

ELECTRIC RAILWAY JOURNAL

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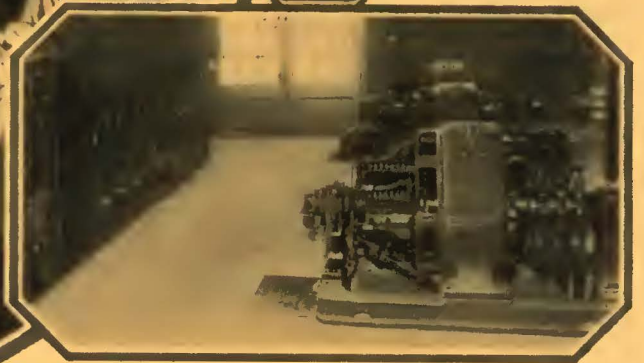
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Ask the Railway Man Another!

WITH the cessation of Mah Jong activity and a decline in the crossword puzzle pastime, the faddists are now engrossed in the game of "Ask Me Another." Over the after-dinner coffee cups a thirst persists not for mere food and drink but for a knowledge of the men and women who were influences in ancient and medieval times. A feature of this new obsession is the inevitable disclosure of how little is known about politics, books, anatomy and points of general information.

If Messrs. Spafford and Esty had included a questionnaire on modern developments in local transportation, what percentage would you have made? What are the most recent transportation sales ideas, developments in car design, the operating records of representative properties, achievements in the promotion of safety and training in courtesy?

Ask any consistent reader of ELECTRIC RAILWAY JOURNAL about new developments in his industry. He is posted up to the minute!

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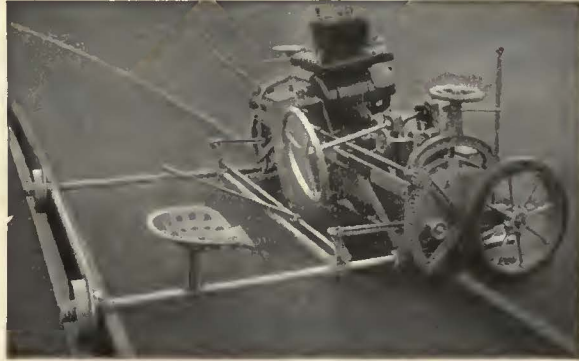
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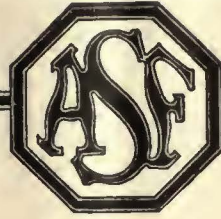
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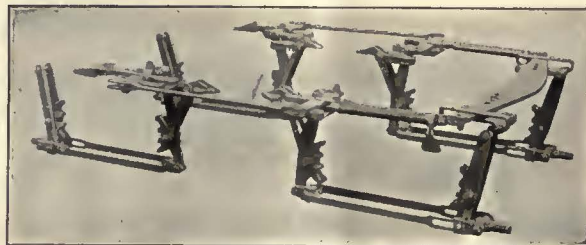
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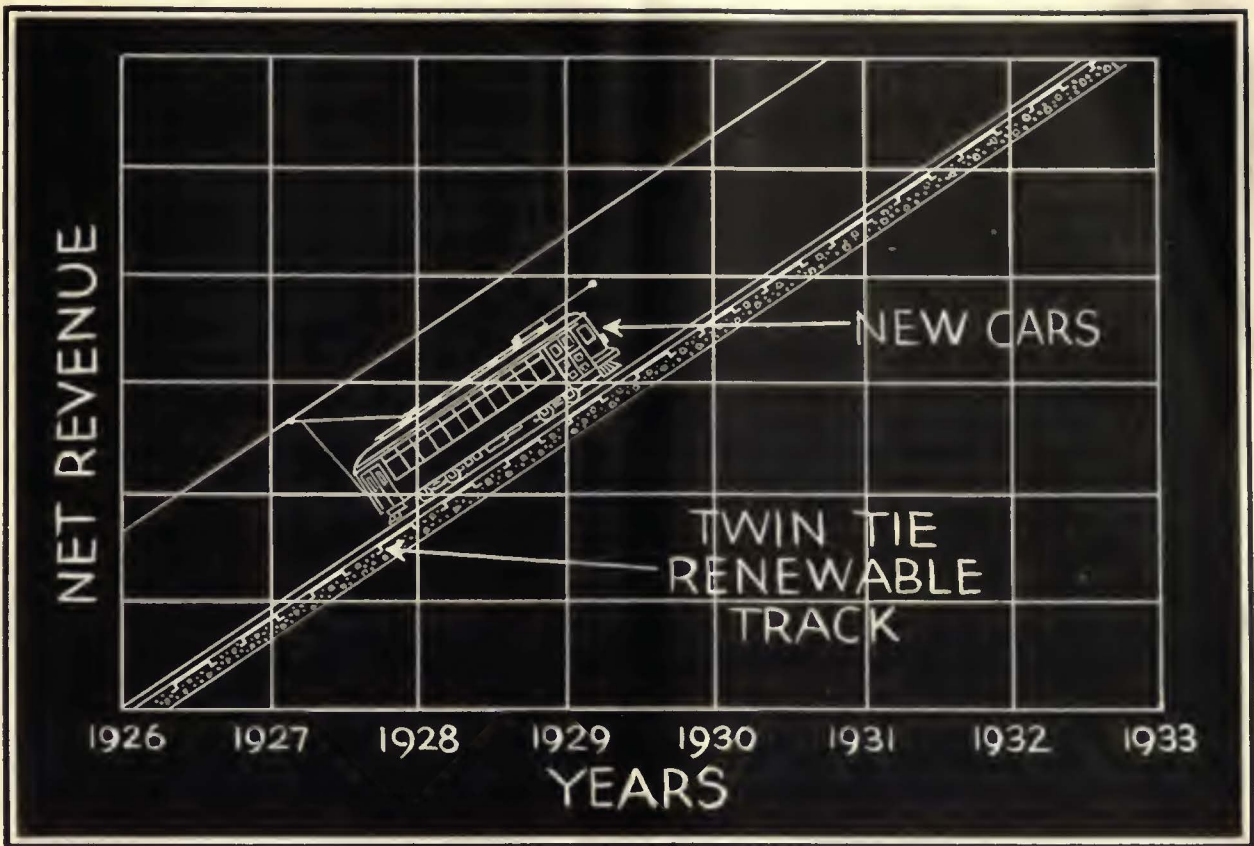
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Concrete Base? Costs? Bearing?
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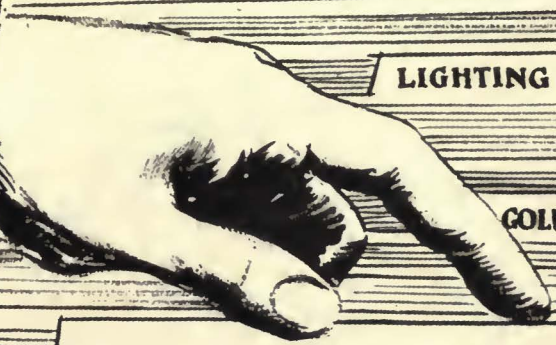
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26, 1927



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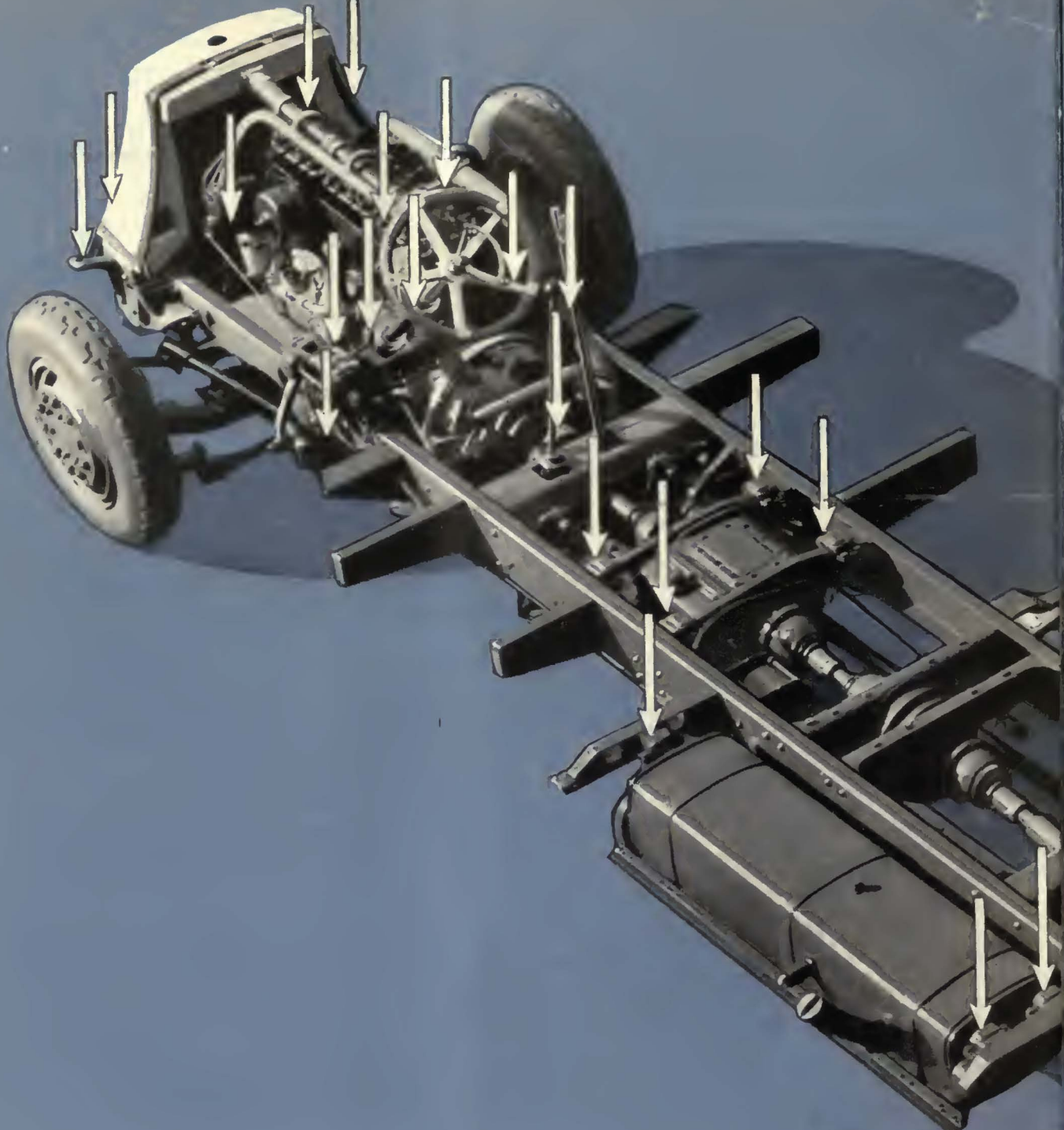
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"QUALITY MACHINES FOR QUALITY SERVICE"

