improvement work, including the proposed Sunset tunnel, against it, but there is talk of a $2,000,000 bond issue to accomplish this work.

Under the present depreciation reserve system $588,000 was set aside in 1925, but after caring for bonds and accident claims, only $266,062 remained for the actual depreciation fund.

On the basis of last year's capital assets, which were figured at $7,992,410, the depreciation deduction under the proposed system would have been $239,772.

Net Income in Allentown Increases

The consolidated income account of the Lehigh Valley Transit Company, Allentown, Pa., for the year ended Dec. 31, 1925, shows an increase of $71,864, with operating expenses $74,411 below those of last year. The net earnings from operation increased $146,276 for the year. In the annual report to the stockholders P. B. Sawyer, president, says this condition was due entirely to a temporary increase in the sales of surplus power and offset a further substantial falling off in street railway business during the year.

The property has been adequately maintained and an allowance set aside for depreciation which more nearly meets the company's requirements in that regard. Equipment trust debt to the amount of $30,000 has been retired and the cash position of the company improved.

A 5-mile relocation to private right-of-way on the Philadelphia division has been constructed at a cost of approximately $450,000. This reduces the Allentown-Philadelphia running time five minutes, relieves the company of a constantly growing highway accident liability and removes the obligation of track paving along the route that was formerly traversed.

Mr. Sawyer also refers in the report to the incorporation of the subsidiary, known as the Lehigh Valley Transportation Company, which now has in operation three passenger buses running over two routes to provide for the increase in population of the territory served. The accompanying table shows the income account for the year ended Dec. 31, 1925, compared with the year previous.

CONSOLIDATED INCOME ACCOUNT OF THE LEHIGH VALLEY TRANSIT COMPANY AND SUBSIDIARIES

	1925	1924
Total gross earnings	$5,047,104	$4,975,240
Total operating expenses including taxes	3,603,062	3,677,474
Net earnings from operation	1,444,041	1,297,766
Income from interest on bonds	906	1,861
Income from interest on notes and deposits	3,618	7,057
Income from dividends on stocks	110,075	111,075
Total net earnings	1,558,642	1,417,761
Depreciation allowance	377,798	231,453
Interest—funded debt	599,802	600,949
Interest—floating debt	.....	31,119
Amortization of discount and expenses	21,705	21,705
	999,306	885,227
Net income	$559,335	$532,534

	Total Operating Revenue	Total Operating Expenses	Taxes	Other Income	Gross Income
Union Traction	$1,384,629	$1,252,857	$46,925	$24,084	$108,931
Indianapolis Northern	743,810	586,512	29,837	16,512	143,972
Muncie, Hartford & Fort Wayne	255,680	209,362	13,450	3,450	36,318
Muncie-Portland	101,349	88,026	6,087	1,056	8,292
Indianapolis, Newcastle and Eastern	275,271	223,141	10,312	4,295	46,121
Muncie-Union City	103,914	103,247	10,237	1,652	*7,918
Marion-Wabash	56,042	58,432	5,300	1,024	*6,665
Anderson-Middletown	18,483	20,292	2,850	401	*4,256
Total	$2,939,181	$2,541,873	$125,000	$52,479	$324,787

*Deficit.

Bondholder's Plea Rejected. — The United States Supreme Court has refused to review the case of Milton Von Boston, an Eastern bondholder of the United Railways, St. Louis, Mo., who sought to intervene in the company's receivership suit. Previously his petition had been denied by United States District Judge Faris and the United States Circuit Court of Appeals. Mr. Von Boston sought to have declared due and payable the $30,000,000 issue of general mortgage bonds. Judge Faris in dismissing his petition held that the acts complained of had not constituted a breach which gave him the right to enforce the foreclosure terms of the general mortgage.

Deficit of $156,887 for Three Months. —The Eastern Massachusetts Street Railway, Boston, Mass., reports to the Department of Public Utilities, for the quarter ended March 31, 1925, a net income of $277,204, after fixed charges, equivalent after sinking fund and preferred dividends to 72 cents a share on the 84,698 shares of common stock outstanding, as compared with $241,262, or 29 cents a share, in the corresponding quarter a year ago. After payment of dividends the deficit was $156,887, compared with $191,338. As of March 31, 1926, current assets stood at $3,264,920 and current liabilities $798,066, leaving net working capital of $2,466,854.

Change in Financial Structure Sought. — The Jamaica-Central Railways, Inc., has filed a certificate in the office of the Secretary of State of New York, changing the par value of its stock from 2,000 shares, $100 par value, to 2,000 shares, no par value. This company was recently organized for the purpose of rescuing three routes in Long Island which were to be abandoned. These lines were controlled by the Long Island Electric Railway. Reference to the Jamaica-Central Railways was made in the ELECTRIC RAILWAY JOURNAL, issue of April 3, 1926, page 606.

Interest Money Advanced.—W. F. Turner, president of the Oregon Electric Railway, Portland, Ore., stated that prompt payment would be made this year on May 1 of the semi-annual interest on $2,000,000 of 5 per cent bonds of that company. The electric line has not been earning its interest, but the parent line, the Spokane, Portland & Seattle Railroad, of which Mr. Turner is also president, was expected to advance the money to meet the obligation. The Oregon Electric is a valuable feeder from the Willamette Valley.

New Directors of United Light and Power.—Further changes are announced in the directorate of the United Light & Power Company, Chicago. Two new directors were elected. They were R. B. MacDonald, vice-president of the Tri-City Railway & Light Company, a United Light subsidiary, and H. C. McClintic of McClintic & Marshall, structural steel firm of Pittsburgh. They succeed Bertrand A. Howe and Warren A. Snow of Howe, Snow & Bertles, Inc., a company which in the past has participated in United Light financing. Other new directors elected since Mr. Hulswit's resignation as president were H. B. Rust, J. S. Brookes and Richard Ingliss, representing the Koppers Company and Otis & Company.

Increase in Traffic for First Quarter. —Revenue passengers carried by the United Railways, St. Louis, Mo., showed a gratifying increase during the first quarter of this year, according to a report filed with the City Register's office on April 19. The report covering the three months ended on March 31 shows the company operated on an average of 1,224 cars daily, made 1,447,990 trips, traveled 9,423,687 car-miles and carried 64,686,265 revenue passengers. In a similar period in 1925 the company used on an average 1,250 cars daily and hauled 64,478,098 revenue passengers.

Book Reviews

Electric Railway Engineering

By C. Francis Harding, professor of electrical engineering, assisted by Dressel D. Ewing, professor of electrical railway engineering, both of Purdue University. Third edition. McGraw-Hill Book Company, Inc., New York, 1926. $5.

This textbook is now in its third edition, the first having been published in 1911. In the preface it is stated that "although the fundamental principles underlying the operation of electric locomotives, cars and trains have not changed materially since the publication of the second edition of this book in 1915, the variety and type of their applications to practice during the past decade, as well as the new statistical data now available, seem to warrant a completely revised and enlarged third edition." Following out this idea, a new chapter has been added to introduce some of the economic problems involved in bus transportation, while the chapter on power station location and design has given way to one on sources of electrical energy.

It is unfortunate that the authors did not find it possible to bring some of the important chapters of the book more thoroughly up to date. For instance, in the chapter on "Traffic Studies—Predetermined" the tabulation on electric railway statistics is taken from the United States census on street and electric railways for 1907. Save for a paragraph on bus competition, the text in this chapter is virtually unchanged from the previous edition. On page 26 the statement is made that "a well-conducted road may safely be assumed to earn 20 cents per car-mile." While this may have been true in 1911, it does not depict present-day conditions.

The chapter on cars shows a particular lack of revision to meet modern practice. While a few sentences have been added to certain paragraphs, there are many statements that are not in keeping with the present. Such statements as the following indicate failure to appreciate the situation: "In the large cities the convertible or semi-convertible double-truck cars . . . are still being used, although many of them have been equipped with the various prepayment devices." "The stepless, center-entrance car introduced in New York City a few years ago is becoming an extremely popular type of car for service in large cities." "Several companies operating in large cities have again introduced types of double-deck cars." "During the last few years the Birney safety car has become exceedingly popular." "Open running board cars are used much more in the East than in the Middle West for suburban service." "The great improvements made during the last few years in storage batteries, bearings and light mechanical parts, brought about largely by the wonderful development of the modern automobile, have contributed much to the success of this type of car for certain classes of service. In 1913 there were 280 of the cars in use. . . . The number has increased considerably since then."

In using the book as a reference or as a text, therefore, care should be taken not to use directly the reference to practice, since the revision has left a large part of the material fully ten years behind the present state of the art.

French-English and English-French Dictionary

By J. O. Kettridge. The H. W. Wilson Company, New York, N. Y. Two volumes, 1,160 pages. From London, $12.50; from New York, $14; Vol. I—French-English, $7.50 postpaid from New York.

This dictionary contains technical terms and phrases used in civil, mechanical, electrical and mining engineering and allied sciences and industries; also a method of telegraphic coding by which any entry in the dictionary can be expressed by a ten-letter cipher word with indicator and check. It contains the translation of 100,000 words, terms and phrases, illustrated by numerous instructive examples and explanations, the whole arranged on original plans in progressive alphabetical order in the readiest form for rapid reference. Many libraries and technical departments of colleges have ordered this dictionary for their reference shelves.

Statistics of Railways in the United States

Thirty-eighth annual report, for the year ended Dec. 31, 1924. Prepared by the Bureau of Statistics, Government Printing Office, Washington, D. C. 112 pages. 15 cents.

The text of this report contains statistics based on the monthly reports of railways for the year 1925, as well as selected data relating to other common carriers subject to the interstate commerce act for the years 1924 and 1925.

Although the title "Statistics of Railways in the United States" is retained, certain tables relating to other classes of common carriers subject to the interstate commerce act are also included. Because of the necessity for the greatest possible economy in printing expense, the usual section of the report giving a detailed list of securities owned and outstanding has been omitted, as was also done in the case of that for 1923. Accident statistics have been omitted from this volume.

Personal Items

H. L. Mack Leaves International

Executive of Buffalo System Plans to Enter Contracting Business for Himself

H. L. Mack, vice-president of the International Railway, Buffalo, N. Y., has resigned, effective May 1, to enter the general contracting and engineering field. Mr. Mack has been connected with the street railway system in Buffalo since 1892, when he became a lineman for the Buffalo Street Railway after several years of experience with the Big Four Railroad. Three years later he was placed in charge of this department. Later the department

H. L. Mack

took over the construction and maintenance of all track, bridges and buildings of the International system.

In March, 1923, Mr. Mack was elected vice-president in charge of engineering and a director of the International Railway. The construction of the Buffalo-Niagara Falls high-speed interurban line was under the supervision of Mr. Mack and he also supervised the construction of the Lockport-Olcott interurban division. He has seen the Buffalo street railway system grow from a road of 90 miles to a system of more than 400 miles in Buffalo, Niagara Falls and Lockport, with interurban lines reaching into more than a score of communities in western New York.

In his letter of resignation to B. J. Yungbluth, president of the International Railway, Mr. Mack said:

> For many years it has been my ambition to enter the contracting business for myself, but each time that I have come to the decision some crisis in the affairs of the company has kept me in service, forcing me to lay aside my personal plans. I now feel that the time has arrived when I can carry out this purpose without seriously disorganizing the work of the company, and therefore ask you to accept my resignation as of May 1. My interest will always be with the International and I hope you will feel free to call upon me whenever you think I may be of service.

Mr. Mack is recognized as one of the leaders in his line in the country. The catenary type of construction developed by him for the Buffalo-Niagara Falls high-speed line attracted much attention in the engineering world.

Personnel Changes in Nashville

G. B. Howard has replaced John H. Carpenter as president of the Nashville Interurban Railway, Nashville, Tenn. The new president and his brother, Lawrence Howard, who will assume the position of secretary and treasurer, are sons of the late J. W. Howard, one of the group that built the railroad, which began operations in 1908.

John A. Pitts remains as vice-president.

J. E. Napier, formerly assistant treasurer, has been made general manager. Mr. Napier has been long connected with the enterprise in the offices at both Franklin and Nashville.

The Nashville Interurban Railway operates 19 miles, connecting Franklin, Grentwood, Nashville and Mount Pleasant.

M. J. Curtin Promoted by Boston Elevated

M. J. Curtin, tie and timber agent of the Boston Elevated Railway, Boston, Mass., has been appointed to the position of supervisor of stores and yards of that company. Mr. Curtin has been connected with the Boston Elevated Railway for twelve years. He went to work for the company as a sub-foreman on track construction. Later he was construction foreman at the carhouses and on building work. He has been tie and timber agent for the past six years.

Mr. Curtin's experience covers a wide range of work in the contracting field. He is a high school graduate and did his first work in engineering in the drafting room of a contracting firm. He entered street railway work with the old Bay State Street Railway, now the Eastern Massachusetts Street Railway. Eventually he became civil engineer of that company. His experience in this line of work also covers a period during which he was foreman for contractors engaged in important street construction work. He has been a member of the committee on wood preservation of the American Electric Railway Engineering Association for several years.