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Compressed and Resilient

**Mack leads the world
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life—comfort—silence
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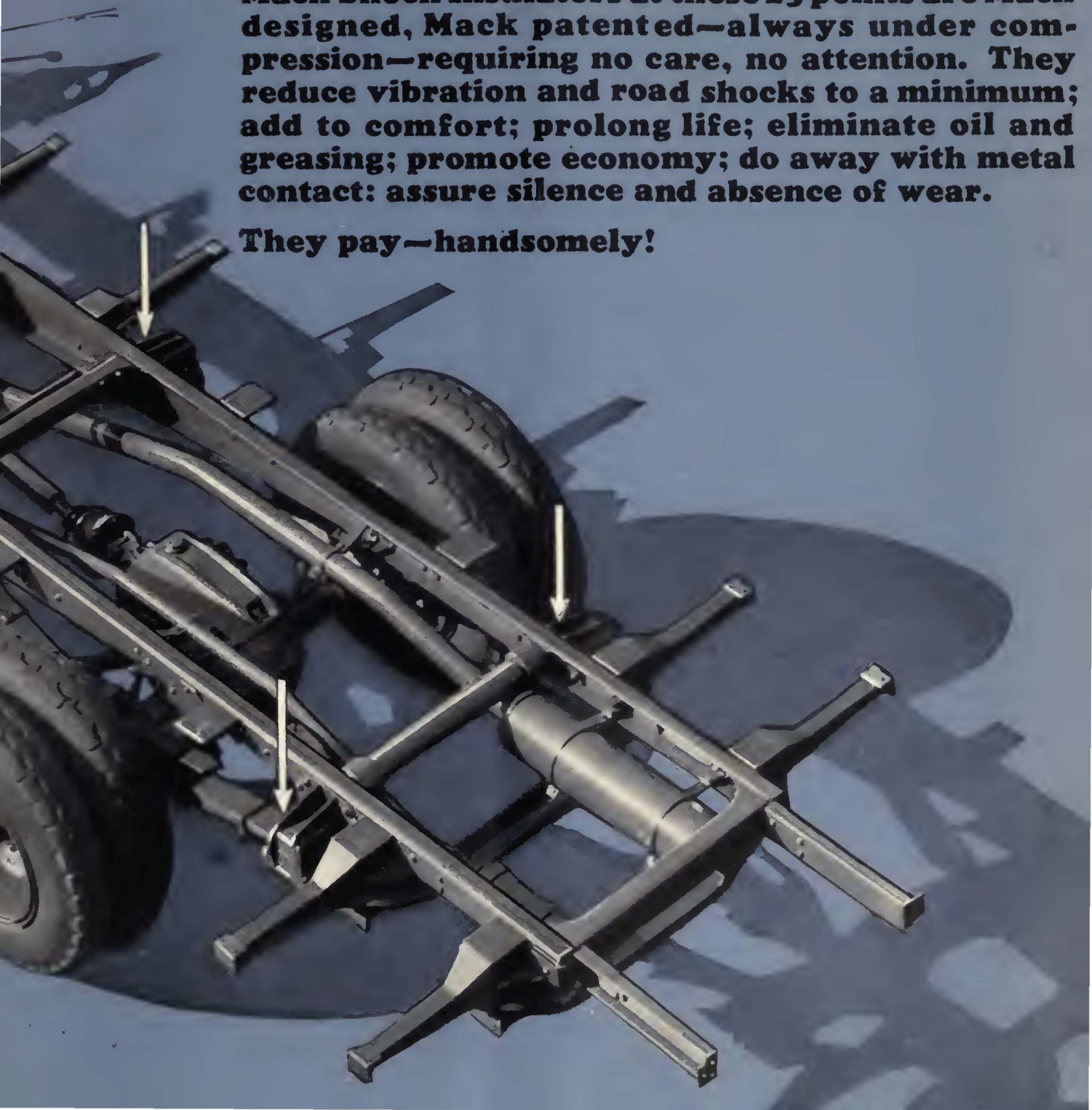


At every vital point Mack uses rubber—compressed, resilient rubber to prolong life and increase efficiency of operation—to assure comfort to passengers.

At each spring end to cushion road impact; at the engine to dampen out vibration; at the transmission to assure silence; at the steering assembly to reduce driver fatigue; at the gas tank to relieve twisting strains; on the drive line to absorb twist when overcoming inertia; at the radiator to prevent leakage.

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They pay—handsomely!





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How Fortunate That Operator—

Operators who know buses have had experience. They have operated buses of different makes under the same conditions; same grade of drivers—same road factors—same shop maintenance—same weather influences. They know by comparison.

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Go to the operator who has used Macks—and others. He will tell, you better than we can, why Macks are preferred.

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It has taken 10 years



A step ahead of the modern trend

of consistent effort to establish a successful principle of modern car *building*

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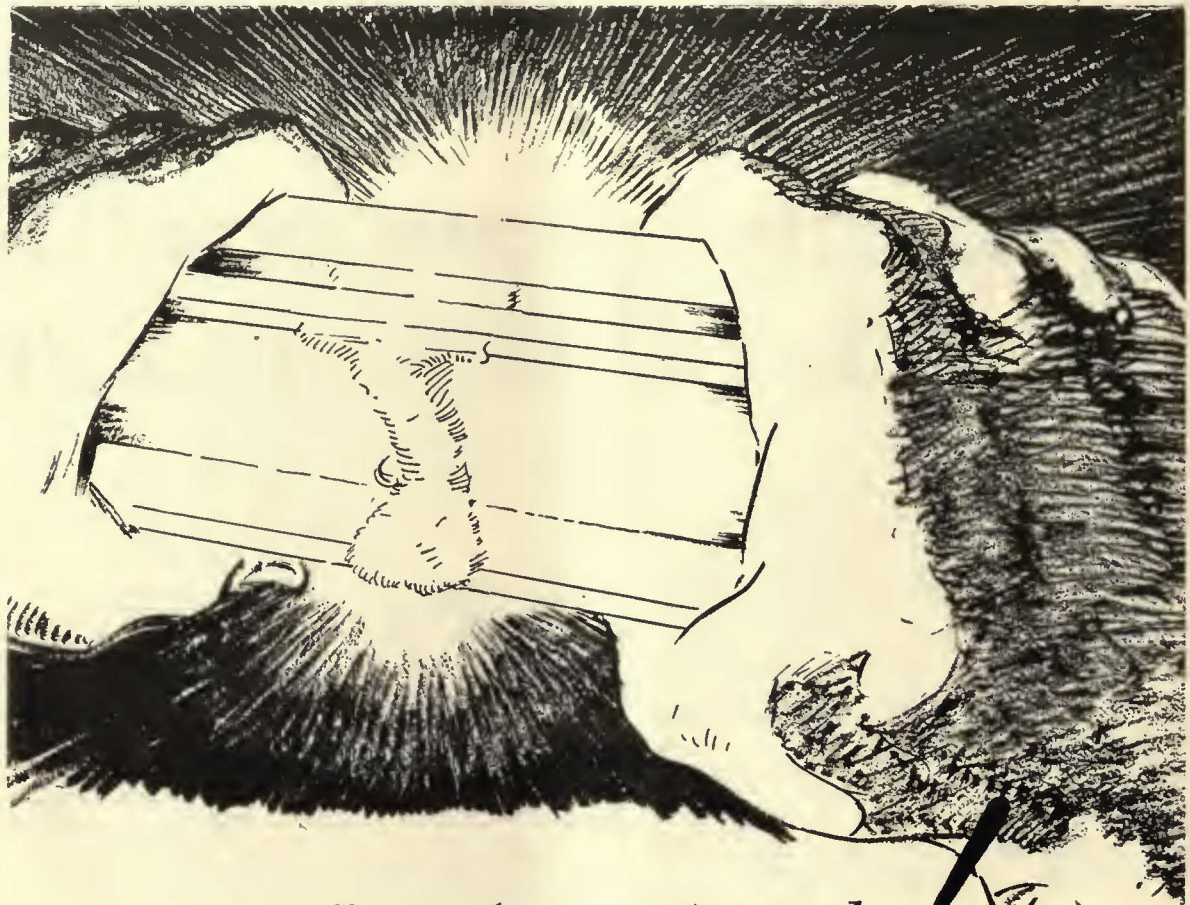
Through ten years of consistent effort the Cincinnati Car Company has worked to establish a basic principle of good car-building

practice. This is now called the principle of **BALANCED DESIGN**. It brings together all the elements of car production, design, construction and equipment, — under one thoroughly competent control. It applies modern precision manufacturing methods with standardization of major units. It assures in short that your new cars will be built to fit your needs with an exact knowledge of what constitutes a properly **BALANCED** unit and with the assurance that every penny of your investment will buy its full equivalent in low-cost passenger preferred transportation.

Space forbids greater detail in these pages, but we will gladly go into the matter from A to Z with any interested electric railway executive.

CINCINNATI CAR COMPANY
Cincinnati, Ohio

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New
CARS

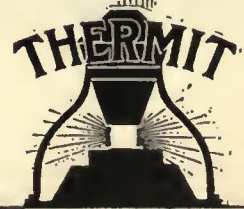
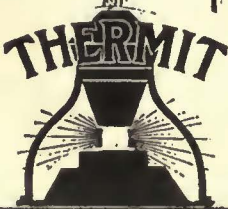


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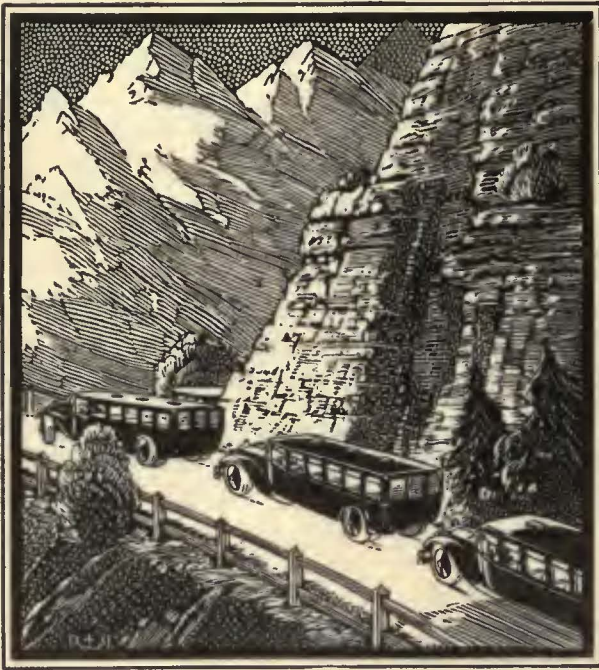
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and he can have shipment started at once. His business doesn't have to wait.

We suggest, now, that call across the state or nation that would get some important thing done. We believe you would be surprised if you knew how little it would cost. . . . *Number, please?*

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The INFANT becomes a GIANT



IN 1920 approximately 20,000 buses were in operation. In 1925, their number had increased to 70,000—and it is estimated that there are 85,000 in use today.

In 1925 the total number of passengers carried by buses was 3,000,000,000. Estimates for 1926 place the figure at 3,500,000,000.

Within seven years bus transportation has established itself as an integral part of the American passenger traffic system.

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It is built definitely for the motorcoach industry—to assure maximum wear—to provide maximum riding qualities—and to cut costs to a minimum.

It has secured and maintains a reputation for “the lowest cost per tire mile.”

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Trade Mark

UNITED STATES ROYAL CORD Motorcoach



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Insures schedule maintenance—earns greater patronage—and greater profits.

UNITED STATES TIRES ARE GOOD TIRES



*For Evansville
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in Nashville by the Nashville Railway & Light Company

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The average citizen, noting attractive, up-to-date cars on his electric railway, visualizes a transportation service that is comfortable, speedy, and satisfactory—and progressive. Such is the personal reaction that makes patrons and friends.

330-24

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 69

New York, Saturday, March 26, 1927

Number 13

Two Developments that Mark Fundamental Progress

IMPORTANT places in the archives of transportation are destined for two achievements reported in this issue. One, the introduction of the articulated car into high-speed interurban service by the Washington, Baltimore & Annapolis Electric Railroad, is a development that at once makes a bid for increased patronage and reduced operating cost. Nothing has been spared to provide comfort of riding. This is brought out in the text and views of the cars in service. Yet, due to fundamental features of design, a 27 per cent weight saving was possible. Two men perform the work with greater ease than do three on a two-car train, and maintenance costs will be reduced because of the fewer number of units of apparatus to inspect and keep up.

The other event in the march of progress is the approaching debut of the Springfield, Mass., car designed for city service. To be sure, it is still in the embryo stage, but it has great promise. Its conception grew out of the increasing desire to try out some of the plans the industry has talked about for many years. Finally, some two years ago C. V. Wood, president, and W. L. Harwood, chief engineer of the Springfield Street Railway, listed what in their opinion were the objectionable features of the design used universally in this country. On another sheet they listed the things that should be accomplished.

Then they began to build. Plans were made and immediately scrapped in favor of other plans destined to meet the same fate. Dozens of manufacturers were consulted. Finally, through the persistence of these Springfield executives, two trucks very different in appearance from the older types began to emerge, and steel and aluminum and wood shapes began to take the form of a car body also very different from that usually observed. The trucks are now complete and after many trials and changes the apparatus is being mounted.

While the proof of the pudding is in the eating, as the two Springfield men have emphatically stated, success has been attained in many of the aims set down two years ago. The car, accommodating 45 people in comfortable, amply spaced seats, will weigh something less than 24,000 lb. The body is attractively finished and is essentially an improvement in appearance, in the opinion of many who have viewed it in the state of partial completion. With the radical changes adopted in the truck material reduction of noise may be expected.

Coincident with this story of the Springfield car comes the announcement of the purchase for the electric railways at Springfield and Worcester of 100 new cars which do not embody the experimental features. It is to be regretted that the new design has not had a year or more of experience behind it so that it could have been adopted for this order. However, because of promises made by the New Haven Railroad at the time

of its re-entry into the management of these two properties to effect an immediate improvement of rolling stock, it was considered inadvisable to postpone construction.

These two developments, one on the W., B. & A., the other at Springfield, are specific examples of the faith that large financial interests have in the future of the industry. They are not shaken in their belief that rail transportation never will become a thing of the past. But these events do denote the insistence of owners and operators that radical improvements must be made to compete with modern conditions. In the past the industry has not so much lacked in possibilities as in imagination and courage to progress.

An Excellent Measure Defeated After the Battle Was Won

PHILADELPHIA'S city government and the various local civic and merchants' associations were commended in the issue of this paper for Jan. 22 for the progressive spirit shown in adopting a sweeping no-parking ordinance for the downtown section. Now, unfortunately, it is necessary partially to retract the words of praise. For the City Fathers of the Pennsylvania metropolis have suffered a change of heart.

Startling charges have been registered against the no-parking ordinance by the Market Street and Arch Street Merchants' Associations and by certain organizations of motorists. Individual business men along Market Street, the principal shopping thoroughfare, declared that inroads have been made into their respective businesses, varying from 10 to 40 per cent. Some of the wealthier residents of the city have been heard to declare that they would rather have their chauffeurs drive them to New York, if necessary, so that they can park when and where they want to and for as long a time as they please!

When the original ordinance was passed Council voted unanimously to give the plan a fair trial. All objections by the merchants were temporarily stilled and it seemed that conditions were propitious for a valuable and revealing demonstration of the benefits accruing to the municipality and business men alike through relief from serious traffic congestion in the central delivery district.

But a wave of hysteria swept the merchants. Naturally many people who for years have been accustomed to use the city streets for free garage space set up a loud clamor against this "infringement" of their rights. Be it to the credit of Director of Public Safety Elliott that the ordinance was enforced fairly and impartially in practically every instance. So those who consider that they have an inalienable right to special privilege had their sense of the eternal fitness of things sadly wounded. Then, too, the no-parking ordinance was put into effect immediately following the holiday

season. Business was naturally slack after the Christmas rush and many merchants unthinkingly placed the full responsibility for this condition at the door of the no-parking enforcement.

Violent agitation for a return to limited parking became the order of the day. The Committee on Public Safety was besieged with petitions and its public hearings were crowded with loud-speaking merchant representatives. Vainly did Director Elliott point out that limited parking was a physical impossibility without a considerable increase in the police force, that any weakening at this time meant a return to the old vice of the parking hog. Members of Council found it expedient to lend a sympathetic ear to the tearful tale of woe poured forth by the most prominent business men of the city. An amended ordinance was passed by the Council on March 24.

Those Who Defeated the Measure Will Find Themselves the Chief Losers

SO PHILADELPHIA is to have one-hour parking again on several important down-town streets. The boundaries of the restricted area have been moved in, so that parking is not to be prohibited over as wide a section as was first planned. True, the streets will presumably be swept clear during the morning and evening rush hours. But after 9:30 a.m. and before 5 p.m. it is to be feared that the old, old story will be told on Market, Arch and Broad Streets.

Back in their chairs the merchants will lean, with the comfortable feeling that they have scotched the transportation company and handily turned the tide in favor of themselves. But who have been the principal losers by this move? Who but the very merchants that have so persistently failed to look beyond the ends of their own noses? Every year more and more people have become disgusted with the intolerable congestion of traffic in the downtown area and have resolved to go to almost any lengths to avoid the mental and physical anguish incident to shopping in the center of the city. These people are ripe for picking by the neighborhood stores and the outlying shopping centers. Surely this class of shoppers constitutes a much bigger loss to the downtown merchants than the comparative few that have considered themselves injured by the recent legislation.

Relatively few shoppers can find, or ever could find, parking space for their automobiles on the narrow streets of downtown Philadelphia. Much of the limited space available is taken up by the clerk or other individual who usurps the space in front of the store in which he is employed—space which the store owner thinks is being used by his customers. Charles Hall, president of the Council, and Director Elliott have both predicted that it will not be long before the merchants wake up and realize that they have been deafened by their own oratory and confused by the false brilliance of their own theories of automobile shopping. Even now a large group of merchants have steadfastly refused to be carried away by the importunings of their fellows and have come right out in meeting with statements to the effect that strict no-parking enforcement is necessary and desirable. And the Automobile Club of Philadelphia has taken a similar stand.

As for Philadelphia, it started out bravely to move mountains and now wakes to find itself dealing in ant-hills.

Co-operation Will Bring Insurance Improvement

WORK which has been done over a period of several years by the insurance committee of the American Electric Railway Association typifies the character of activity in which an association committee can bring about material savings for members by acting as a clearing house for the interchange of data and experience.

Co-operation by member companies is essential to the success of such a committee's work. Of necessity it is dependent for its studies on information furnished by operating companies in answer to its inquiries. Unless such inquiries are answered completely, work of the committee is seriously curtailed.

This year the insurance committee is broadening its activity. It is not only interested in gathering fire loss statistics, so as to check up insurance rates directly, but is likewise endeavoring to stimulate the adoption by member companies of approved fire prevention measures which will reduce the fire hazard.

Questionnaires which were sent out some time ago are being compiled. The information developed is to be presented in the committee's report. This may be made complete or incomplete, depending on the degree to which operating companies furnish the necessary data. In order that the work of the committee may be the means for bringing about substantial improvement in the insurance situation, operating companies which have not answered the questionnaire will render a service both to the industry and themselves by sending in at once the information requested.

Appreciative Newspaper Comment Is Valuable to Railway Companies

SYMPATHETIC understanding of the problems of the electric railways is by no means uncommon among the daily press. This, of course, excludes from the list of commentators papers that never have anything but an axe to grind. The influence of such sheets will always be a subject of speculation, but there can be no question about the power for good of the best of the dailies. So in saying as it did, in a recent case in which fares were increased in an Eastern city, that the commission recognized a transportation and economic development familiar to every observing citizen in the present era of automobile competition, the paper in which this expression appeared put itself forcibly on record as recognizing this same condition.

The paper was not in full agreement with the schedule of rates authorized by the commission. It felt, for instance, that the short-haul rider had been penalized to the disadvantage of the company's revenues, but it did say in simple justice to the railway that "it has been struggling, like all other corporations of the same class, not only against tremendous difficulties, due to the automobile drain, but also against municipal exactions, in the way of taxation, that greatly handicap it in the resulting competition." There is no doubt that the paper did the city a real service in characterizing as fantastic the talk of enforcing the 5-cent fare condition of the original franchise grant. Of course, the courts have repeatedly ruled that, franchise or no franchise, electric railways cannot constitutionally be compelled to operate at a loss. It should be unnecessary to remind an intelligent community that the 5-cent fare was fixed in railway franchises at a time when operating costs, including wages, were radically dif-

ferent from what they are today, but it does seem necessary to repeat this truth again and again.

No sympathy was wasted by this commentator on the threat of retaliation against the local railway by the process of licensing buses to compete with the railway and "bring it to time." Very aptly it said, in substance, that, aside from the propriety of this kind of destructive revenge, its effect would be, not to restore 5, 6 or 7-cent fares, but to destroy railway service, the main reliance of the great bulk of the people. In that event the city would have to forfeit hundreds of thousands of dollars a year in franchise taxes and paving taxes or transfer the equivalent of these assessments to the bus companies. And the paper clearly sees that, in either event, the public would have nothing to show but a melancholy deprivation of railway facilities for its foolish experiment in municipal vengeance.

In thus ably presenting the case in its two editorials the commentator has done a real service to city officials, the public and the railway. No thoughtful, far-seeing citizen desires to cripple the corporate agency that furnishes to the city a considerable part of its daily transportation. On the contrary, that agency, having demonstrated its desire to carry on, must be sustained in every reasonable way. On its part, the city has the right to demand in return fair play to patrons, together with a demonstration by the railway of its sincerity in providing the highest grade of service that is possible under the particular economic limitations imposed.

Safety Co-operation from the Top

WITH respect to the all-important subject of safety and accident prevention work, a new note is sounded in a recent article by A. W. Robertson, president of the Philadelphia Company, writing in the N.E.L.A. *Bulletin*. He says in part:

"In order to get the most out of safety devices and wise safety rules, it is absolutely essential that the individual be protected and that his co-workers and companions have the right mental attitude toward both of these and all other matters pertaining to safety. If the mental attitude is wrong, it is quite possible to almost defeat the effectiveness of both. Safety devices will compensate in some measure for faulty rules and appliances. Here is where the executive can help very materially. If he has no interest in safety, the chances are he will affect his immediate subordinate officers and they, in turn, will affect those directly under them to have a contempt and disregard for safety work. This attitude tends to put the brakes on every safety movement in the organization, although the subordinate may have ample safety devices installed and adequate rules promulgated."

With this approach to the safety problem, Mr. Robertson has unearthed one of the greatest stumbling blocks to a perfect safety organization. In a few words, he promulgates the axiom that pressure from the top is much more effective than pressure from the bottom. Also that pressure from the top and from the bottom exerted at the same time will eradicate any faults that may lie in the middle of the pile. The whole history of the safety movement is justification of the assertion that executive indifference has retarded and devitalized some of the best plans and most enthusiastic efforts for the conservation of human life in the industrial world.

Speaking very plainly, the JOURNAL has had the opportunity to see the effects of this executive indifference, or, what is worse, a mild display of enthusiasm

that is a shadow instead of a substance. Those familiar with the safety movement will undoubtedly agree that accident statistics decrease in direct proportion to the percentage of workers, from president to office boy, that are sold on the movement.