H. G. Tulley Heads Cab Company

Mr. Tulley recently returned to Management, Inc., has been elected president of the Yellow Cab Company of Philadelphia, Pa., recently taken over by the Philadelphia Rapid Transit Company. In this capacity he replaces W. E. McGuirk of New York.

Mr. Tulley, recently returned to Philadelphia from Buffalo, where he was associated with the International Railway. He went with Mitten Management in Philadelphia fifteen years ago. He was one of the important factors in the rehabilitation of the Philadelphia Rapid Transit System.

A. J. Challeen on Detroit United

New Superintendent of Equipment Progressive and Alert on Things Mechanical

A. J. Challeen has succeeded Hugh Savage as superintendent of equipment and shops for the Detroit United Railway, Detroit, Mich. In his new post Mr. Challeen has been devoting particular attention to improving the appearance of the rolling stock of the company. This he has sought to do through the use of various painting effects so as to give a streamline appearance to cars. As a result he has made some of the older type equipment particularly attractive. In addition to car maintenance, Mr. Challeen has also

A. J. Challeen

been devoting special attention to bus maintenance and to improving the riding qualities and appearance of the buses operated by the Detroit United Railway. This, of course, is the esthetic side of the matter. There is, however, another side, the purely utilitarian. Mr. Challeen knows that, too. He is particularly well informed in regard to car design and various types of car construction.

Mr. Challeen was born in Rush City, Minn. His scholastic training included special courses in mechanical and electrical work at the University of Minnesota. He then entered electric railway work with the Twin City Lines. This was in 1908. In 1912 he was made general repair foreman in one of the outlying shops of the company. In 1921 he was advanced to general foreman of the principal repair shop of the Twin City Company. In March, 1925, he left the Twin City Company to take up duties as mechanical superintendent under A. L. Drum of the Light-Weight Noiseless Electric Street Car Company. Since June, 1925, he has been with the Detroit United Railway, of which Mr. Drum is manager for the receivers. Mr. Savage, who was succeeded at Detroit by Mr. Challeen, resigned from the property there to become connected with the Brooklyn City Railroad.

Utility Man Is Pine Bluff's Most Useful Citizen

Harvey C. Couch, president of the Arkansas Light & Power Company, Pine Bluff, Ark., and interested in other large projects for the development of Arkansas and the south, has been declared Pine Bluff's most useful citizen and has been selected to receive the Chamber of Commerce good citizenship award of 1925, for which he will be presented the *Commercial* loving cup.

The award was made to Mr. Couch on the grounds of his great and untiring efforts for development of Pine Bluff and Arkansas, particularly with reference to electrical power developments. Mr. Couch is actively identified with all civic movements for the betterment of city and community and an untiring worker in the Chamber of Commerce.

In an editorial headed "Honored in His Own Country" the Pine Bluff *Commercial* on Feb. 16 said:

> Many signal honors have been visited upon Harvey C. Couch, empire builder, dreamer of dreams that come true and mighty factor for progress in this, the wonder state. And not the least of these is the awarding of the Pine Bluff good citizenship trophy, voted to Mr. Couch by the unanimous voice of a committee representing every activity, every walk of life and every phase of community life in Pine Bluff.
>
> This award would be significant if for no other reason than that it is proof positive that Pine Bluff is not unappreciative of the efforts made by Mr. Couch for the progress of this city, proof that this city realizes the door Mr. Couch has opened to opportunity and development and proof that all prophets are not without honor in their own country.

Richard Schaddelee Heads United Light Group

Much interest attaches to the career of Richard Schaddelee, who recently succeeded Frank T. Hulswit as president of the United Light & Power Company, Chicago, an organization with public utility holdings wide in their ramifications, particularly in the Central West. Not only is Mr. Schaddelee camera shy, but heretofore he has successfully eluded the seeker of biographical facts. Despite the load that he has long carried as an officer of the United Power & Light, this man, who rose from $20 a month as a meter reader and bill collector to the presidency of a great corporation, has escaped the public eye.

Born in the Netherlands in 1873, Mr. Schaddelee came to the United States at the age of fourteen. The excellent schools of his native country laid the foundation for a remarkable self-acquired education. Aside from a few weeks in the public schools of Holland, Mich., he had no opportunity for study and higher education, so far as schools were concerned.

Working for a carpenter in the Michigan village, his first wage was $1.25 a week. When the family moved to Grand Rapids the boy found work in a furniture factory, where he spent two years, in which time he learned to speak and write the English language.

Several jobs intervened before he went into the employ of the Gas Light Company of Grand Rapids, Mich., in 1892, at a salary of $20 a month. As a meter reader and bill collector, he showed unusual ability in collecting bad accounts. He advanced through various office jobs to the post of cashier and head of the credit department.

His reputation for doing things and getting results won an appointment by bankers of Grand Rapids to take charge of a small gas plant at Albion, Mich. His success as a manager settled him in his life work and started him on his long road to national prominence in the public utility business.

Among the United Light properties are several electric railways operated in towns of medium size. Their problems have always received Mr. Schaddelee's earnest attention. He has felt that the occasional rider on the electric railway should pay more for the service than does the man who uses the road habitually. He has given expression to these views many times, and has embodied the principle behind them in a form of commutation ticket which he worked out successfully for application on several of the properties included in the United Light & Power group.

Obituary

Victor Angerer

Victor Angerer, vice-president of the Taylor-Wharton Iron & Steel Company and a vice-president and a director of the subsidiaries of that company, William Wharton, Jr., & Company, Easton, Pa., the Philadelphia Roll & Machine Company, Philadelphia, Pa., and the Tioga Steel & Iron Company, Philadelphia, died on May 5. He had been connected with these companies and their predecessors since 1884.

Mr. Angerer was one of the foremost authorities in the United States on special trackwork. Twenty of twenty-five years ago he was working on problems the solution of which is just being accepted today. In the course of his career he designed many switches and frogs and special trackwork devices. He made many experiments, particularly in connection with the so-called Trilby rail. He also gave a great deal of attention to the proper design of other rail sections, particularly of rails and guards for curves. His studies of the question of the fatigue of steel won for him high recognition in scientific circles.

He was very openminded in his approach to problems presented to him for solution, and particularly in committee work established a reputation for himself by his consideration of others who advanced ideas not always compatible with his own. His scientific interest in the problems with which he was concerned always transcended his interest in them as a manufacturer, and no little credit is due to him for his advancement of the science of track engineering. He was always seeking out the reasons for things, and by himself, but primarily in the interest of his own company, conducted early in 1925 a survey of conditions to determine the present status and future prospects of the electric railways. Like him he applied some tests to this study that were new. And then he unselfishly made public his findings through the ELECTRIC RAILWAY JOURNAL for the benefit of the entire industry. Incidentally it might be mentioned that this was only one of his many contributions to the literature of the industry made through the JOURNAL.

Born in Vienna, Austria, on June 4, 1861, Mr. Angerer was educated at the Technical College in Vienna. His first work in the United States was as a draughtsman with William Sellers & Company where he remained four years. He then entered the employ of William Wharton, Jr., & Company as mechanical engineer. In 1886 he was made chief engineer of that company, superintendent in 1889, second vice-president and works manager in 1897 and vice-president and general manager in 1902. When the firm was consolidated with the Taylor Iron & Steel Company in 1912 he was made vice-president of the Taylor-Wharton Iron & Steel Company.

Mr. Angerer's A.E.R.A. committee activities date from 1920. Since then he has been a member of the committee on way matters. Prior to 1920 he gave the committees the benefit of his advice and help, but he did not participate in the proceedings as a member because such formal participation by manufacturers was not then countenanced. In 1923 he was also a member of the special committee appointed to develop standard wheel and rail contours. More recently he was a member of the newly-organized way and structures committee and at the time of his death was chairman of a special committee on the design of steam and electric railway crossings. In addition to these activities with the A.E.R.A. Mr. Angerer has been chairman since 1923 of an A.E.S.C. sectional committee to develop American standards specifications for special trackwork material and also standard designs for 7-in. T-rail for use in paved streets. He was a member of many other scientific and engineering bodies.

Thomas Millen

Thomas Millen, who was master mechanic of the Metropolitan Street Railway, New York, from 1894 to 1908, died on May 1 in New York at the age of 77. Prior to his connection with the Metropolitan Street Railway, Mr. Millen's experience had been with steam railroad companies, including the Central Railroad of New Jersey, Delaware, Lackawanna & Western Railroad and New York City & Northern Railway. He was connected with the Metropolitan Street Railway during the time that the lines of this company were electrically equipped and when experience with the underground conduit system was very meager. This meant that important problems in the selection and maintenance of large quantities of rolling stock had to be undertaken under Mr. Millen's direction. His ability is shown by the fact that much of this equipment and many methods adopted at that time are in use at the present day. Mr. Millen retired from the railway business when he left the Metropolitan Street Railway.

Better Merchandising Is Bringing Results

Local Transportation Industry Is Moving Forward Rapidly—Equipment Purchases Are Expected to Be Double Last Year's—Broadened Conception of Their Part in Community Life Giving Transportation Men New Incentive

AN INTERVIEW

By Charles Gordon

"THE trend of thought and effort at the present time among executives, engineers and operating staff officers of our electric railways is directed toward a grasp more embrasive of the whole transportation problem. In the past, engineering considerations were largely the governing factors. Measures for securing the absolute minimum in power consumption, first cost and maintenance, combined with the greatest possible durability, were of major interest. Recently, however, attention has been directed to the car unit from the broader viewpoint of its business-getting possibilities. In general, it may be stated in a sense that electric railway equipment in the past has been somewhat over-engineered, and, if we may coin an expression, "under-merchandised."

With this introduction Myles Lambert, transportation sales manager Westinghouse Electric & Manufacturing Company, started his reply to my first question regarding the tendencies in electric railway equipment design. From this point on my task was relatively simple. The subject opened up the entire field of the electric railway outlook, and there I had struck into a subject on which Myles Lambert stands out as one of the most progressive thinkers in the industry.

"The effort toward the reduction of weight started a decade or so ago," he continued, "and the consequent reduction in power consumption, has been a healthy influence in the direction of greater efficiency. This was particularly true on properties where the Birney type of ultra-lightweight car was applied to give more frequent service and at the same time to effect operating economies as the only available means of showing improved net results at the end of the year.

Lack of Co-ordinated Effort in Design

"A few years ago Britton I. Budd directed a broadside at the electric railway equipment manufacturers by telling them that they were more or less 'asleep at the switch.' Aside from some progress in weight reduction and a few other improvements, he said that we still have about the same old car that we had ten or fifteen years ago. Against this he contrasted the progress that has been made by private automobile and bus manufacturers in improving the performance, attractiveness and comfort of their vehicles.

"It was pointed out to Mr. Budd at that time that there is a great difference between the two enterprises because the automobile has developed a large quantity demand, enabling the manufacturers to enjoy 'quantity production' costs and resulting profits. A goodly share of this profit has been used further to advertise and merchandise that industry. Such 'quantity demand' has never existed for electric railway cars. The total number of street cars in the United States is far less than one year's output for any one of the larger automobile plants, and, in addition, such a thing as a standard street car is unknown. In a word, the automobile industry is on a manufacturing basis, while the electric railway car is built on a special design, 'job building' basis.

Myles Lambert

"The bus has been helped in design by the competition among manufacturers for a new market which has offered the incentive for commercial engineering minds to concentrate on producing complete vehicles designed throughout for a specific objective. In contrast to this the electric railway car has been developed by several independent groups of engineers, each group acting and thinking largely about that part of the car equipment for which it is responsible. The railway operating engineer has followed the practice of specifying in general the construction of car body and trucks, frequently issuing exact specifications. Manufacturers of other parts of the equipment have thus been obliged to build their product to suit the particular car weight, truck, axle dimensions and schedule speeds specified. In every job the motor size varies with all of these factors and, in addition, with the grades and other operating conditions in each city for which the cars are destined. Hence electric railway car development has been retarded by lack of co-ordinated effort toward a unified design and has of course suffered in comparison with the automotive vehicle as a result.

"Mr. Budd's discussion of the subject did its part in exciting further thought and activity not only in the direction of more attractive car designs but it also stimulated interest in the subject of better co-ordination in design effort among all the manufacturers who share in the production of the apparatus that is embraced in the complete car. Mr. Storrs is now promoting the effort to bring about greater co-ordination of manufacturing effort, as an association activity.