A Railway Operator Speaks Frankly

FRANK, indeed, were the remarks made before the recent meeting of the Illinois Electric Railway Association at Springfield, Ill., by J. R. Blackhall, vice-president and general manager Chicago & Joliet Electric Railway, regarding the manufacturers' responsibility for keeping abreast of the industry's present-day equipment needs. Some there may be who feel that Mr. Blackhall was unduly severe in his criticism, or at least neglected to give adequate credit for those improvements which have been made in electric railway equipment. Others might be inclined to hold that the speaker had overlooked the effect on car development of the buying habits of many operating companies. In this latter category would come the practice of buying cars to detailed specifications and the strong resistance encountered by manufacturers in the introduction of new devices.

But whether or not Mr. Blackhall recognized adequately the difficulties encountered by the car builders, the question of how to bring about car improvement merits more than passing consideration on the part of both manufacturers and operators. Electric railway equipment must be brought up to a level of attractiveness and performance that will meet present-day transportation standards, and the speed with which the industry may be expected to move forward into its proper place in the sun depends on the extent to which this is accomplished. It is indeed "a condition and not a theory that confronts us."

Just what is needed in the way of car improvements cannot be definitely cataloged. It would likewise be an ambitious undertaking to attempt to predict just what will form the developments of the next few years. But it is a simple matter to list the characteristics that are wanted in the car of the future. It must be faster; it must be more attractive to the eye and more comfortable to ride. Reduction of noise in operation is absolutely essential. It seems quite probable that this last requirement will lead to some fundamental changes in design. In fact, several interesting attempts to work out improvements in this direction are already under way. It was his own experience in the development of a truck with fully inclosed gears and spring suspended motors that led Mr. Blackhall to question the initiative of the car builders.

Frank discussion of a question so vitally important to the industry is decidedly helpful. Each day there is a growing inclination on the part of every one concerned to face the facts and to abandon the shackles of precedent and prejudice. The ultimate electric railway car will not be developed overnight. Mere changes do not necessarily constitute improvements. Failures and mistakes may be expected. In some cases the importance of making adequate provision for economical and rapid maintenance and repairs may be overlooked. But there seems to be no good reason why electric railway cars cannot be made as attractive to the public as any other vehicle on the streets. In fact, in comparison with the problems with which the bus designer must contend, the car builder's task is relatively simple.

Fundamental Design Changes

Feature Experimental Car at
Springfield, Mass.



Exterior lines of Springfield experimental car show many traces of motor bus influence

Compound curves have been used freely to create a pleasing appearance. The wide sloping windshield is an innovation in street car design. Doors will be painted to conform to general color scheme.

PRECEDENT has been cast aside in the design of a new car by the Springfield Street Railway, Springfield, Mass., and a vehicle has been developed which differs in many important respects from any hitherto operated by electric railways in this country. The object has been to build a car lighter, faster and more comfortable than those now in use. The outward appearance of this new car is novel, but not so much so as the design and arrangement of the equipment. This has been accomplished not by camouflaging an old design but by adopting an entirely new one. Many ideas borrowed from the automobile industry have been incorporated. Special effort has been made to reduce noise and vibration. To this end radical departures have been made from established practice in truck design. The practicability of the many innovations will be thoroughly tried out in a series of tests.

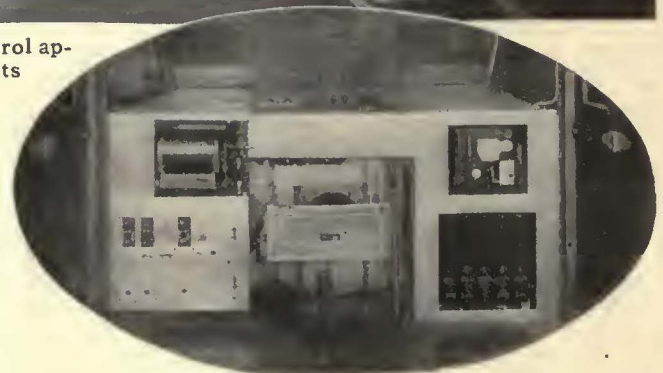
The idea of building a car radically different from any previously operated was conceived several years ago by Clark V. Wood, president Springfield Street Railway and Worcester Consolidated Street Railway. Because comparatively few major changes had been made in street car design in many years, he believed

Inclosed Worm Drive from Four High-Speed Motors Mounted on Truck Frames, Tapered Roller Bearings and Internal Expanding Brakes Are Expected to Reduce Noise and Vibration—Combination Wood and Duralumin Streamline Body Has Rakish Appearance



All switches and control apparatus are in cabinets at ends of car

Air piping on the platform has been replaced by electric wiring. Covers are removed in this and other views shown. Treadle step is seen at the left. Floor will be covered with linoleum.



Handle of the master controller with horizontal drum, seen at the left, moves in a vertical plane. Automobile type lever at right is for emergency braking. The post in the foreground supports the operator's seat.

that this vehicle had come to be considered by the public as antiquated. The tremendous increase in the use of automobiles had accustomed people to many refinements not incorporated in the usual type of street car. He determined, therefore, to undertake the construc-



The deep-cushioned seats are upholstered in dark brown Spanish leather

tion of a car that would be far in advance of present practice. The work of designing the vehicle was entrusted to W. L. Harwood, engineer of power and equipment for the Springfield and Worcester railways.

After careful consideration of the problem, it was decided that efforts should be directed particularly toward reducing noise and vibration and toward giving the car an attractive appearance. It was thought that the journal bearings should be of the so-called frictionless type, which would be possible if the motors were spring supported instead of being dead weights on the axles. Gears should be of a design that would cut down noise and permit the use of higher speed motors. Brakes should be of the internal expanding type, eliminating the rattle of levers and rods. Interior fittings, seats, lighting, etc., should be made more attractive. In place of a bell or whistle, the car should be equipped with a warning signal having a more agreeable sound.

NOVEL FEATURES IN TRUCK DESIGN

Numerous unusual features have been embodied in the truck design. Dished steel wheels of 26-in. diameter are mounted on differential axles of the automobile type, which revolve on tapered roller bearings arranged as shown in an accompanying drawing. The truck is of steel with I-beam side frames inside the wheels. The wheelbase is 6 ft. Coil bolster springs carry the weight of the car body up to three-quarters of the seated load. In addition semi-elliptic springs

mounted in seats provided with Mack rubber shock insulators are in use at all times. This truck design is a joint development of the Wason Manufacturing Company, the Timken-Detroit Axle Company and the Springfield Street Railway.

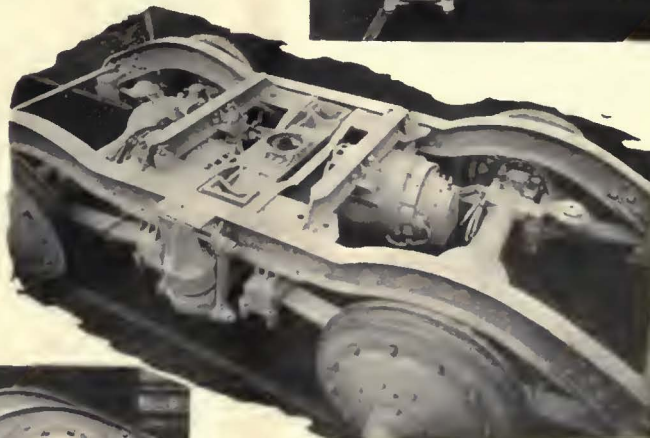
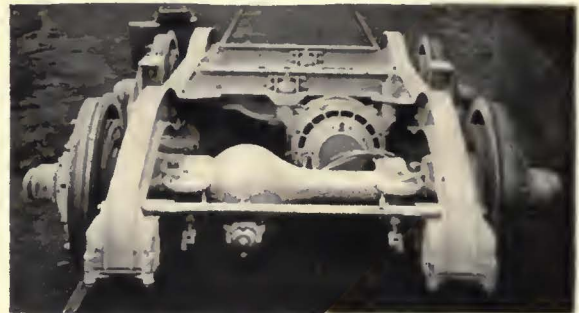
Each of the trucks carries two Westinghouse V91B, 300-volt motors, connected permanently in series. Variation in speed is obtained by placing the pairs in series and in parallel. Each motor is attached through rubber blocks to the truck frame with its shaft parallel to the direction of motion of the car. It is connected to the remote axle of the truck through a flexible Spicer propeller shaft. The gear reduction is 10 to 1, permitting the use of small high-speed motors, weighing 424 lb. each. The worm drive operates in a bath of oil. Universal joints between the motor and the axle permit placing the motors well up on the truck frame, where they will be out of the way of water, snow and slush.

Brakes are of the internal expanding type similar to those developed for buses. They were designed by the Westinghouse Traction Brake Company. Composition inserts used as shoes were made specially by the American Brake Shoe Foundry Company. An accompanying illustration shows the brake mechanism.

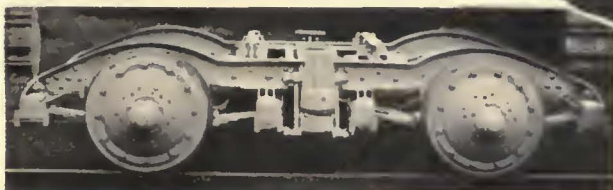
This truck weighs only 5,650 lb. complete with motors and drive shaft. Scale weights of various parts are given in an accompanying table. The combination of the light weight and friction reducing features make it possible for a man easily to push the complete truck with one hand along the track.

CAR BODY HAS RAKISH LOOK

Many novel features have been incorporated in the car body, which has been built by the Wason Manufacturing Company. Underframing is of steel with duralumin bolsters. The weight of each bolster is 101½ lb. It is interesting to note that this is less than the weight of



Unsprung weight is reduced by mounting high-speed motors on the truck frame and connecting them to the remote worm-drive axles through flexible propeller shafts. Brakes of the internal expanding type are located inside each wheel.



Worm-drive roller-bearing truck developed for experimental car

the trolley base used on the car. By using duralumin a saving of 400 lb. was effected without reducing the safety factor. Window posts are of wood reinforced below the belt rail with duralumin angles. The sheathing below the belt rail consists of plates of sheet aluminum held in place by battens. These plates curve inward slightly at the bottom, giving an appearance similar to that of a bus body, and extend 8 in. below the underframe, forming an apron which conceals the greater part of the equipment and running gear.

Length over corner posts is 30 ft. and 40 ft. 8 in. over all. Width over belt rails is 8 ft. 4 in. Truck centers are 19 ft. 6 in. apart. The platforms are curved

usual design of the trucks the height from the rail to the car floor is only 2 ft. 8 3/4 in. There is a single well step between the ground and the car floor, with its edge curved to conform to the body lines. Double outward folding doors conforming to the same curve inclose the four step wells. At two diagonally opposite doors, treadle steps are provided for rear exit. These doors are provided with street collector's control.

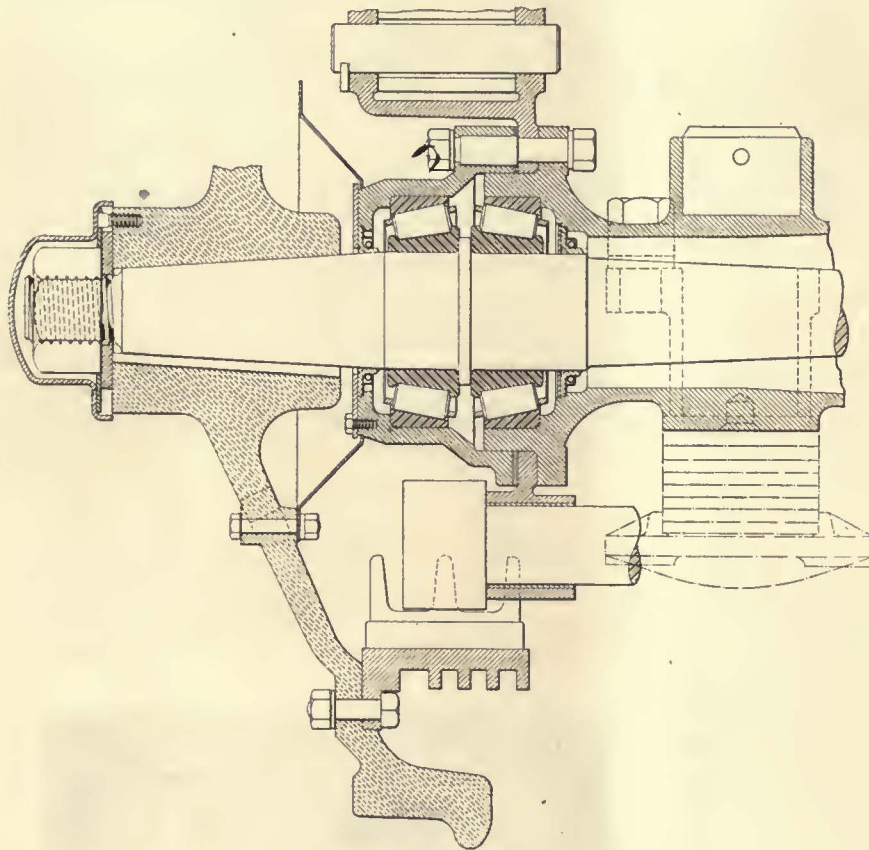
A feature which suggests the bus rather than the typical street car is a plate glass sloping windshield 56 in. wide. This has the practical advantage that it eliminates reflections from the interior lights of the car. An electric windshield wiper is provided. Above the windshield is a sloping sun shade. Under this is a hinged ventilator which may be raised to admit air. An automobile type bumper has been placed at a height of 24 in. above the ground.

Special attention has been given to the lines of the roof, which resembles that of a high-grade automobile. The inside height from floor to ceiling is only 7 ft. 2 in. This makes possible the small over-all height of 10 ft. 2 in. from rail to top of roof. All exterior lines are continuous from end to end of the car body. The color scheme is yellow below the belt rail and cream from the window sills to the roof. A red band 8 in. wide completely encircles the car immediately below the window sills. Outside the doors have been painted with bands of color to conform to the general scheme.

Seats are provided for 45 passengers. There are sixteen pairs of cross seats, spaced 31 in. apart, and four longitudinal seats at the ends accommodating three passengers each. Two revolving seats with backs are provided in the center of the platforms. The forward one is for the operator and the other is available for passengers. All seats are deep cushioned and covered with dark brown Spanish leather.

Windows have Rex single drop sash. The floor is a single layer of wood covered

with brown inlaid linoleum. Illumination is furnished by five 94-watt dome lamps with a compensating panel, located in the platform cabinet. Ventilators are of the bus type, located in the roof. Chromolux electric heaters are used with thermostatic control. The interior of the car has been given a pleasing appearance by carrying the white Agasote headlinings straight through, unbroken by bulkheads. Below the window sills the sides



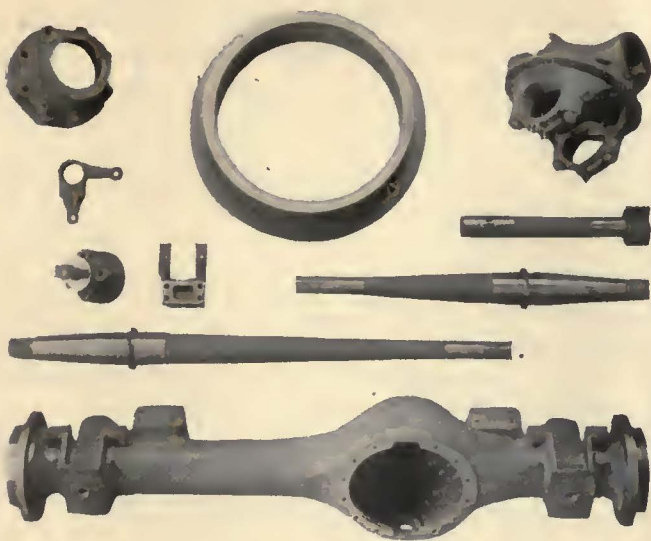
The 26-in. rolled steel wheel in dished to bring the throat vertically in line with the tapered roller bearings

between the body corner posts and the end, which is straight for a distance of 4 ft. 8 in. Duralumin is used also for the letterboard and belt rail. Altogether 735 lb. of this metal is employed for the side members, letterboards, bolster, etc. Carlines are of steel and wood, while the roof is of tongued and grooved 3/4-in. cedar covered with No. 8 canvas.

Due to the use of small diameter wheels and the un-

List of Manufacturers of Equipment Used on Springfield Experimental Car

Air brakes.....	Westinghouse Traction Brake Company	Interior trim	Haskellite Manufacturing Corporation
Air compressor.....	General Electric Company	Journal bearings.....	Timken Roller Bearing Company
Axles	Timken-Detroit Axle Company	Lamp fixtures.....	Electric Service Supplies Company
Brake shoes.....	American Brake Shoe & Foundry Company	Motors.....	Westinghouse Electric & Manufacturing Company
Car signal system.....	Electric Service Supplies Company	Sash fixtures.....	Curtain Supply Company
Control.....	Westinghouse Electric & Manufacturing Company	Seats	J. G. Brill Company
Destination signs.....	Electric Service Supplies Company	Seating material.....	Blanchard Brothers & Lane
Door mechanism.....	National Pneumatic Company	Shock absorbers	Mack Trucks, Inc.
Electric horn.....	American Bosch Magneto Company	Trolley catchers.....	Wilson & Company
Energy-saving device.....	Economy Electric Devices Company and Wm. Arthur	Trolley base.....	R. D. Nuttall Company
Gears	Timken-Detroit Axle Company	Trucks	Wason Manufacturing Company
Heaters	Railway Utility Company	Ventilators	Nichols-Lintern Company
Headlining	Pantasote Company	Universal joints.....	Spicer Manufacturing Corporation
		Wheels	Standard Steel Works Company



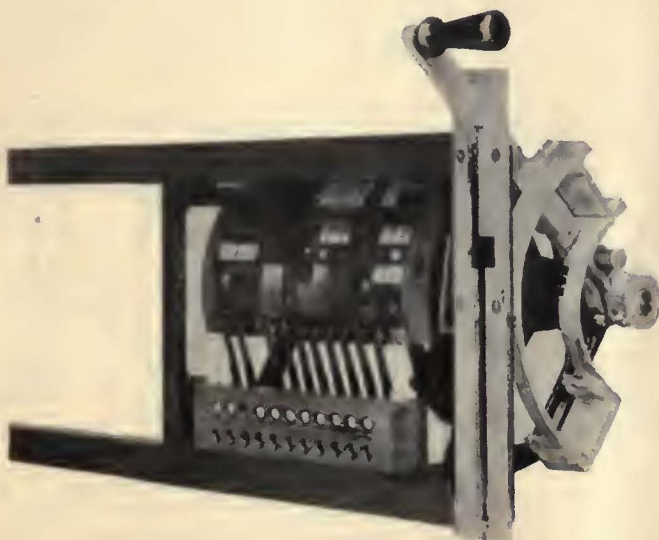
Differential axle and housing before assembly

are of mahogany-faced Haskelite, while brown imitation leather is used above. There are no bell cords or register rods. Faraday buzzers are provided. A two-toned electric horn is used in place of a warning gong.

ELECTRICAL EQUIPMENT IS UNUSUAL

Care has been exercised in locating the equipment and the old method of placing switches, thermostats, relays, etc., here and there throughout the car has been abandoned. In front of the operator is a cowl with two panels somewhat resembling a small desk. Switches, light relays, indicating lamps, pressure gage, controller, brake handle, etc., are all mounted flush in these panels. The operator has full control of the car and all apparatus while in his seat.

Remote control of motors is employed. On the platform a master controller operated at 24 volts actuates the main switches under the car body. This master controller is an adaptation of a type of electric vehicle control. The drum is mounted on a horizontal axis, as shown in an accompanying illustration, so that the handle moves in a vertical plane. Energy for the master controller is obtained from two U.S.L. 12-volt storage



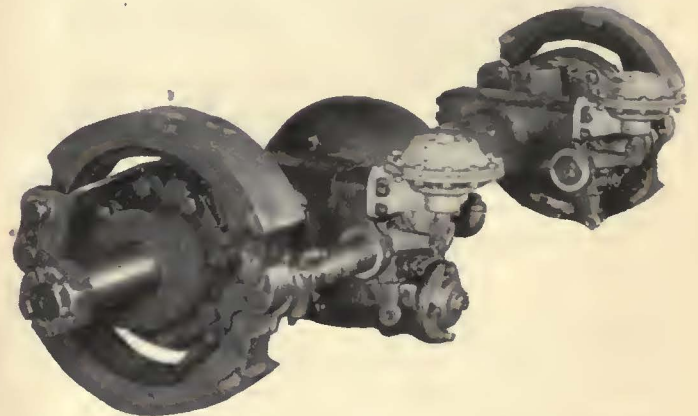
Master 24-volt controller with horizontal drum and handle which moves in a vertical plane is located in platform cabinet

batteries, series connected. These batteries are charged by being in series with the car lamps and the air compressor. Energy is furnished from the same source for the tail lights, so that oil lamps are not required. It is estimated that the saving in this item alone will practically pay for the use of the battery.

REMOTE ELECTRIC CONTROL IS USED FOR BRAKES AND DOOR ENGINES

Air brakes and doors have remote control. The operator's brake handle merely establishes various electrical contacts which actuate magnet valves which are located under the longitudinal seats and above the doors. Thus the only pipe on the platform is that for the gage. The pneumatic door engines are of the light-weight type made by the National Pneumatic Company. With this type of door engine and the bus-type braking mechanism it is possible to use a General Electric CP-25-C8 air compressor of 10 cu ft. capacity. In the compressor aluminum castings have replaced iron to lessen the weight. Flexible aluminum tubing with brass automobile type fittings is used for all the air piping.

The emergency brake mechanism is operated by a hand lever of the type used on automobiles. The lever



Movement of the camshaft causes brakeshoes of composition bronze to press against the drum within the wheel

at each end operates only on the adjacent truck. Connection between the lever and the cam by which the brake shoes are brought into play is through wire cables. This arrangement eliminates all chains and rods which might be a source of noise.

Due to the light weight of the motors and the extensive use of duralumin throughout the body, the total weight has been kept down to 23,450 lb. It is expected that this will permit rapid acceleration and braking. The weight is divided between the various parts of the car body and trucks as shown in the accompanying table.