Commercial Engineering Now Rules Car Design

"Power consumption, weight, first cost, low maintenance and durability are of course still important factors in car design, but they are no longer the ruling factors. The primary considerations today are the things that determine the business-getting possibilities of the car for a given service. For example, rapid acceleration and high schedule speeds are now considered far more important than power consumption. Comfortable, attractive cars are of more importance than first cost and low maintenance. The entire subject must be approached from the commercial angle of determining what practice will give the greatest return on the entire investment. If a more comfortable and attractive car will draw sufficient additional business to give increased profits, even though first cost is increased, business logic leaves no other choice. In addition to the other factors named, reduction of noise is an important step toward better merchandising. Noise is a natural accompaniment of a motor arrangement in which a large proportion of the weight is not spring-suspended."

Mention of noise reduction opened up a subject that has apparently received more attention in Europe than in the United States. It was also a subject on which Myles Lambert is particularly qualified to talk from his intimate association with the development of existing forms of electric railway apparatus in this country. His views represent an intensely practical experience and keen vision. He denies the right to be classed as an engineer, yet his function for many years was to make the product of engineers perform

satisfactorily under actual service conditions. Thus his views are founded not on theory, but practice.

Myles started his active association with the local transportation industry in Brooklyn. Electric power for rapid transit lines in Greater New York was initially tried on the old Kings County "L" system in 1898, where Mr. Lambert later held the position of division superintendent. He had risen rapidly to this post of responsibility from a job as ticket agent and telegraph operator, with a previous background of odd jobs such as a farm boy of fifteen was able to grow into. As a messenger, tower helper and brakeman on the Long Island Railroad he had managed to pick up a knowledge of telegraphy which enabled him to get employment with the "L" system in Brooklyn.

But electrification brought him a new outlook. In 1900 he resigned from his hard-won position to take an apprentice course in the Westinghouse plant at East Pittsburgh. On its completion after two years he was made a supervisor of railway equipment installation and construction work and was assigned for a year on the Boston "L" system. He had charge of the work on the sample car equipped with Westinghouse apparatus on one of the first New York subway cars, also the re-equipment of the Metropolitan Elevated in Chicago when it was changed from "L" type control to multiple-unit operation. In Chicago he also supervised the work of equipping a group of new cars on the South Side elevated lines to operate in trains with the original Sprague control equipment.

Mr. Lambert moved forward steadily in the Westinghouse organization. From service activity he was placed in charge of railway equipment sales at East Pittsburgh and later was made assistant manager of the railway department. He was again moved up to manager of the department, and in that position has kept in intimate contact with the industry in which he pioneered. He has recently been made transportation sales manager in charge of all transportation sales for the company; heavy and light railway, marine, automotive and mining. Although primarily an electrical man, he takes a broad view on local transportation, holding that anything which contributes to the development of transportation is of benefit to all industry in that it contributes to the development of cities which have made modern industry possible.

Considers Transportation as True Public Service

He looks on the work of the transportation man as being in the broadest sense a true public service so tied up with the welfare of the country as to call for the highest degree of devotion and skill. Myles Lambert practices what he preaches and is never too busy to devote his time and fertile mind to the upbuilding of the industry. He has won added respect and esteem by his readiness to put aside commercial expediency in favor of what he considers to be in the interest of the industry's welfare.

Noise reduction opened up the whole question of the fundamentals of motor mounting and truck arrangement. I asked Myles for an opinion on the possibilities of worm or bevel gear types of drive in which the motor may be detached from the axle and mounted either in a spring-suspended sub-frame on the truck or on the car body directly.

"Research work up to the present time," he said, "indicates that a worm-driven motor vehicle, while less noisy than the present construction, does not meet the propulsion requirements of American operating practice. At the same time such forms of construction tend to be much more expensive than the present simple arrangement and offer serious difficulties to convenient maintenance and rapid repair.

Reduction of Unsprung Weight Is Possible

"There is, however," he continued, "a possibility of developing a form of motor suspension that, while carrying the motor on the axle, would nevertheless make it entirely spring-suspended. Reduction of the amount of weight now unsprung does not necessarily require a wide departure from the present arrangement of motors in trucks. On single-truck equipment the worm or bevel drive construction may prove satisfactory. But on double-truck cars it presents serious complications and difficulties in construction."

"Since a considerable part of car noise is attributable to the effects of worn bearings, particularly at the axle, what opportunities do you see for the introduction of anti-friction bearings to car construction?" I asked.

"The combination of such bearings on armature and axle would have the advantage of maintaining gear alignment and consequently reducing noise and vibration. However, such construction without other improvements at the same time would not relieve the unsprung weight situation. This would be serious on the bearings themselves, would produce complications in motor design and would present several maintenance difficulties."

"What, then, do you anticipate in the line of improving the present arrangement of driving mechanism," I persisted.

"I believe that improvement will be in the general nature of reducing the present amount of unsprung weight, while at the same time retaining the principal features of the present simple construction. Such development is unquestionably on its way."

There was room for more discussion here, but there were many other questions of moment on which I wanted Myles Lambert's views. Consequently I switched back to the question of merchandising service.

"What are your views on the possibilities for improving transportation on street railways so as to attract riders who now use private conveyances?" I asked.

"There are both geographical and social considerations that must be taken into account. In an industrial district, for example, speed and frequency of service are the ruling considerations. Here the rate of fare is an attraction. In residential sections comfort and attractiveness take precedence in building patronage. The fare becomes a secondary consideration."

"What do you foresee for business in the electric railway field during the present year?"

"From the interest in new equipment manifested by active inquiries now coming in, which are a result in large part of the aggressive advertising and better selling within the industry, it is a conservative estimate to say that equipment business for the present year will more than double that of last year. In my judgment the industry is genuinely interested in the improvement of its cars. Business conditions for the manufacturing side of the industry are definitely on the up-grade."

"Do you think this is just a spurt or that this improved condition will continue?" I persisted.

"Samuel Insull answered that question recently in his address before the Advisory Council conference in Chicago when he said emphatically that one of the principal troubles with the electric railway industry has been that many properties lack the courage to provide the equipment needed to bring them back to a sound earning basis. To my mind the present activity in the electric railway market is a definite indication that many railway managements have determined to provide improved facilities as the solution to the problem of increasing railway revenues. I am convinced that this movement is rapidly gaining momentum and that the improvement of local transportation properties will continue to accompany the expansion and economic development of American communities. Without adequate transportation facilities modern cities cannot grow normally. The improvement program now getting under way will quickly make itself felt in the public mind. Effective demonstration of the advantages of improved transit facilities will lead to a new basis of co-operation between the transportation companies and the public they serve.

Renewed Courage in Industry

"Electric railway executives are acquiring renewed courage and a broader grasp of the whole local transportation problem. They are prepared to utilize any type of vehicle or equipment that is best suited to a particular service requirement. There is no question but that a demand for more and better transportation service exists in every community. With the continued growth in population that is taking place this demand is bound to increase. Adding to this the resulting business development that must ensue, there will be a corresponding growth in the demand for new and better cars and buses. There is still much to be done and some properties are slow in starting, but present tendencies make the future look bright indeed."

"Assume that both manufacturers and operators will push the matter of better equipment and more intensive merchandising of this improved service," I asked, "what other factors require increased attention at this time in order to push the industry forward toward improved conditions?"

The answer came quickly. Myles seemed prepared for my question.

"There is a need for a more profound economic knowledge of the transportation business by the rank and file of the manufacturers' representatives serving the industry and similarly by those throughout the operating organizations of transportation companies," he declared. "This large group of several hundred thousand individuals all need to have a clearer conception of the part which transportation plays in our everyday economic, social and industrial life. They need to become more interested as individuals in the improvement of transportation service. Either choice or chance put them into this most fascinating service to modern society.

"Every individual has his duties and obligations in the modern social structure, but transportation is an underlying basic service upon which the very existence of the modern community depends. Transportation men in every city need a more vivid conception of the part which they play in their everyday duties as individual members of an organization that carries the responsibility of making the modern city possible. Here is the romantic side of what has sometimes been considered a prosaic occupation. When each man from track cleaner to president is imbued with this conception of service and is determined to do his part in understanding the fundamentals of the relations which his company bears to the community, then indeed will the future of the local transportation industry be assured. When every employee understands the relation between the part he plays and the general job of carrying safely and efficiently the millions who daily use transportation service, the problems of public relations will be solved automatically. They must understand not only their part in this general scheme but they must be willing and ready to carry to their customers, both by word and by deed, this conception of their part in the complex structure of modern community life."

Public Service Orders More Gas-Electric Buses

Further replacement of its older buses by new vehicles is foreshadowed in the order recently placed by the Public Service Transportation Company, Newark, N. J., a subsidiary of the Public Service Railway, for 54 additional gas-electrics. This supplementary order increases from 333 to 387 the total number of gas-electric buses purchased by the railway from the Yellow Truck & Coach Manufacturing Company. Body work and painting on the first 200 is being done by the manufacturer, but the rest are being finished in the Plank Road Shops of the railway.

The first group of the new buses was placed in service on the Market line in Newark on April 21. Shortly after, service on the new Bergen Turnpike bus line was commenced with gas-electrics. Since then they have been put in operation also on other lines, proving very satisfactory and popular with the public. It is expected that the entire order will be completed within two or three months and all the buses in service.

Manufactures and the Markets

News of and for Manufacturers—Market and Trade Conditions
A Department Open to Railways and Manufacturers
for Discussion of Manufacturing and Sales Matters

Advantages of Modern Cars Re-emphasized

J. G. Brill Company, Philadelphia, Pa., has issued in booklet form the first reprint of a series of advertisements from the ELECTRIC RAILWAY JOURNAL emphasizing the advantages of modern cars, "the need of a great industry." The company is distributing 5,000 of these reprints to the railway industry and the members of the American Investment Bankers Association. With the series on modern cars and their displacement of obsolete equipment, the Brill company intends to keep alive the interest in this subject, which it thinks means increased riding and in the final analysis ability to pay dividends. This first reprint, leaflet No. 302, April, 1926, shows what can be done with modern equipment.

Freeman & Company to Finance Bus Purchases

Interests headed by Freeman & Company, New York, have announced plans for an organization to finance bus equipment trusts. The organization will be known as the National Transportation Lines Corporation.

The new corporation would simplify the legal procedure involved in bus financing, in that equipment trust certificates of such a vendor corporation would form a marketable security. Several equipment trust issues marketed in recent years had included buses with other collateral, and last fall a substantial issue of motor bus certificates entirely secured by buses and indorsed by the Chicago Motor Coach Company was sold by a group consisting of J. & W. Seligman & Company, G. M.-P. Murphy & Company and Freeman & Company.

The National Transportation Lines Corporation will be operated by Freeman & Company on lines similar to those of the National Steel Car Lines Company, which was formed by them in 1920 to finance purchases of tank cars, refrigerator cars and other special types of railroad equipment. For many years Freeman & Company have specialized in the sale of equipment trust obligations secured by pledge of steam railroad rolling stock.

Metal, Coal and Material Prices

Metals—New York	May 4, 1926
Copper, electrolytic, cents per lb	13.825
Copper wire, cents per lb	16.00
Lead, cents per lb	7.85
Zinc, cents per lb	7.12
Tin, Straits, cents per lb	63.25
Bituminous Coal, f.o.b. Mines	
Smokeless mine run, f.o.b. vessel, Hampton Roads, gross tons	$4.325
Somerset mine run, Boston, net tons	1.925
Pittsburgh mine run, Pittsburgh, net tons	1.95
Franklin, Ill., screenings, Chicago, net tons	1.825
Central, Ill., screenings, Chicago, net tons	1.575
Kansas screenings, Kansas City, net tons	2.50
Materials	
Rubber-covered wire, N. Y., No. 14, per 1,000 ft	$6.25
Weatherproof wire base, N.Y., cents per lb.	18.00
Cement, Chicago, net prices, without bags	2.10
Linseed oil (5-bbl. lots), N.Y., cents per lb.	11.30
White lead in oil (100-lb. keg), N. Y., cents per lb	15.00
Turpentine (bbl. lots), N. Y., per gal	$0.85

Specialties for Buses Covered in New Catalog

The Electric Service Supplies Company, Philadelphia, Pa., has issued Catalog No. 9, listing complete lines of equipment for buses. The manufacturer states that practically all of the material catalogued has been in service for at least two years. The equipment shown is rugged, in line with the need for substantial and failure-proof transportation units.

Some of the more important equipment listed in this catalog includes Hunter illuminated destination signs, Faraday passenger signal systems, Golden Glow headlamps, Keystone-Ivanhoe bus lighting fixtures, fare registers, signal keys, pull switches, door switches, ventilators, windshield cleaners, etc.

For the past twenty years the Electric Service Supplies Company has specialized in similar equipment for electric railway cars with great success.

Fifty Double-Deckers Ordered by Detroit from Fageol

Purchase of 50 double-deck, 60-passenger Fageol motor coaches by the Department of Street Railways at Detroit was approved by the Council on May 4. Delivery will begin within four months, under the terms of the bid offered by the Fageol company. This company, bidding under its own name, was the low bidder at the opening of the tenders on May 3 at D. S. R. headquarters. The Fageol price was $12,050 a bus, without tires.

It was originally planned to purchase 125 of these buses, but on examination of city finances it was found the city could pay cash by purchasing 50 buses at once.

Plans for the use of the coaches are being formulated by the Department of Street Railways, but the disposition of the coaches has not been decided, according to H. U. Wallace, general manager. G. Ogden Ellis, president of the Street Railway Commission, in announcing a few weeks ago the department's intentions to call for cash bids on 50 coaches, declared that the first of the coaches would be used to establish a Fourteenth Avenue line, from Chicago Boulevard south to West Grand Boulevard, thence over Holden Avenue to Cass Avenue and Second Boulevard to a point downtown.

Specifications drafted for the 50 buses were much the same as for the 125, bids on which had been asked before.

Extensive Bus Wheel Tests Being Made in Kansas City

Extensive tests on bus rear wheel combinations are being conducted by the Kansas City Railways, under the direction of R. W. Bailey, superintendent of power and equipment, and his assistant, F. C. Lynch. These tests are conducted in conjunction with representatives of many bus and equipment manufacturers who are interested.

The tests began April 23 and will probably last two weeks or more. They are open to all representatives of bus and equipment manufacturers. At the beginning of the second week of the test, 39 representatives of the leading bus and equipment manufacturers were represented.

In order to obtain basic data and information on the question of heat developed in regular operation, tests were made on several buses both of single and double deck type, taken out of regular operation. These buses were run in a specified manner over a test route of 2.8 miles per round trip. Two thermocouples were placed in each rear wheel, one between the tire bead and the rim and the other on the brake drum itself. Many combinations of tires and wheels of different types and sizes and different brakes and brake linings were tested. Careful records were kept of the several combinations and the results obtained. Tests were run until the temperature noted became constant. An electric potentiometer was placed in a small building at one end of the test run and readings were made at the end of each round trip.

These tests bid fair to give the industry important data that may result in the establishment of certain factors necessary to design a proper combination of wheel types and sizes, tires, drums, brakes and axles that will diminish certain difficulties that have developed.

Results of the tests will be assembled in a report after they have been completed. Data of interest to readers of the JOURNAL will be published in a future issue.

Thirteen equipment manufacturing companies in addition to the railway are participating in the tests.

Rolling Stock

Montreal Tramways, Montreal, Que., will obtain delivery in June of 50 one-man, two-man double-truck safety cars which were ordered from Canadian Car & Foundry Company in December, 1925, The cars are semi-steel in construction and have a seating capacity of 40. Principal specifications are given here:

Weights:	
Car body	15,200 lb.
Trucks	10,000 lb.
Equipment	8,800 lb.
Total	34,000 lb.
Bolster centers, length	17 ft. 7 in.
Length over all	41 ft. 2 in.
Truck wheelbase	5 ft. 4 in.
Width over all	8 ft. 3 in.
Height, rail to trolley base	10 ft. 10¼ in.
Body, wood	Semi-steel
Interior trim	Cherry
Headlining	Haskelite
Roof	Arch
Air brakes	Canadian Westinghouse
Armature bearings	Plain bronze, babbitt lined
Axles	4 in., 4½ in. gear seat
Bumpers	Hedley 4-rib
Bumpers	Hedley 4-rib anti-climber
Car signal system	Faraday
Car trimmings	Bronze
Center and side bearings	Cast steel, friction type
Compressors	Westinghouse DH-16
Control	K-35 XB with Westinghouse 806-L line switch
Couplers	Montreal Tramways standard
Curtain fixtures	National Lock Washer
Curtain material	Pantasote
Destination signs	Hunter
Door-operating mechanism	National Pneumatic
Fare boxes	Cleveland
Wheelguards	H-B
Gears and pinions	Nuttall, helical ratio 13-69
Hand brakes	Peacock staffless
Heater equipment	Thermostatic control, 45 cars Consolidated, 5 cars Railway Utility
Journal bearings	3¾ in. x 7 in. standard
Journal boxes	Canadian Car & Foundry
Lightning arresters	Westinghouse MP
Motors	Four Westinghouse 510-A2, inside hung
Finish	Enamel
Sanders	Meissner's patent pneumatic
Sash fixtures	National Lock Washer
Seats	Ottawa Car Company
Seating material	Rattan
Slack adjuster	Westinghouse, Form E-1
Step treads	Kass
Trolley catchers	Keystone
Trolley base	Nuttall M-20
Trolley wheels	Ideal
Trucks	Canadian Car & Foundry
Ventilators	Railway Utility
Wheels	Cast iron, 26 in.
Special devices, etc.	Westinghouse variable load brake, Electric Service Supplies Company type K compensating lighting fixtures

Schenectady Railway, Schenectady, N. Y., has just received two Differential cars from the Differential Steel Car Company of Findlay, Ohio. These cars will be used principally for revenue purposes, such as hauling gravel for contractors.

Dallas Railway, Dallas, Tex., has just placed an order with the Differential Steel Car Company for a two-car Differential train. Each car will be equipped with G.E.-247 H motors and the control will be G.E. type M from one end.

Track and Line

Madison Railways, Madison, Wis., will rebuild and raise its track zone around the Capitol Square circle of four blocks in accordance with the city's new paving plans.

Key System Transit Company, Oakland, Cal., is planning to install new switches at Telegraph Avenue and Bancroft and at College Avenue and Dwight Way, in Berkeley, to provide a loop which would facilitate the handling of crowds for the University of California stadium. In addition the Spruce Street line would be extended Northward from Los Angeles Avenue to Regal Road.

New York, Westchester & Boston Railway, New York, N. Y., has awarded to Dwight F. Robinson & Company the contract for an extension of the New York, Westchester & Boston double-track electrically operated railway system from Mamaroneck to Hamilton, N. Y. Work on the construction of the extension will probably be begun immediately.

Los Angeles Railway, Los Angeles, Cal., will spend approximately $175,000 for its portion of the bridge and track changes on the Macy Street viaduct, opened on April 17.

Trade Notes

Ohio Brass Company, Mansfield, Ohio, moved its Chicago office on May 1 from 1217 to 1714 Fisher Building, 343 South Dearborn Street.

National Carbon Company, Inc., New York, N. Y., has taken over the plant inventory and good will of the Corliss Carbon Company. The combined National and Corliss lines now offer a complete assortment of brush grades to the market. A new finishing plant has been opened at Birmingham, Ala., to be used in supplying brushes throughout the Southern territory.

Cameron Electrical Manufacturing Company, Ansonia, Conn., manufacturer of commutators, announces the opening of a New York sales office in the Hudson Terminal Building, 50 Church Street, where in the future all inquiries or orders for its products will receive prompt and careful attention. The office will be under the management of E. G. Long Company, with which the Cameron company has been associated many years.

H. F. Darby, Jr., for more than twenty years with the Cutter Electrical & Manufacturing Company, Philadelphia, Pa., has resigned to organize a sales service for electrical and power machinery manufacturers. Mr. Darby states that he is about to visit manufacturing plants throughout the country and expects to establish headquarters in Philadelphia about June 1.

John T. Hogan was admitted to partnership in the firm of Parsons, Clapp, Brinckerhoff & Douglas, engineers, of New York, N. Y., on March 1, 1926. Mr. Hogan is a member of the American Society of Civil Engineers and was a director of that society from 1921 to 1923. He is also a member of the Society of American Military Engineers and served as lieutenant-colonel of engineers during the World War.

J. E. Rhodes, who has been identified with the electric railway industry for the last eighteen years and is a former official of the Irving S. Van Loan Corporation, has opened offices in the Times Building, New York City, under the name of the Electric Traction & Bus Company, to deal in high-class electric railway cars and equipment and to purchase entire railway properties.

New Advertising Literature

Armco Culver & Flume Manufacturers Association of Middletown, Ohio, has issued a pamphlet entitled "Increasing the Efficiency of Road Bed Drainage." The booklet provides a complete discussion of subdrainage with Armco perforated iron pipe, with particular reference to its advantages and application to railway work.

Reo Motor Car Company, Lansing, Mich., has issued a circular letter in which it lists the improvements which have been made in the third-year, model W, six-cylinder Reo bus. Among the points stressed are lower operating costs per mile, less time required for maintenance, easier operation, smoother running, additional energy available.

Especially adapted
to light-weight, safety cars—

Peacock Staffless Brakes

Though they have tremendous braking power, Peacock Staffless Brakes are light in weight, and require minimum platform space. These points make them especially adapted to use in modern light-weight cars that are so rapidly gaining favor throughout the electric railway industry.

Motormen like Peacock Staffless Breaks because of their simplicity, ruggedness and absolute dependability. Operators like them because of their low installation and maintenance costs. Available facts and figures bear out these statements.

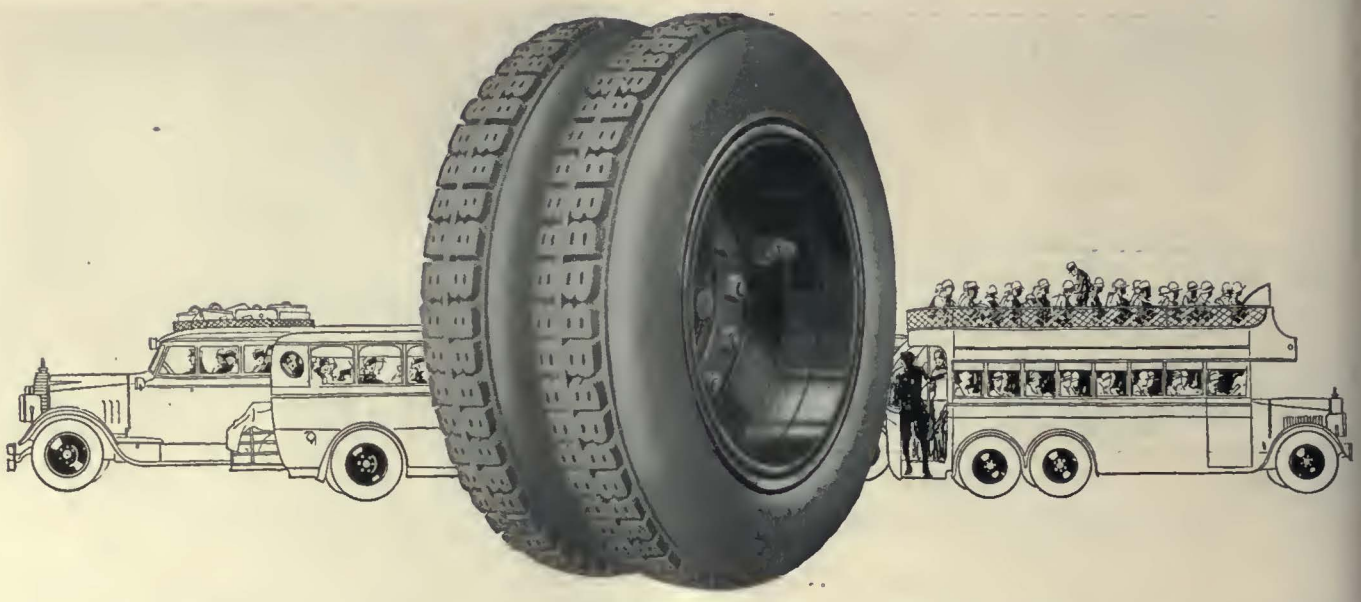
The Peacock Staffless

Write for complete particulars

National Brake Co., Inc.
890 Ellicott Sq., Buffalo, N. Y.
Canadian Representative:
Lyman Tube & Supply Company, Limited, Montreal, Canada

Peacock Staffless Brakes

Bankers and Engineers



Budd-Michelin Dual Wheels

are the silent ambassadors to greater profits

YOU'LL see them wherever heavy buses travel. You'll find them whirling out long, profitable miles under giant buses on all kinds of roads. You'll find Budd-Michelin Dual Wheels on every bus.

That's about the highest indorsement any wheel can have — and Budd-Michelin Duals have it! They have grown up with the bus industry. They made it possible for heavy buses to ride on *regular size* pneumatics. They solved the problem of getting lower body suspension without sacrificing seating capacity.

Veteran bus owners have put their fleets on Budd-Michelin Dual Wheels. They know by their check stubs when they're getting their money's worth. They know the economy of one-size wheels, one-size tires, one wheel-service for the entire fleet. And they're rolling up 15,000 to 20,000 miles and more on a set of tires.

You can't beat actual service as a test of merit. Over 40,000 heavy buses are keeping their operating costs down to bed-rock with Budd-Michelin Dual Wheels. It doesn't pay to take the detours of experiment. Not when the way is paved with proved performance.

BUDD
WHEEL COMPANY
Detroit

The Budd-Michelin equipment—two Budd-Michelin single wheels in front, two Budd-Michelin Dual Wheels in the rear (pairs of single wheels acting together as units.) All wheels completely interchangeable either as units or as halves of Duals. One spare.

The G-Boy

GRAHAM BROTHERS *New* ONE TON TRUCK

Graham Brothers latest and most impressive achievement—the G-BOY!