NEW FEATURES, IF SUCCESSFUL, WILL BE INCORPORATED IN FUTURE CARS

Work has been finished on the trucks and only a few minor details remain to be completed on the car body. It is planned to assemble the body and trucks at an early date and test the operation of the car. The management is hopeful that many of the innovations embodied in this design will turn out to be real improvements, but considers the car at this stage to be entirely an experiment. After thorough testing, if the new features prove to be as advantageous as expected, they will be adopted and

DETAIL WEIGHTS OF SPRINGFIELD WORM-DRIVE CAR

	Pounds	Pounds
Body	7,800	
Seats	1,750	
Floor covering	200	
Heaters	300	
Electrical equipment	600	
Air brake equipment	1,000	
Miscellaneous	500	
Total body		12,150
Two motors, 424 lb. each	848	
Two axle assemblies, 1,550 lb. each.....	3,100	
Frame	1,622	
Shafts and joints	80	
Total, each truck	5,650	11,300
Total, two trucks		23,450
Weight, complete		23,450

Total Dividend of St. Louis Loan Association \$843,708

AT A recent meeting of the board of directors of the United Railways Savings and Loan Association, St. Louis, Mo., the 23d consecutive semi-annual dividend was declared at the rate of 6 per cent per annum, payable to members of record Aug. 31. The dividend will total \$99,000. It brings the grand total paid to members of the association to \$843,708. The association has never paid less than 6 per cent dividends, compounded semi-annually, and has paid a dividend every six months. The association has placed 2,009 members in homes of their own. It now has 5,798 members. It was founded to encourage home owning and stimulate thrift.

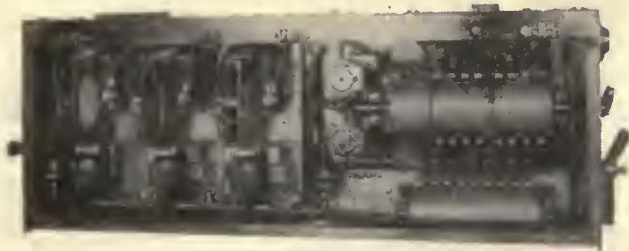
incorporated in the design of future cars. It is anticipated that under conditions of quantity production cars of this type could be built at approximately the same cost as that of the light-weight, double-truck car of the ordinary type.

It is planned to make complete tests of the car, using special apparatus where possible to determine the com-

Glasgow Single-Deck Car Popular but Not Economical

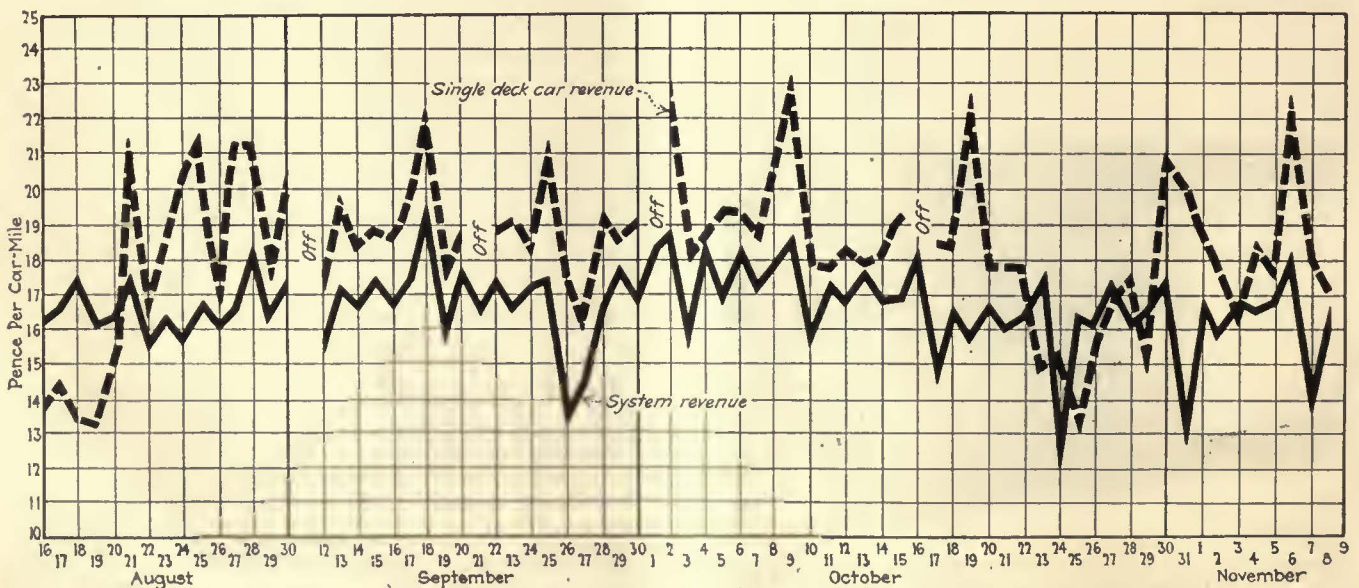
EXPERIENCE of several months with an experimental single-deck car designed by the Glasgow Corporation Tramways, Glasgow, Scotland, somewhat along American lines, has led the management to the conclusion that such a vehicle is not well suited to the transportation needs of that city. While this car has proved quite popular with the riding public, its comparatively small seating capacity has been a disadvantage, especially during rush hours. Details concerning the construction of this car appeared in ELECTRIC RAILWAY JOURNAL, Oct. 23, 1926, page 769.

A measure of the relative popularity of the single-deck vehicle and the double-deck tram long standard on the Glasgow system is had by comparing the revenue per mile of the new equipment and that of the entire system. Earnings have been consistently higher for the single-deck car, as shown by the accompanying chart. During 70 days of operation in August, September, October and November of last year, the revenue per car-mile averaged 18.2 pence for the single-deck car and 16.7 pence for the system as a whole. It is believed that these higher earnings may be due to the more attractive appearance of the new car, and to the use of transverse upholstered seats instead of longitudinal seats of wood. These features, of course, could be embodied equally well in a double-deck car.



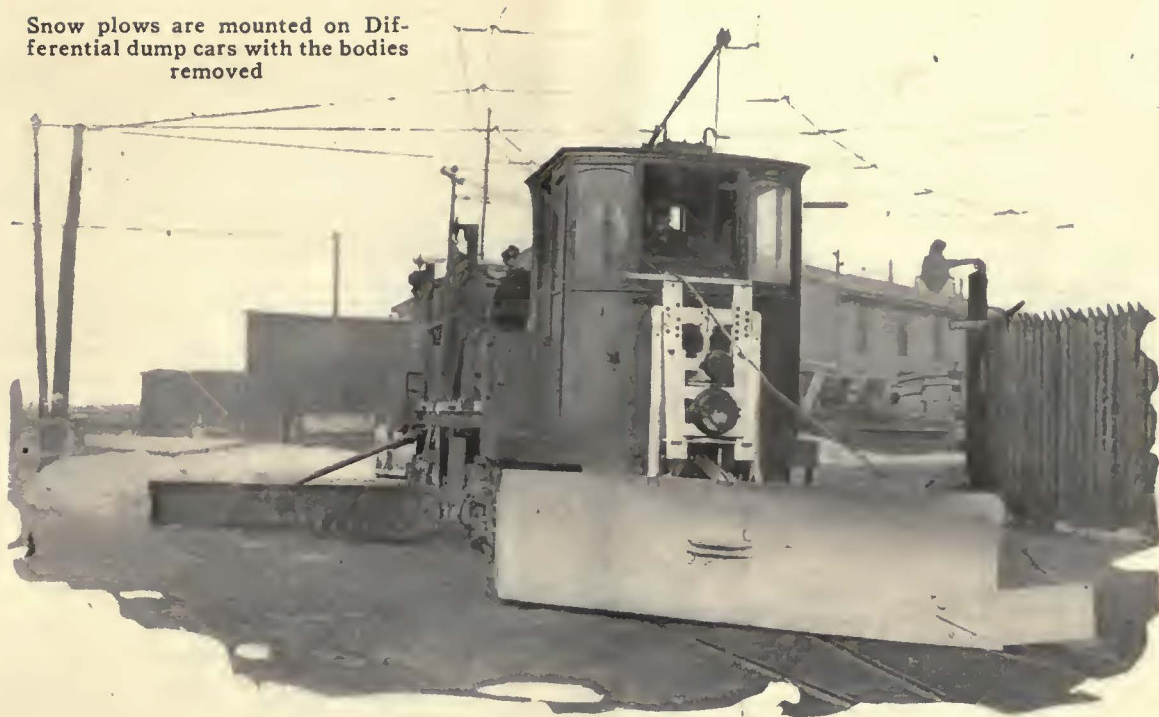
Switch group located under car body

parison of the new type with existing equipment. The instrument developed by the committee on noise reduction of the American Electric Railway Engineering Association will be employed to measure the noise. Following these special tests it is planned to place the car in service on one of the lines of the Springfield property and make service tests for a period of from six months to a year in order to determine whether any of the features require modification before the design is acceptable for use.



Revenue per car-mile with single-deck equipment compared to revenue for the entire Glasgow system shows the popularity of the new car

Snow plows are mounted on Differential dump cars with the bodies removed



Snow-Fighting Methods Revolutionized

By H. M. Steward

Superintendent of Maintenance Boston Elevated Railway

Boston Elevated Railway Now Plows Snow from Tracks and Roadway, Finding It Pays Well to Keep a Vehicle Road Open to Prevent Blocking Car Tracks

DUE to the changes in traffic conditions which have occurred in recent years; that is, the substitution of motor vehicles for practically all horse-drawn vehicles and the use of motor vehicles, particularly pleasure cars, throughout the year, the Boston Elevated Railway has found it necessary to readjust its method of handling snow.

Formerly the railway plowed the snow from its tracks to provide a clear roadway for the operation of its cars, without being obliged to consider the roadway alongside. In fact, several of the municipalities desired that a certain amount of snow be left on the roadways in order that vehicles on runners could be operated without trouble. During this period, on streets where business would not permit the snow plowed from the tracks to remain, it was necessary for the railway to remove it.

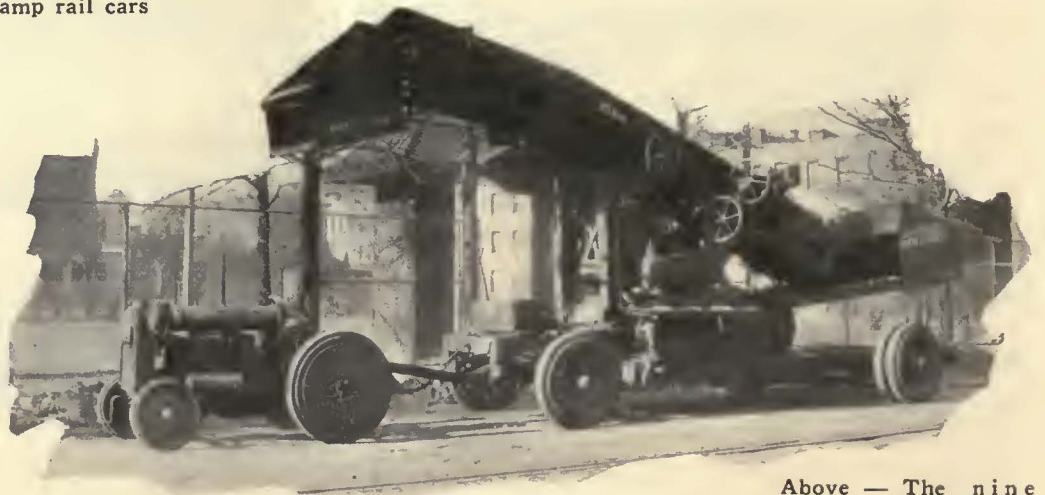
The present method is to plow the tracks with the various types of electric car plows or sweepers, as before. As soon, however, as the snow at the end of the plow or sweeper wings reaches a depth of approximately 12 in. motor vehicles equipped with plows or shears are used to push the snow back further. This operation continues throughout the duration of the storm. On the first night following a snowstorm nine cars equipped with long steel wings come into play for the purpose of pushing the snow back to the curb. If certain streets are too wide for the wings of these cars to reach to approximately the curb, the snow is pushed

back to the desired point by motor vehicles working in conjunction with the winged cars. This method of handling the snow provides a roadway for practically the full width of the street, which allows all vehicular traffic to use the entire roadway and does not make it necessary for vehicles to run in the track area only.