A one ton truck embodying entirely new ideas in design and balance and selling at an astonishing price.

Extraordinary purchasing power and vast production made the G-BOY possible.

Largest exclusive truck manufacturers in the world, Graham Brothers buy and build in enormous volume.

The price and quality of the G-BOY illustrate the extent to which buyers benefit by this volume and its resultant economies.

The G-BOY is the most important contribution in years to the cause of *Better Transportation at Lower Cost.*

A new system of weight distribution effects a revolutionary improvement in balance.

The compact wheelbase facilitates ease of handling and yet affords unusually generous body capacity. The truck is gracefully low, with steel spoke wheels and 30 x 5 truck type cord tires.

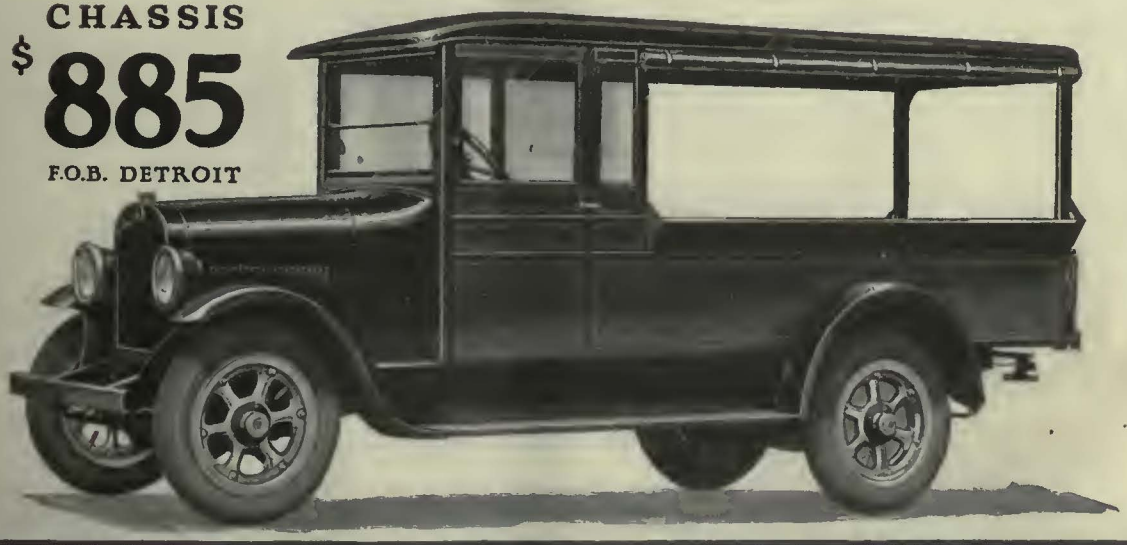
Dodge Brothers engine is the standard power unit, with a new heavy transmission that has proved its quality in greater capacity types.

The entire truck, in fact, is built to outlive and outperform trucks costing hundreds of dollars more.

Bodies for the G-BOY—and for Graham Brothers complete line of Trucks and Motor Coaches—are built in Graham Brothers own factory at Evansville, Ind. —the most modern plant of its kind in America. Whatever your requirements may be, a suitable body is immediately available at an attractive price.

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

CHASSIS
$885
F.O.B. DETROIT



SOLD BY DODGE BROTHERS DEALERS EVERYWHERE

FISK TRANSPORTATION "Fillerless" CORDS

Tires that run big mileages under exacting conditions. They add safety in operation and help keep down running expenses thru their consistent reliability on the road.

From Maine to California they have proved their value to the big bus operators.

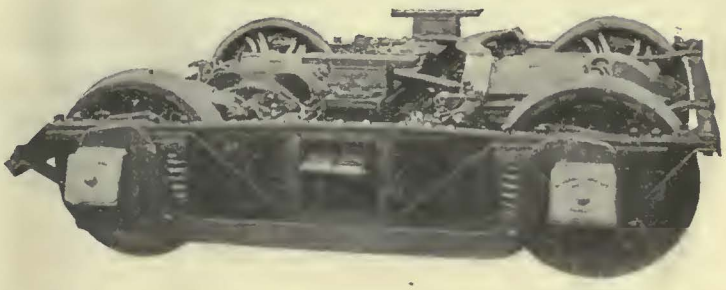
Fisk Transportation "Fillerless" Cords are made in all bus and truck sizes.

The Fisk Tire Company, Inc.
Chicopee Falls, Mass.

Time to Re-tire Get a Fisk
Trade Mark Reg. U. S. Pat. Off.

Modern Cars

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

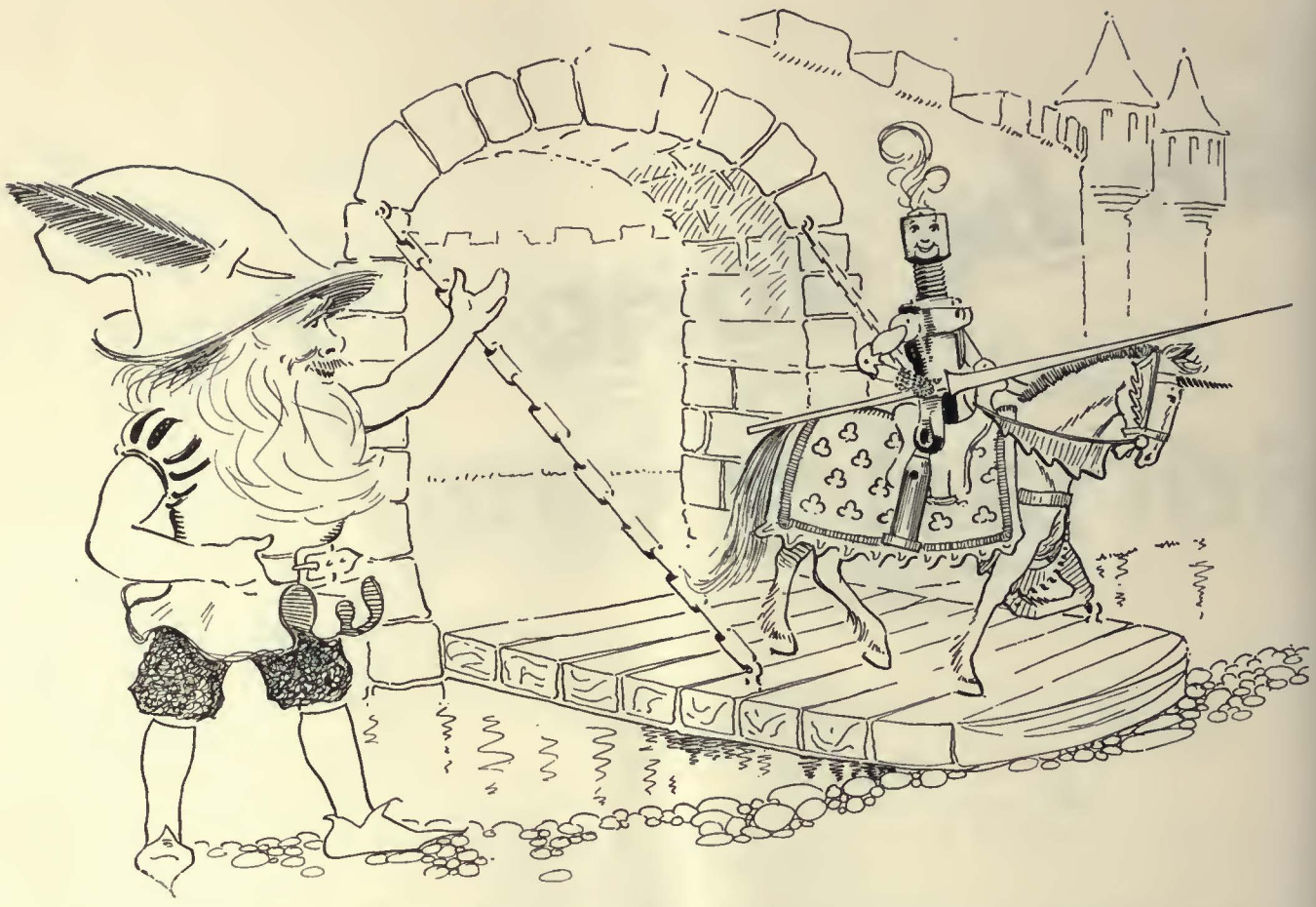


MC62 Light weight truck for low car bodies, city or interurban service. Inside hung equalizer bars.

CUMMINGS CAR AND COACH COMPANY

Successor to McGuire Cummings Mfg. Co.

111 W. Monroe Street
CHICAGO



Positive Protection!

"Boyerize to Economize"

When the knight rode forth to battle in ancient times he was fully protected from head to foot by heavy armor which the enemy could not pierce.

When a Boyerized Part goes into service in modern days it is completely protected from end to end by our Boyerizing Process which the "wear-and-tears" cannot penetrate.

Because of this treatment Boyerized Parts easily outlast ordinary steel parts three to four times. Which means that to standardize on these parts is to economize on maintenance costs.

Ask for quotations on your requirements.

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

Bemis Car Truck Company

Electric Railway Supplies

Springfield, Mass.

Representatives:

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

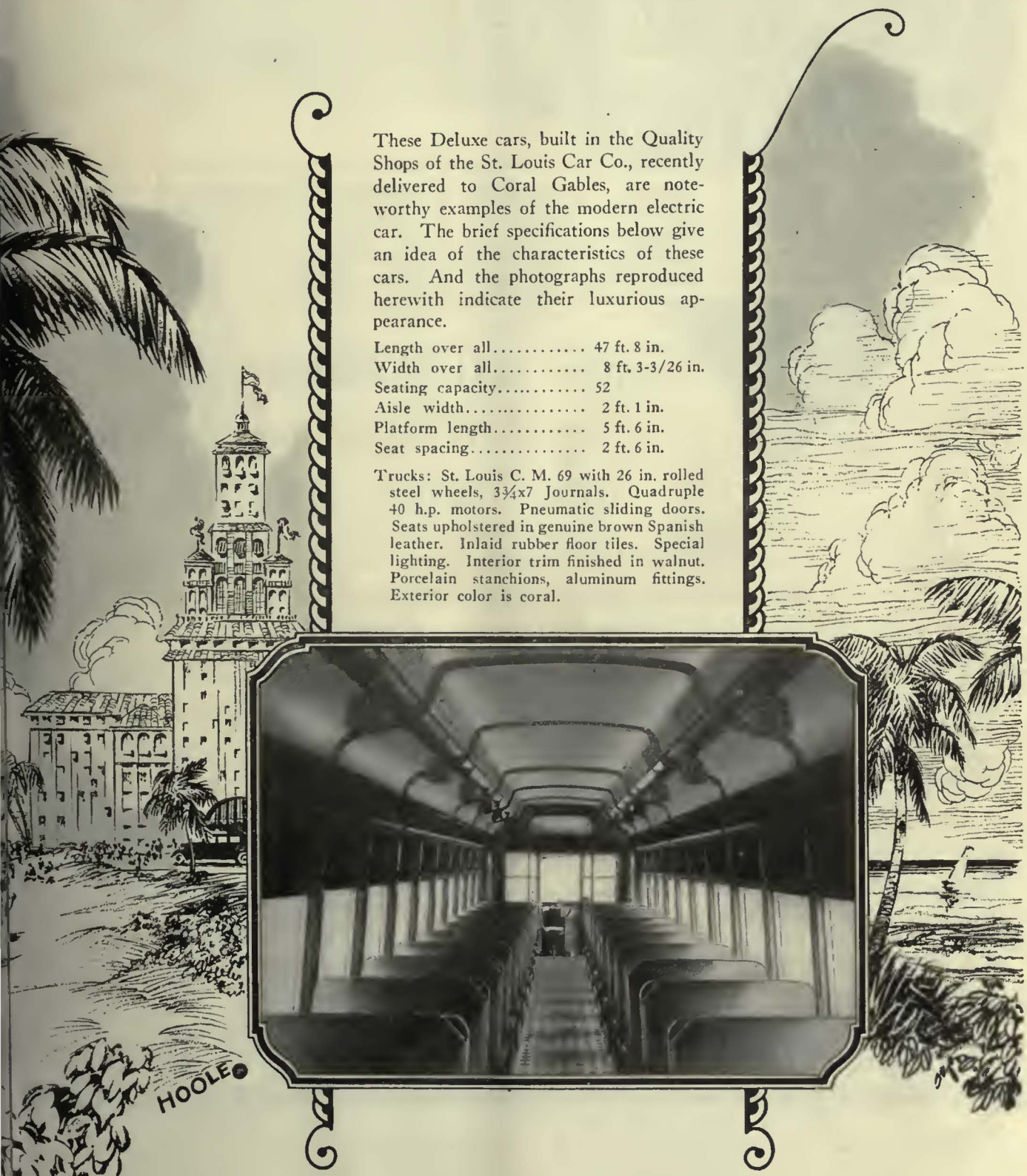
MODERN CARS *for* Coral Gables,

Florida's outstanding real estate development, and most modern city, has attracted world-wide attention because of its size, magnificence and the complete way in which the plans have been executed.