This method of handling the snow also removes almost entirely the menace of high ice which formerly existed, and consequently reduces the expense of car maintenance, prevents delays and materially reduces accidents due to vehicles slipping on the ice and side-wiping cars. During the heavy snowfall in the winter of 1919-20, when the tracks only were cleared, ice several inches in depth formed in the track and deep ruts occurred, due to the operation of motor and other vehicles. This resulted in severe losses to the railway on account of delays, repairs to cars, the expense of removing the ice and payment for accidents. By clearing the roadway for practically the full width of the street, the melted snow has an opportunity to run to the sides of the roads and thence to the gutters, instead of accumulating in the track, as it did formerly. It must be understood, of course, that it is necessary to use care and to remove the snow thoroughly from around hydrants and to open catch basins in the gutters. Snow must also be removed promptly from driveways to garages, business houses, gasoline stations, public buildings, etc. The extra expense, if any, of pushing back



The company has an auto trailer that is useful in transporting equipment, and a fleet of four low ramp rail cars



Below—Differential dump cars are used for pulling the ramp cars. A snow loader is shown in process of being moved

Above — The nine Barber - Greene snow loaders are transported from place to place by several methods. The one shown is on an auto trailer being hauled by a Fordson tractor



A close-up view of the ramp cars, showing their construction



the snow for practically the full width of the street is probably more than offset by the saving resulting in lessened damage to cars, delays to traffic and accidents. During snowstorms, when all our plows and sweepers are in use, we have employed up to 22 trucks equipped with plows or shears, together with seven tractors, three Walter snow fighters and one FWD truck.

During snowstorms vehicles are liable to break down on the track area and prevent the operation of cars. To supplement the emergency equipment, which is sufficient during the summer months, it has been found advisable to use trucks equipped with jacks, block and tackle, towing ropes, picks, shovels, etc., stationed at strategic points with two experienced men, besides the driver, as a crew. These trucks are used only while the snow is falling or until the streets are opened for traffic. During snowstorms we have used up to eleven extra emergency trucks of this sort.

On bus routes it is also necessary to plow the snow and during snowstorms up to 29 trucks equipped with shears have been used. After the storm is over the bus routes are plowed to practically the full width of

to plow snow and in addition owns 37 shears for trucks which are used on trucks hired from contractors. Arrangements are made with high-class contractors in the late summer to furnish trucks for plowing and for hauling snow. A list of contractors desiring this work is prepared and suitable arrangements are made for calling and responding promptly. Trucks to be used for plowing are required when a heavy snowfall is predicted and soon after snow begins to fall. In order to speed up the work, the trucks are sent to the railway shops at four different locations and the shears are put in place. After the plowing work has been done, the shears are removed, inspected, repaired and stored, all ready for the next storm. No difficulty has been encountered in securing the necessary number of trucks. During the heavy storms in February, 1926, 130 trucks were readily secured for plowing and removing the snow.

Formerly it was the practice to load snow, to be removed by hand, into sleds or other vehicles drawn by horses. These horse-drawn vehicles were then hauled to convenient dumps and the load was removed by hand.

The present method consists of pushing the snow



Top—Substantial outboard plows clear the roadway alongside the railway tracks

At left—This fleet of 5-ton tractors equipped with V plows has proved excellent for snow fighting in Boston



Above—Two of the three Walter snow fighters which have been used with good results on the Boston Elevated Railway



In oval—Three of a group of 44 trucks equipped with Champion snow plows

the street and down to the pavement where possible. This is accomplished by using Walter snow fighters which are equipped with scrapers located between the front and rear wheels. If the snow is not plowed down practically to the pavement, the roadways soon become rough and bumpy, with resulting severe damage to the buses.

The railway, in the development of its snow-fighting system, has accumulated a wide range of equipment, most of which has been found quite essential under present-day conditions. It includes the following:

- | | |
|-------------------------------|--|
| 9 Barber-Greene snow loaders. | 1 Four-Wheel-Drive truck. |
| 4 trail cars. | 44 trucks equipped with shears. |
| 1 motor trailer. | 6 Differential cars equipped with plows and wings. |
| 7 tractors. | 3 rail cars equipped with wings. |
| 3 Walter snow fighters. | |

Accompanying illustrations show some of this apparatus.

The railway owns seven 5-ton trucks which are used

into long piles parallel with the curbs, picking up the snow and loading it into trucks with Barber-Greene snow loaders. The trucks used hold an average of 7 cu.yd. of snow and 60 seconds on the average is required to load a truck. By the proper selection of dumps, the round trip per truck does not exceed 30 minutes on the average. Seven trucks are sufficient to keep a snow loader in continuous operation, except where the dumps are located beyond the average distance.

The Boston Elevated Railway owns and operates nine snow loaders, which are taken to the locations where they are to be used on low trail cars or on motor trailers. A few of the cities and towns also own snow loaders. When all of the Boston Elevated Railway snow loaders are in operation it is necessary at times, depending upon the amount of snow to be handled, to use up to 100 trucks per day.

By means of snow loaders and trucks the snow which the railway is obligated to remove can be taken care of in a storm of, say, 12-in. fall in not over 36 hours.



One of the first service trips of the W., B. & A. articulated trains



Looking through the drum from one body to the next



Passengers boarding one of the ten new articulated cars of the Washington, Baltimore & Annapolis line in the company's Washington terminal



One of the two end trucks before mounting the motors



Center pivot truck without motors but supporting two inner body ends and connecting drum

Articulated Cars in High-Speed Interurban Service

Two-Body, Three-Truck Units Built by Brill and Westinghouse-Equipped Go in Service on Baltimore-Washington Division of the Washington, Baltimore & Annapolis Electric Railroad



Two articulated cars of the W., B. & A., having a four-car capacity, may be operated as a unit

COMplete replacement of the high-speed equipment on the 40-mile Baltimore-Washington division of the Washington, Baltimore & Annapolis Electric Railroad is being made as an open challenge to all forms of competitive transportation. The new cars are of the articulated type and the first of this design to be operated in the United States in high-speed interurban service. In addition they are of a de luxe type with better appointments than those of many steam railroads.

Commencing April 1, eight of the new units, built in the Philadelphia plant of the J. G. Brill Company, will be used to fill the half-hour limited schedule between Baltimore and the national capital. Six of the twin cars were delivered early in March and are being "worked in" while the crews become familiar with the details of the equipment. The remaining four have just been delivered and will be ready for regular operation on schedule time. The cars will receive wide publicity as they will help to handle the crowds attending the Bowie race meet starting April 1.

The Washington, Baltimore & Annapolis has lines over two different routes between Baltimore and Annapolis and the main line between Baltimore and Washington. The latter consists of double-tracked private right-of-way as far as the Maryland-District of Columbia boundary line, from where entrance to Washington is over the tracks of the Washington Railway & Electric Company. In Baltimore the company runs its tracks into its terminal on Howard Street.

The two Annapolis lines serve the home of the United States Naval Academy and the intervening territory, much of which is suburban to Baltimore. The country along the Severn and Magothy Rivers is fast developing into summer resorts. Annapolis and the intermediate territory to Baltimore are served solely by the W., B. & A. both for passengers and freight.

The main line between the two major cities is the backbone of the service and revenue of the company. The intervening territory is sparsely settled and hence the need is naturally for high-speed, infrequent-stop service. The Baltimore & Ohio Railroad and the Pennsyl-

vania Railroad are competitors, running many trains from terminal to terminal in 60 minutes or less. With its entrances to the terminal cities on public streets, the W., B. & A. trains require 1 hour and 30 minutes, but have the advantage of more central stations, and charge lower fares.

In recent years de luxe interstate buses between the cities have offered additional competition, and the country-wide automobile expansion has affected this company the same as it has all railways. Despite all this, the W., B. & A. has for a number of years carried annually 60 per cent of all Baltimore-Washington common carrier traffic. Following the enormous peak occasioned by Camp Meade and other World War activities in this territory, the gross traffic has been decreasing consistently, although the 60 per cent ratio has been substantially maintained.

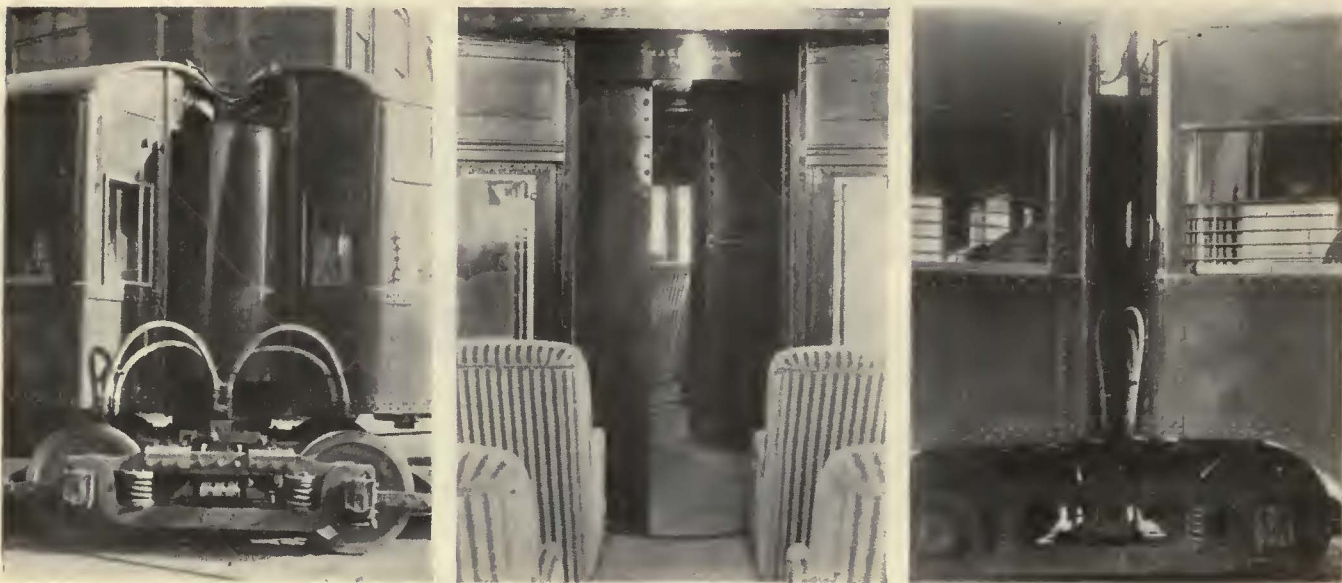
COMBATING COMPETITION A PURPOSE OF THE NEW CARS

The new equipment has therefore been purchased not only to give the essential service but to combat the most serious of the competition. It is expected that

Loading and unloading at intermediate points is supervised by the conductor at the side door. All doors are pneumatically operated. At terminals the rear door, controlled from the conductor's position, is also used. Upon entering, the passengers choose either car, the rear body always being reserved for smokers.