Coral Gables realized the necessity of modern transportation to any community, and organized the Coral Gables Rapid Transit Corporation, which built a railway from Miami to Coral Gables and into the newly developed area. The establishment of this line emphasizes the permanent character of the development and the stability of the project, and testifies to the vision and sound judgment of the executives.

Quality Cars

a MODERN CITY



These Deluxe cars, built in the Quality Shops of the St. Louis Car Co., recently delivered to Coral Gables, are noteworthy examples of the modern electric car. The brief specifications below give an idea of the characteristics of these cars. And the photographs reproduced herewith indicate their luxurious appearance.

Length over all	47 ft. 8 in.
Width over all	8 ft. 3-3/26 in.
Seating capacity	52
Aisle width	2 ft. 1 in.
Platform length	5 ft. 6 in.
Seat spacing	2 ft. 6 in.

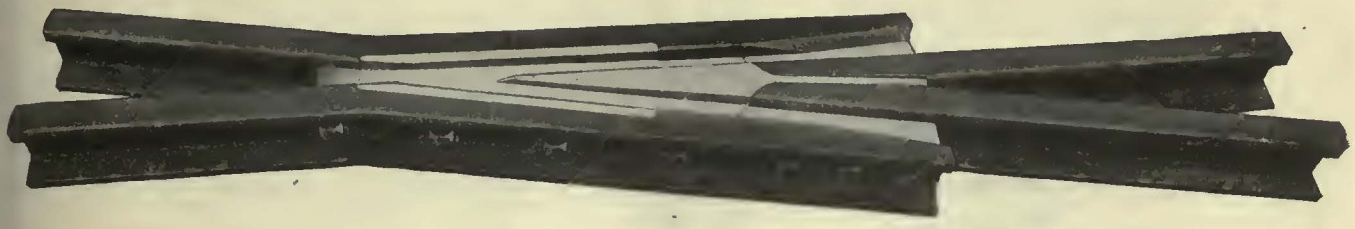
Trucks: St. Louis C. M. 69 with 26 in. rolled steel wheels, 3¾x7 Journals. Quadruple 40 h.p. motors. Pneumatic sliding doors. Seats upholstered in genuine brown Spanish leather. Inlaid rubber floor tiles. Special lighting. Interior trim finished in walnut. Porcelain stanchions, aluminum fittings. Exterior color is coral.

St. Louis Car Company

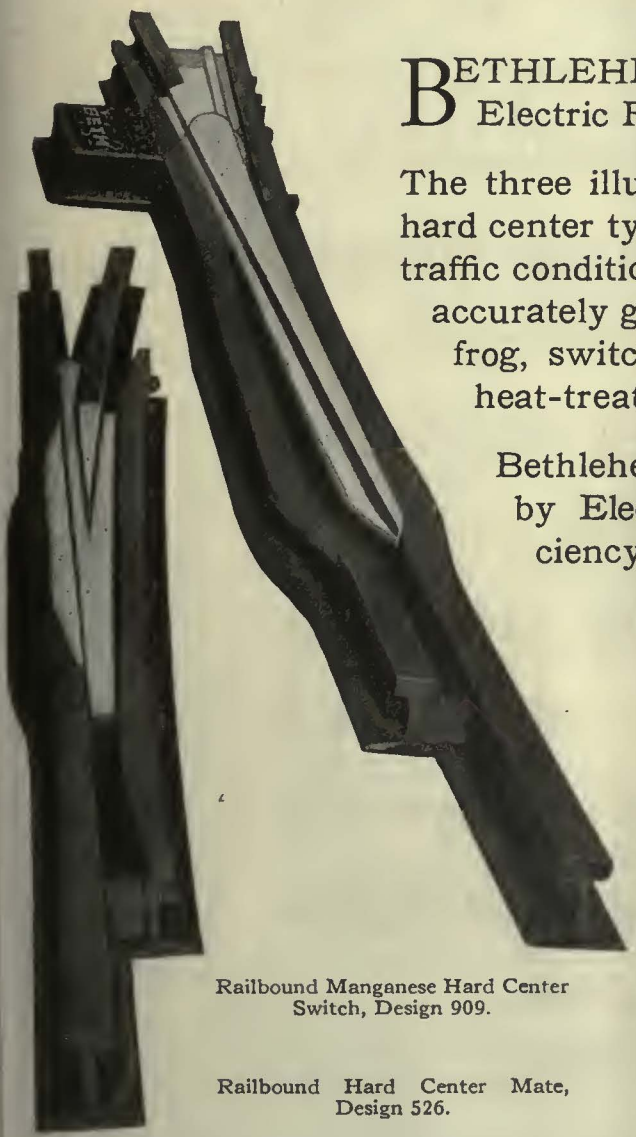
St. Louis, Mo.

"The Birthplace of the Safety Car"

Bethlehem Track Specialties



Railbound Manganese Hard Center Frog, Design 951.



Railbound Manganese Hard Center Switch, Design 909.

Railbound Hard Center Mate, Design 526.

BETHLEHEM manufactures a complete line of Electric Railway track specialties.

The three illustrated products are of the railbound hard center type, and are made to withstand extreme traffic conditions. The manganese steel centers are accurately ground to fit the rail. The parts of the frog, switch and mate are bolted together with heat-treated Mayari chrome-nickel bolts.

Bethlehem track specialties are widely used by Electric Railways because of their efficiency, economy and durability.

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.

Descriptive Literature Sent on Request

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

District Offices:

New York Boston Philadelphia Baltimore Washington Atlanta Pittsburgh
Buffalo Cleveland Detroit Cincinnati Chicago St. Louis San Francisco Los Angeles Seattle

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

BETHLEHEM

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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.

ERJ

WE OWN AND OFFER—

FOR SALE

ALL EQUIPMENT OF FORMER

NEW YORK & LONG ISLAND TRACTION CO.

which includes:

Birney Cars	Sweepers	Materials and Supplies
Brill Cars	Snow Plows	Machine Shop Equipment
Southern Cars	Work Cars	Track Tools

Approximately 40 Miles of Track and Overhead Material, Etc.

FOR INFORMATION REGARDING THE ABOVE, WRITE OR WIRE

H. E. SALZBERG CO., INC.

50 Church Street, New York City

POSITIONS VACANT

MANAGER wanted for motor bus division of rapidly growing street and interurban railway system in Middle West. Must have considerable experience in motor bus operating management, handling of employes, public relations, etc. Fine opportunity for right man. State fully experience and qualifications. P-900, Electric Railway Journal, 7 So. Dearborn St., Chicago, Ill.

POSITIONS WANTED

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

RAILWAY superintendent in charge of operation and maintenance of rolling stock track and overhead, an outstanding success in operating co-ordinated railway and coach service, desires change for personal reasons. Correspondence invited. PW-887, Electric Railway Journal, 7 So. Dearborn St., Chicago, Ill.

SUPERINTENDENT transportation. With a wide experience and successful record on city and interurban properties also co-ordination of rail and bus service, successful in handling labor, public relations, etc. Recognized as a transportation official of exceptional ability fully capable of getting results on any property. At present engaged. Personal reasons for desiring change. Best of references. Correspondence invited. Address PW-903, Electric Railway Journal, Guardian Building, Cleveland, Ohio.

SAVE 30% TO 50% ON
RAILS-LOCOMOTIVES-CARS

Economy—Service
Quality—Reliability

HYMAN-MICHAELS COMPANY
Peoples Gas Bldg., Chicago
ST. LOUIS — DALLAS — LOS ANGELES
SAN FRANCISCO — PORTLAND — SEATTLE

Rotary Converters

1—500 kw., 600-v., 833 amp., 900 r.p.m., 6-ph., compound wound Westinghouse Rotary Converter, with 3—165 kva., 60-cy., single ph., 13200 v. primary transformers with A.C. and D.C. panels.

1—300 kw., 600-v., 500 amp., 1200 r.p.m., 6-ph., compound wound interpole Westinghouse Rotary Converter, with 3—110 kva., 60-cy., single ph., 13200-v. primary transformers with A.C. and D.C. panels.

GEO. SACHSENMAIER CO.
926 N. Third St., Philadelphia, Pa.

"SEARCHLIGHT"

IS

Opportunity Advertising

—to help you get what you want.
—to help you sell what you no longer need.

Take Advantage Of It

For Every Business Want

"Think SEARCHLIGHT First"

G-36

FOR SALE

200 Tons New Rail

Lorain Section, 7-in. 82-505 Standard Drilling. For price and further details write

Purchasing Agent
EAST ST. LOUIS & SUB. RY. CO.,
East St. Louis, Ill.

SPECIALIZING
In High Class
ELECTRIC RAILWAY CARS & EQUIPMENT
We solicit your inquiries and offerings.
ELECTRIC TRACTION & BUS CO.
Times Building, New York City

TO HELP YOU

LOCATE COMPETENT MEN

"Searchlight" Advertising

G-3

FOR SALE

30 Birney Safety Cars

Brill Built
West. 508 or G. E. 264 Motors. Cars Complete—Low Price—Fine Condition.

ELECTRIC EQUIPMENT CO.
Commonwealth Bldg., Philadelphia, Pa.

WHAT AND WHERE TO BUY

Equipment, Apparatus and Supplies Used by the Electric Railway Industry with Names of Manufacturers and Distributors Advertising in this Issue

Advertising, Street Car
Collier, Inc., Barron G.

Air Brakes
Christensen Air Brake Co.
Westinghouse Air Brake Co.

Air Receivers & Aftercoolers
Ingersoll-Rand Co.

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

Armature Shop Tools
Elec. Service Supplies Co.

Automatic Return Switch Stands
Ramapo Ajax Corp.

Automatic Safety Switch Stands
Ramapo Ajax Corp.

Axles
Bemis Car Truck Co.
Bethlehem Steel Co.
Brill Co., The J. G.
Carnegie Steel Co.
Illinois Steel Co.
Johnson & Co., J. R.
National Ry. Appliance Co.
St. Louis Car Co.
Westinghouse E. & M. Co.

Axles, Carbon Vanadium
Johnson & Co., J. R.

Axles, Steel
Bethlehem Steel Co.
Carnegie Steel Co
Johnson & Co., J. R.

Babbit Metal
Ajax Metal Co.
Johnson & Co., J. R.
More-Jones Brass & Metal Co.

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

Batteries, Dry
National Carbon Co.
Nichols Lintern Co.

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

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

Bells & Buzzers
Consolidated Car Heating Co.

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

Benders, Rail
Railway Trackwork Co.

Bodies, Bus
Baker-Raulang Co., The
Cummings Car & Coach Co.
Graham Bros.

Bodies, Passenger Car
Baker-Raulang Co., The

Body Material, Haskelite and Plymetl
Haskelite Mfg. Corp.

Bolsters
Babcock & Wilcox Co.

Bolts & Nuts Track
Illinois Steel Co.

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

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

Bonds, Rail
Amer. Steel & Wire Co.
Electric Railway Improvement Co.
Elec. Service Supplies Co.
General Electric Co.
Ohio Brass Co.
Railway Trackwork Co.
Una Welding & Bonding Co.
Westinghouse E. & M. Co.

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

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

Brake Shoes
Bemis Car Truck Co.
Brill Co., The J. G.
St. Louis Car Co.

Brakes, Brake Systems and Brake Parts
Bemis Car Truck Co.
Brill Co., The J. G.
General Electric Co.
National Brake Co.
Safety Car Devices Co.
St. Louis Car Co.
Westinghouse Tr. Br. Co.

Brick, Paving
National Paving Brick Mfrs. Assn.

Brick, Vitrified
National Paving Brick Mfrs. Assn.

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

Brushes Graphite
Morganite Brush Co., Inc.
National Carbon Co.

Brushes, Metal Graphite
National Carbon Co.

Brushes, Wire Pneumatic
Ingersoll-Rand Co.

Bulkheads
Haskelite Mfg. Corp.

Bus Seats
Hale-Kilburn Co.

Buses, Motor
Brill Co., The J. G.
Cummings Car & Coach Co.
Graham Brothers
International Harvester Co.
International Motor Co.
Mack Trucks, Inc.
St. Louis Car Co.
Yellow Truck & Coach Manuf. Co.

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

Cables. (See Wires and Cables)

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

Carbon Brushes (See Brushes, Carbon)

Carbon Paste, Welding
National Carbon Co.

Carbon Plates, Welding
National Carbon Co.

Carbon Rods, Welding
National Carbon Co.

Car Lighting Fixtures
Elec. Service Supplies Co.

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

Car Steps, Safety
Irving Iron Works

Car Wheels, Rolled Steel
Bethlehem Steel Co.

Cars, Dump
Brill Co., The, J. G.
Differential Steel Car Co.
St. Louis Car 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.
Cummings Car & Coach Co.
Kuhlman Car Co., G. C.
National Ry. Appliance Co.
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
Ajax Metal Co.
More-Jones Brass & Metal Co.

Castings, Gray Iron and Steel
American Steel Foundries
Bemis Car Truck Co.
St. Louis Car Co.
Wm. Wharton, Jr. & Co.

Castings, Malleable and Brass
Bemis Car Truck 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
Graybar Electric Co.

Ceiling Car
Haskelite Mfg. Corp.
Pantasote Co., Inc.

Ceilings, Plywood, Panels
Haskelite Mfg. Co.

Change Carriers
Cleveland Fare Box Co.
Electric Service Supplies Co

Circuit-Breakers
General Electric Co.
Westinghouse E. & M. Co.

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

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

Clusters and Sockets
General Electric Co.

Coil Banding and Winding Machines
Elec. Service Supplies Co.
Westinghouse E. & M. Co.

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

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

Coin Counting Machines
Cleveland Fare Box Co
International Register Co.

Coin Sorting Machines
Cleveland Fare Box Co.

Coin Wrappers
Cleveland Fare Box Co.

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

Commutator Truing Devices
General Electric Co.

Commutators or Parts
Cameron Electrical Mfg. Co.
General Electric Co.
Westinghouse E. & M. Co.

Compressors, Air
General Electric Co.
Graybar Electric Co.
Ingersoll-Rand Co.
Westinghouse Tr. Br. Co.

Compressors, Air, Portable
Ingersoll-Rand Co.

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

Condenser Papers
Irvington Varnish & Ins. Co.

Connectors, Solderless
Westinghouse E. & M. Co.

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

Controllers
American Brown Boveri Elec. Corp.

Controllers or Parts
General Electric Co.
Westinghouse E. & M. Co.

Controller Regulators
Elec. Service Supplies Co.

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

Converters, Rotary
American Brown Boveri Elec. Corp.
General Electric Co.
Westinghouse E. & M. Co.

Copper Wire
American Brass Co.
Anaconda Copper Mining Co.

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

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

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

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

Cross Arms (See Brackets)

Cranes, Hoists & Lifts
Electric Service Supplies Co.

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 & Curtain Fixtures
Brill Co., The J. G.
Morton Mfg. Co.
Pantasote Co., Inc.
St. Louis Car Co.

Dealer's Machinery & Second Hand Equipment
East St. Louis & Sub. Ry. Co.
Elec. Equipment Co
Electric Traction and Bus Co.
Hyman Michaels Co.
Sachsenmaier Co., George
Salzberg Co., Inc., H. E.

Dealer Second Hand Rails
Hyman Michaels Co.

Derailing Devices (See also Track Work)

Derailing Switches
Ramapo Ajax Corp.

Destination Signs
Elec. Service Supplies Co.

Detective Service
Wish-Service, P. Edward

Door Operating Devices
Brill Co., The J. G.
Consolidated Car Heating Co.
Nat'l Pneumatic Co., Inc.
Safety Car Devices Co.

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

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

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

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

Ears
Electric Service Supplies Co.
Ohio Brass Co.
Westinghouse E. & M. Co.

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

Electric Locomotives
St. Louis Car Co.

Electrical Wires and Cables
Amer. Electrical Works
Amer. Steel & Wire Co.
Graybar Electric Co.
John A. Roebling's Sons Co.

Electrodes, Carbon
Railway Trackwork Co.
Una Welding & Bonding Co.

Electrodes, Steel
Railway Trackwork Co.
Una Welding & Bonding Co.

Engineers, Consulting, Contracting and Operating
Allison & Co., J. S.
Archbold-Brady Co.
Beeler, John A.
Bibbins, Rowland J.
Buchanan & Layng Corp.
Day & Zimmermann, Inc.
Ford, Bacon & Davis
Hemphill & Wells
Holst, Engelhardt W.
Jackson, Walter
Kelker & DeLeuw
Kelly Cooke & Co.
McClellan & Junkersfeld
Richey, Albert S.
Sanderson & Porter
Stevens & Wood
Stone & Webster
White Eng. Corp., The J. G.

Engines, Gas, Oil or Steam
Ingersoll-Rand Co.
Westinghouse E. & M. Co.

Exterior Side Panels
Haskelite Mfg. Corp.

Fare Boxes
Cleveland Fare Box Co
Ohmer Fare Register Co.
Perey Mfg. Co.
Nat'l Ry. Appliance Co.

Fare Registers
Electric Service Supplies Co.
Ohmer Fare Register Co.

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

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

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

Field Coils (See Coils)

Flashlights
National Carbon Co.

Flaxlinum Insulators
National Railway Appliance Co.

Floodlights
Electric Service Supplies Co.

Floor, Sub
Haskelite Mfg. Corp.

Flooring, Fireproof
Irving Iron Works

Flooring, Non-Slipping
Irving Iron Works

Floorings, Open Steel
Irving Iron Works

Flooring, Steel, Subway
Irving Iron Works

Flooring, Ventilating
Irving Iron Works

Floors
Haskelite Mfg. Corp.

Forgings
Brill Co., The, J. G.
Carnegie Steel Co.

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

Frogs, Track (See Track Work)

Frogs, Trolley
Electric Service Supplies Co
Ohio Brass Co.
Westinghouse E. & M. Co.

Funnell Castings
Wm. Wharton, Jr. & Co.

Furnaces, Electric
American Brown Boveri Elec. Corp.

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

Fuses, Refillable
General Electric Co.

Gaskets
Westinghouse Tr. Br. Co.

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

Gas Producers
Westinghouse E. & M. Co

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

Gauges, Oil and Water
Ohio Brass Co.

Gear Blanks
Bethlehem Steel Co.
Brill Co., The, J. G.
Carnegie Steel Co.

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

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

Generating Sets, Gas-Electric
General Electric Co.

Generators
American Brown Boveri Elec. Corp.
General Electric Co.
Westinghouse E. & M Co

Girder Rails
Bethlehem Steel Co.
Lorain Steel Co.

Gong (See Bells and Gongs)

Grating, Steel Subway
Irving Iron Works

Greases (See Lubricants)

Grinders & Grinding Supplies
Metal & Thermit Corp.
Railway Trackwork Co.

Grinders, Portable
Railway Trackwork Co.

Grinders, Portable Electric
Railway Trackwork Co.

Grinding Bricks and Wheels
Railway Trackwork Co.

Guard Rail Clamps
Ramapo Ajax Corp.
Wm. Wharton, Jr. & Co.

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

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

Hammers, Pneumatic
Ingersoll-Rand Co.

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

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

Headlining
Haskelite Mfg. Corp.
Pantasote Co., Inc.

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

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

Heaters, Car Stove
Smith Heater Co., Peter

Helmets, Welding
Railway Trackwork Co.
Una Welding & Bonding Co.

Hoists, Portable
Ingersoll-Rand Co.

Industrial Tractors
International Harvester Co.

Instruments Measuring, Testing and Recording
Amer. Steel & Wire Co.
General Electric Co.
Graybar Electric Co.
Westinghouse E. & M. Co.

Insulating Cloth, Paper and Tape
General Electric Co.
Irvington Varnish & Ins. Co.
Okonite Co.
Okonite-Callender Cable Co.
Westinghouse E. & M. Co.

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

Insulating Varnishes
Irvington Varnish and Insulator Co.

Insulation (See also Paints)
Electric Ry. Equipment Co.
Elec. Service Supplies Co.
General Electric Co.
Irvington Varnish & Ins. 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.

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

Interior Side Linings
Haskelite Mfr. Corp.

Interurban Cars (See Cars)

Jacks (See also Cranes, Hoists and Lifts)
Buda Co.
Elec. Service Supplies Co.
National Ry. Appliance Co.

Joints, Rail (See Rail Joints)

Journal Boxes
Bemis Car Truck Co.
Brill Co., J. G.
St. Louis Car Co.

Lamp Guards & Fixtures
Electric Service Supplies Co.
General Electric Co.
Westinghouse E. & M. Co.

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

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

Lanterns, Classification
Nichols-Lintern Co.

Letter Boards
Haskelite Mfg. Corp.

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

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

Locking Spring Boxes
Wm. Wharton, Jr. & Co.

Locomotives, Electric
American Brown Boveri Elec. Corp.
Cummings Car & Coach Co.
General Electric Co.
Westinghouse E. & M. Co.

Locomotives, Oil Engine, Electric Driven
Ingersoll-Rand Co.

Lubricating Engineers
Universal Lubricating Co.

Lubricants, Oil and Grease
Universal Lubricating Co.

Manganese Parts
Bemis Car Truck Co.

Manganese Steel Castings
Wm. Wharton, Jr. & 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 & Crossings
Bethlehem Steel Co.
Ramapo Ajax Corp.
Wm. Wharton, Jr. & Co.

Meters (See Instruments)

Motor and Generator Sets
General Electric Co.

Motor Buses (See Buses, Motor)

Motor Generators
American Brown Boveri Elec. Corp.

Motor Trucks
International Harvester Co

Motors and Control
Graybar Electric Co.

Motors, Electric
American Brown Boveri Elec. Corp.
General Electric Co.
Westinghouse E. & M. Co.

Motorman's Seats
Brill Co., J. G.
Electric Service Supplies Co.
St. Louis Car Co.
Wood Co., Chas. N.

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

Oils (See Lubricants)

Omnibuses (See Buses, Motor)

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

Oxygen
International Oxygen Co.

Packing
Westinghouse Traction Brake Co.

Paints and Varnishes (Insulating)
Electric Service Supplies Co.
Irvington Varnish & Ins. Co.

Paints and Varnishes, Preservative
Joseph Dixon Crucible Co.

Paints and Varnishes for Woodwork
National Ry. Appliance Co.

Panels, Outside, Inside
Haskelite Mfg. Corp.

Pavement Breakers
Ingersoll-Rand Co.

Paving Materials, Vitrified Brick
National Paving Brick Mfrs. Assn.

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

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

Pinions (See Gears)

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

Pipe Fittings
Westinghouse Tr. Brake Co.

Planers (See Machine Tools)

Plates for Tee Rail Switches
Ramapo Ajax Corp.

Pliers, Rubber Insulated
Elec. Service Sup. Co.
Nat'l Ry. Appliance Co.

Plywood, Roofs, Headlinings, Floors, Interior Panels, Bulkheads, Truss Planks
Haskelite Mfg. Corp.

Pneumatic Tools
Ingersoll-Rand Co.

Pole Line Hardware
Bethlehem Steel Co.
Electric Service Supplies Co.
Ohio Brass Co.

Pole Reinforcing
Hubbard & Co.

Poles, Metal Street
Bates Expanded Steel Truss Co.
Elec. Ry. Equipment Co.
Graybar Electric Co.
Hubbard & Co.

Poles, Pneumatic
Westinghouse Traction Brake Co.

Poles and Ties Treated
Bell Lumber Co.

Poles, Ties, Posts, Piling & Lumber
Bates Expanded Steel Truss Co.
Bell Lumber Co.
Graybar Electric Co.
Naugle Pole & Tie Co.

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

Poles, Tubular Steel
Elec. Ry. Equipment Co.
Electric Service Supplies Co.

Portable Grinders
Buda Co.

Potheads
Okonite Co.
Okonite-Callender Cable Co., Inc.

Power Saving Devices
National Ry. Appliance Co.

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

Pumps
A. S. Cameron Steam Pump Wks. (Ingersoll-Rand Co.)
Ingersoll-Rand Co. (A. S. Cameron Steam Pump Wks.)

Pumps, Vacuum
A. S. Cameron Steam Pump Wks. (Ingersoll-Rand Co.)
Ingersoll-Rand Co. (A. S. Cameron Steam Pump Wks.)

Punches, Ticket
International Register Co.
Wood Co., Chas. N.

Rail Braces & Fastenings
Ramapo Ajax Corp.

Rail Grinders (See Grinders)

Rail Joints
Carnegie Steel Co.
Illinois Steel Co.
Rail Joint Co.

Rail Joints—Welded
Lorain Steel Co.
Metal & Thermit Corp.

Rail Welding
Metal & Thermit Corp.
Railway Trackwork Co.
Una Welding & Bonding Co.

Rails, Relaying
Hyman-Michaels Co.

Rails, Steel
Bethlehem Steel Co.
Carnegie Steel Co.
Illinois Steel Co.

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

Rattan
Brill Co., The J. G.
Cummings Car & Coach Co.
Elec. Service Supplies Co.
Hale-Kilburn Co.
St. Louis Car Co.

Rectifiers, Mercury
American Brown Boveri Elec. Corp.

Registers and Fittings
Brill Co., The J. G.
Electric Service Supplies Co.
International Register Co.
Ohmer Fare Register Co.
Rooke Automatic Register Co
St. Louis Car Co.

Reinforcement, Concrete
American Steel & Wire Co.
Bethlehem Steel Co.
Carnegie Steel Co.

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

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

Replacers, Car
Electric Service Supplies Co.

Resistances
Consolidated Car Heating Co.

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

Retrievers, Trolley (See Catchers and Retrievers, Trolley)

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

Roofing, Car
Haskelite Mfg. Co.
Pantasote Co., Inc.

Roofs, Car and Bus
Haskelite Mfg. Corp.

Safety Control Devices
Safety Car Devices Co.

Sanders, Track
Brill Co., The J. G
Electric Service Supplies Co.
Nichols-Lintern Co.
Ohio Brass Co.
St. Louis Car Co.

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

Sash Metal Car Window
Hale-Kilburn Co.

Scrapers, Track (See Cleaners and Scrapers, Track)

Screw Drivers, Rubber Insulated
Electric Service Supplies Co.

Seating Materials
Brill Co., The J. G.
Haskelite Mfg. Corp.
Pantasote Co., Inc.
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.
Hale-Kilburn Co.
St. Louis Car Co.

Second Hand Equipment
East St. Louis & Sub. Ry. Co.
Electric Equipment Co
Electric Traction & Bus Co.
Hyman-Michaels Co.
Sachsenmaier Co., George
Salzberg Co., Inc., H. E.

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

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.
Electric Service Supplies Co.
Nat'l Pneumatic Co., Inc.

Signals, Indicating
Nichols-Lintern Co.

Signal Systems, Block
Electric 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)

Slag
Carnegie Steel Co.

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

Smokestacks, Car
Nichols-Lintern Co.

Snow-Plows, Sweepers and Brooms
Brill Co., The J. G.
Consolidated Car Fender Co.
Cummings Car & Coach Co.
Root Spring Scraper Co.
St. Louis Car Co.

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

Special Adhesive Papers
Irvington Varnish & Ins. Co.

Special Trackwork
Bethlehem Steel Co.
Lorain Steel Co.
Wm. Wharton, Jr. & Co.

Spikes
Amer. Steel & Wire Co.
Illinois Steel Co.

Splicing Compounds
Westinghouse E. & M. Co.

Splicing Sleeves (See Clamps and Connectors)

Springs, Car and Truck
American Steel Foundries
American Steel & Wire Co.
Bemis Car Truck Co.
Brill Co., The J. G.
St. Louis Car Co.

Sprinklers, Track and Road
Brill Co., The J. G.
Cummings Car & Coach Co.
St. Louis Car Co.

Stair Steps, Safety
Irving Iron Works

Steel and Steel Products
Carnegie Steel Co.
Illinois Steel Co.
Morton Manufacturing Co.

Steel Car Doors
Morton Mfg. Co.

Steel Flooring
Morton Mfg. Co.

Steps, Car
Brill Co., The J. G.
Irving Iron Works
Morton Mfg. Co.

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

Stop Signals
Nichols Lintern Co.

Storage Batteries (See Batteries, Storage)

Strain Insulators
Electric 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
American Brown Boveri Elec. Corp.
Consolidated Car Heating Co
Electric Service Supplies Co.
General Electric Co.
Westinghouse E. & M. Co.

Switches, Tee Rail
Ramapo Ajax Corp.

Switches, Track (See Track Special Work)

Tampers, Tie
Ingersoll-Rand Co.
Railway Trackwork Co.

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

Tee Rail Special Track Work
Bethlehem Steel Co.
Ramapo Ajax Corp.
Wm. Wharton, Jr. & Co.

Telephones and Parts
Elec. Service Supplies Co.
Graybar Electric Co.

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

Thermostats
Consolidated Car Heating Co.
Gold Car Heating & Lighting Co.
Railway Utility Co.
Smith Heater Co., Peter

Ticket Choppers and Destroyers
Electric Service Supplies Co.

Tie Plates
Illinois Steel Co.

Ties and Tie Rods, Steel
Carnegie Steel Co.
International Steel Tie Co.

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

Tires, Rubber
Fisk Tire Co., The
Mohawk Rubber Co.

Tongue Switches
Wm. Wharton, Jr. & Co.

Tool Steel
Bethlehem Steel Co.
Carnegie Steel Co.

Tools, Track & Miscellaneous
American Steel & Wire Co.
Electric Service Supplies Co.
Hubbard & Co.
Railway Trackwork Co.

Torches, Acetylene (See Cutting Apparatus)

Towers and Transmission Structures
Archbold-Brady Co.
Bates Expanded Steel Truss Co.
Westinghouse E. & M. Co.

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

Track Grinders
Metal & Thermit Corp.
Railway Trackwork Co.
Ramapo Ajax Corp.

Track, Special Work
Bethlehem Steel Co.
Buda Co.
Ramapo Ajax Corp.
Wm. Wharton, Jr. & Co.

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

Transfer Issuing Machines
Ohmer Fare Register Co.

Transformers
General Electric Co.
Graybar Electric Co.
Westinghouse E. & M. Co.

Treads, Safety, Stair, Car Step
Irving Iron Works
Morton Mfg. Co.

Trolley Bases
General Electric Co.
More-Jones Brass & Metal Co.
National Railway Appliance Co.
Nuttall Co., R. D.
Ohio Brass Co.

(Continued on Page 56)

Center — Electric driven portable compressor supplies air for tie tampers or paving breakers.

Bottom—Two CC-Paving Breakers cutting out pavement along track.

Increase your profits with Air Power

A high rate of speed can be maintained on track jobs when compressed air tools aid hand labor. Full power is available all day long.

Portable air compressors, pneumatic tie tampers, and paving breakers make possible a surprising reduction in the cost of track work. Pneumatic tie tampers enable four men to tamp more track per day, and do a better job, than ten to twelve men using hand picks and bars.

With CC Paving Breakers you can remove pavement or concrete foundations in a small fraction of the time required by hand methods. Other air tools, such as grinders, rail drills, spike drivers, riveters, etc., further increase the savings.

An investigation of Ingersoll-Rand machines will show you how you can increase your profits by reducing the labor item. Ask for full information on all the labor-aiding uses of an Ingersoll-Rand Portable air compressor outfit.

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Offices in Principal Cities the World Over

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260 St. James Street, Montreal, Quebec

42 P.C.

Ingersoll-Rand

ALPHABETICAL INDEX TO ADVERTISEMENTS

WHAT AND WHERE TO BUY

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Trolley Bases, Retrieving
General Electric Co.
National Railway Appliance Co.
Nuttall Co., R. D.
Ohio Brass Co.

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

Trolley Material, Overhead
Electric Service Supplies Co.
More-Jones Brass & Metal Co.
Ohio Brass Co.
Westinghouse E. & M. Co.

Trolley Wheel Bushings
More-Jones Brass & Metal Co.
Star Brass Works

Trolley Wheels & Harps
Electric Service Supplies Co
More-Jones Brass & Metal Co.
Star Brass Works

Trolley Wheels (See Wheels, Trolley)

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

Trucks, Car
Bemis Car Truck Co.
Brill Co., The J. G.
Cummings Car & Coach Co.
St. Louis Car Co.

Trucks, Motor
Graham Bros.
International Motor Co.
Mack Trucks, Inc.
Yellow Truck & Coach Mfg. Co.

Truss Planks
Haskelite Mfg. Corp.

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

Turbines, Steam
General Electric Co.
Westinghouse E. & M. Co

Turnstiles
Electric Service Supplies Co.
Ohio Brass Co.
Perey Mfg. Co., Inc.

Turntables
Electric Service Supplies Co.

Valves
Ohio Brass Co.
Westinghouse Tr. Br. Co.

Varnished Papers & Silks
Irvington Varnish & Ins. Co.

Ventilators
Consolidated Car Heating Co.

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

Vestibule Linings
Haskelite Mfg. Corp.

Weatherproofing
Morton Mfg. Co.

Welded Rail Joints
Electric Railway Improvement Co.
Metal & Thermit Corp.
Ohio Brass Co.
Railway Trackwork Co.
Una Welding & Bonding Co.

Welders, Portable Electric
Electric Railway Improvement Co.
Ohio Brass Co.
Railway Trackwork Co.
Una Welding & Bonding Co.
Westinghouse E. & M. Co.

Welders, Rail Joint
Ohio Brass Co.
Railway Trackwork Co.

Welding & Cutting Tools
International Oxygen Co.

Welding Processes and Apparatus
Electric Railway Improvement Co.
General Electric Co.
Metal & Thermit Corp.
Nat'l Ry. Appliance Co.
Ohio Brass Co.
Railway Trackwork Co.
Una Welding & Bonding Co.
Weatinghouse E. & M. Co.

Welding Steel
Electric Railway Improvement Co.
Railway Trackwork Co.
Una Welding & Bonding Co.

Welding Wire
American Steel & Wire Co.
General Electric Co.
Railway Trackwork Co.
Roebling's Sons Co., J. A.

Welding Wire and Rods
Railway Trackwork Co.

Wheel Guards (See Fenders and Wheel Guards)

Wheel Presses (See Machine Tools)

Wheels, Car, Cast Iron
Bemis Car Truck Co.
Griffin Wheel Co.

Wheels, Car, Steel & Steel Tire
American Steel Foundries
Illinois Steel Co.

Wheels, Trolley
Elec. Ry. Equipment Co.
Elec. Service Supplies Co.
General Electric Co.
More-Jones Brass and Metal Co.
Nuttall Co., R. D.
Star Brass Works

Wheels, Steel Disc
Budd Wheel Co., The

Wheels, Wrought Steel
Carnegie Steel Co.
Illinois Steel Co.

Whistles, Air
General Electric Co.
Ohio Brass Co.
Westinghouse E & M. Co.
Westinghouse Traction Brake Co.

Window Sash, Locks and Racks
Morton Mfg. Co.

Wire Rope
American Steel & Wire Co
Roebling's Sons Co., J. A.

Wires and Cables
American Brass Co.
American Electrical Works
American Steel & Wire Co.
Anaconda Copper Min. Co.
General Electric Co.
Graybar Electric Co.
Okonite Co.
Okonite-Callender Cable Co., Inc.
Roebling's Sons Co., J. A.
Westinghouse E. & M. Co.

Brill "Admor" Seat

Increased Seating Capacity

Improved Public Relations

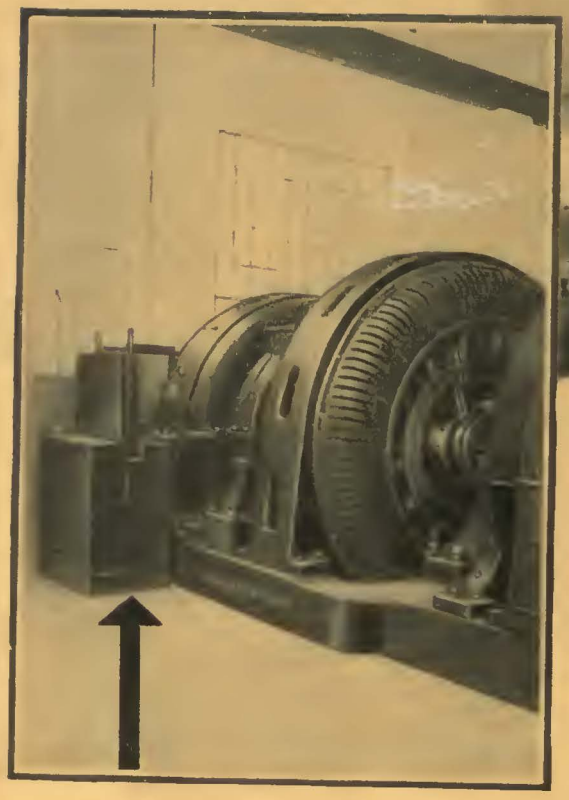
Adapted to both end and center platforms of cars equipped with either slat or upholstered seats.

Easily and quickly operated.

Separates incoming and outgoing passengers at service doors.

The Brill "Admor" Seat (patented) makes it possible to utilize the space in front of non-operating platform doors for additional seating accommodations. Brooklyn City Railroad with 535 cars equipped, Asheville Power & Light Company, City of Miami, The Washington Railway & Electric Co. on its 15 new cars, and the Chilian Electric Co. of Santiago on 30 cars now building have already taken advantage of its facilities. Further details furnished upon request.

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



The "Milwaukee" installed them first — in 1917

High-speed air circuit breakers afford protection for direct-current apparatus to a degree not previously attainable. Their use makes possible also many radical improvements in direct-current locomotive and substation designs.

The decision of the Chicago, Milwaukee & St. Paul Railway to install G-E High-Speed Breakers in the substations for its initial electrification opened a new era in substation practice. The principle was later extended to the protection of locomotives.

Today upwards of 900 G-E High-Speed Breakers are in the service of railways throughout the United States and in foreign countries.

Experience with hundreds of G-E High-Speed Circuit Breakers amply proves the value of this protective device—developed by General Electric previous to 1917. Users have come to regard the high-speed breaker as essential to most satisfactory operation.

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GENERAL ELECTRIC