Besides the innovation of the articulated feature the cars are equipped and finished with a view to comfort and pleasing appearance. Early trials indicate that these aims have been attained. The rigid connection of the two inner ends on the common truck damps out the nosing or side sway common in either single-car or ordinary multiple-unit operation. The tendency to surge between cars when starting or stopping is also eliminated by the use of a single unit with connection through the center track.

The drum mounted rigidly on the center truck provides easy access between the two sections, giving the effect of one long car unbroken by partitions or doors. Even when negotiating the limiting 50-ft. radius curve in Baltimore the width of opening remains the same, although shifted slightly to the side. The connecting



W., B. & A. articulated car easily negotiates the limiting curve of 50-ft. radius. View at the left shows the outer side of the car on the limiting curve, while at the right is illustrated the inner side. The center view shows appearance of the connecting drum opening shifted to one side, but still easily passable

additional traffic will be drawn from other channels, particularly private automobiles, as the single intercity highway is greatly congested and the parking situations in the two terminal cities are growing worse daily.

Patronage on the Washington-Baltimore division has always been great enough to require two-car trains, which heretofore have been made up with multiple-unit equipment. The old cars were built of wood in the conventional manner of 1910, weigh 40 tons apiece, or 80 tons per train, and have been in use since the change to 1,200-volt d.c. operation in 1910.

The new cars will provide equal passenger capacity with greatly superior facilities and marked economy. The weight saving of 27 per cent alone will reduce the power bill. Three trucks against four, one set of motors, control and equipment as against two, will immediately be manifest in the cost of equipment maintenance. Maintenance of the track should also be less, due to the lighter weight of the units. By means of the permanent connection, the unit is essentially one car, allowing the use of two trainmen as against three.

drum is cylindrical, allowing each body to revolve about the outer surface. It is made of sheet steel $\frac{1}{8}$ in. thick, supported on steel angles. The bottom is rigidly secured to the center of the pivot truck. Rubber rollers attached to each side of each body are held against the exterior of the drum by springs that allow the entire surface of each roller to engage the drum at all times. In this way practically a tight fit is obtained. A rain-storm was encountered during an early trip and no leakage at these points took place.

The interior finish is pleasing. The floors are mottled gray and black rubber that presents a clean appearance even when soiled after a day in service. The double seats are of the individual chair type with heavy springs in the base and individual pads of light springs, heavily upholstered. The backs are firmly attached to the seats and have a well-shaped curve. The backs are constructed with springs and heavily upholstered. Each seat is completely covered with a striped frieze mohair, light gray in color. While operating loops are provided at each terminal, the cars often must be reversed. For

this reason the pairs of seats may be turned horizontally on a center pivot, after releasing a pedal-controlled catch. This feature also permits the seats to be swung partly around should passengers desire to face the side. The twin unit car carries 47 double seats all alike, thus seating 94 passengers. The seats conform to the window spacing of 35 in., leaving ample knee and leg room.

Baggage racks of bronze are mounted overhead with ample clearance. One lavatory with a flush hopper and wash basin is provided at the end of one of the bodies, immediately behind the motorman's compartment. Paper towels and a tank for drinking water are included in the equipment.

Posts, sills, panels and doors are solid mahogany. The ceiling is finished a deep cream, which, with the mahogany trim, makes a pleasing contrast with the neutral gray of the seats and floor.

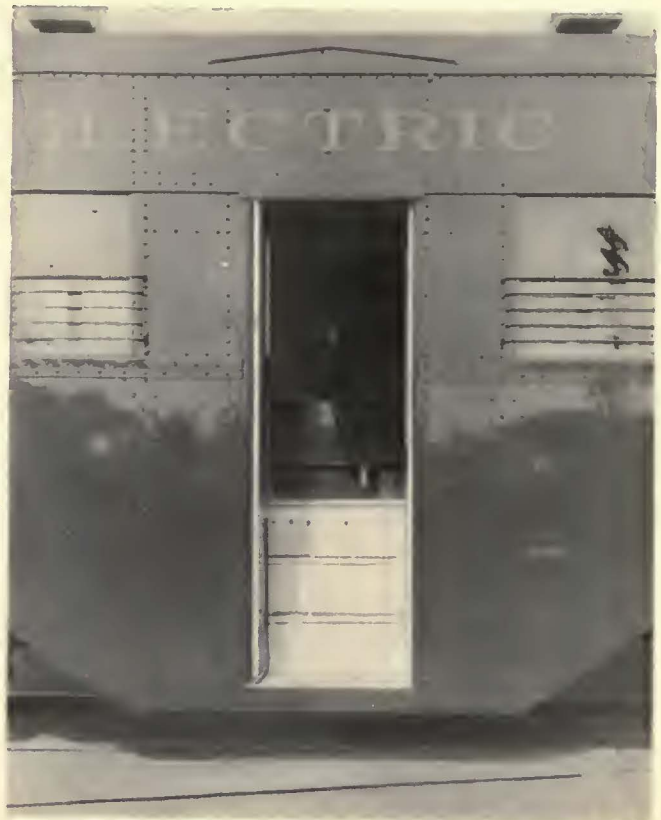
Plate glass set in brass sash is used in all windows. The single side sash may be raised upward into pockets behind the deep letterboard. Illumination is provided by shaded lamps mounted in two rows in the ceiling, one row directly over each seat.

There is a cab for the motorman at the right-hand side of each operating end. A hinged door, glazed in the upper portion, opens into the car. A 22-in. hinged door at the motorman's right, with a glazed drop sash above, gives access to the cab without need for the motorman to pass through the interior. The inclosed compartment contains all operating switches, the controller and the air brake valve. The narrow end doors and left-hand sash are also glazed with plate glass, allowing good visibility forward.

MULTIPLE-UNIT OPERATION POSSIBLE

For extraordinary conditions two units may be coupled together, operated as a train from one position, giving a capacity equal to four of the old cars. To accomplish this there are Tomlinson M.C.B. type couplers at each end and jumper cable connections are placed on the roof. Small end doors allow access between units for the crew. Headlights of the standard portable type used by the W., B. & A. are hung on the forward door, the connectors fastening into sockets in the ends of the illuminated sign boxes shown in the end views. There are two bullseye marker lamps in the letter panel at each operating end. Adams & Westlake No. 252 tail lamps are furnished by the railway.

Specifications tabulated elsewhere show the details of the equipment. In the Jan. 22 issue of ELECTRIC RAILWAY JOURNAL, page 165, were side elevation and floor



Between terminals passengers enter and leave by this center door, where the conductor is located. All doors are under pneumatic control from this position

plan drawings showing the dimensions. The cars are framed with steel, using side sills of 4-in.x4-in.x $\frac{5}{8}$ -in. angles. Center sills are 8-in., 11.4-lb. channels with 3-in., 4.1-lb. crossing channels and 6-in., 10.5-lb. bumper channels. The corner posts are 2-in.x2-in.x $\frac{1}{2}$ -in. angles with $\frac{3}{8}$ -in. steel sheet, while the side posts are 2-in.x2-in.x $\frac{1}{2}$ -in. to $\frac{5}{8}$ -in. tees. The top rail is made of 2-in.x2-in.x $\frac{5}{8}$ -in. angles and the belt rails of 3 $\frac{1}{2}$ -in.x $\frac{1}{2}$ -in. flat bar with 16-lb. sheet-steel coping. The letter panel and side sheathing are $\frac{3}{8}$ -in. patent leveled blue annealed sheet steel. Roof carlines are 1 $\frac{1}{2}$ -in.x $\frac{3}{4}$ -in. steel bars covered with $\frac{1}{8}$ -in.x2 $\frac{1}{2}$ -in. poplar boards.

Scale weights were slightly less than the estimated weights as published in the previous article. The units averaged 58 $\frac{1}{2}$ tons, divided between equipment and distributed on trucks as shown in the accompanying two tables.

General Dimensions and Specifications, W., B. & A. Articulated Cars

Length over all, each section...48 ft. 8 in.	Seating capacity, section without saloon... 48	Gongs.....Brill dedenda
Length over vestibules, two-section unit.....95 ft. 4 in.	Seating capacity, section with saloon... 46	Grab handles.....Elcon type, mahogany, porcelain finish
Length over all, two-section unit.....97 ft. 4 in.	Total seats.....94	Hand brakes.....Peacock tunnel type
Wheelbase, motor and pivot trucks.....6 ft. 6 in.	Interior trim.....Mahogany	Heaters.....Railway Utility Company, truss plank No. 130
Width over posts.....8 ft. 8 in.	Headlining and side lining... $\frac{1}{4}$ -in. Agasote	Journal bearings.....4 $\frac{1}{2}$ in. x 8 in.
Width over drip rail.....8 ft. 10 in.	Air brakes.....Westinghouse Traction Brake Company	Journal boxes.....Brill
Width of each side door opening...2 ft. 10 in.	Car signal system.....Consolidated Car Heating Company	Motors.....Four Westinghouse 333-VV-8, inside hung on end trucks only
Height, rail to top of floor...4 ft. 2 $\frac{1}{2}$ in.	Car trimmings.....Statuary bronze	Sanders.....Ohio Brass Company
Height, rail to center line of coupler.....33 $\frac{1}{2}$ in.	Compressors.....Two Westinghouse D-2-K, 1,200-volt	Sash.....Rex all-metal type
Height, top of floor to top of roof board.....8 ft. 5 $\frac{1}{2}$ in.	Control.....Westinghouse HL, double-end, 1,200-volt	Seats.....Hale & Kilburn No. 900 double rotating chairs
Height, rail to top of roof...12 ft. 8 in.	Couplers.....O-B Company Tomlinson No. 23 radial	Seating material.....Chase frieze plush, pattern No. 188, gray No. 2,082, quality X
Height, rail to top of trolley board.....12 ft. 11 $\frac{1}{2}$ in.	Curtain fixtures.....Curtain Supply Company Rex	Step treads.....Kaas safety
Truck centers, each section...35 ft. 10 in.	Curtain material.....Pantasote	Trolley retrievers.....Ohio Brass Company
Distance center to center of side posts.....2 ft. 11 in.	Destination signs.....Illuminated, in dash	Trucks.....Brill 26-MCB-2
Wheel diameter.....36 in.	Door mechanism.....National Pneumatic Company, not interlocked with control	Ventilators.....Railway Utility Company
	Fenders.....Steel pilots	Wheels.....36-in. diameter, 3 $\frac{1}{2}$ -in. tread
		Window glass..... $\frac{3}{8}$ -in. plate

AVERAGE WEIGHTS OF W., B. & A. ARTICULATED CARS	
Bodies, including electrical and air equipment.....	70,993 lb.
Four motors	14,570 lb.
Three trucks	31,090 lb.
Total weight of complete unit.....	116,653 lb.
Scale weight on trucks of one unit:	
Front truck carried.....	41,180 lb.
Center truck carried.....	32,440 lb.
Rear truck, with saloon carried.....	42,710 lb.
Total weight of complete unit.....	116,330 lb.

With one set of four motors, two mounted on each end truck, only one set of control and air brake equipment is necessary. Air brakes are placed on the center truck as well as on each motor truck, giving brake applications on all wheels. Because of the difference in weight distribution, adjustments to apply equivalent pressures on all wheels are made. The straight and automatic type of brakes with emergency features are used with two compressors, one mounted under each body. This is a precautionary measure in case of failure of one compressor.

From the Baltimore terminal to the District of Columbia the operation is with 1,200-volt direct current obtained from an overhead catenary trolley. From this point to Fifteenth and H Streets, N. E., in Washington, a 600-volt direct-suspension trolley is used, and from there to the W., B. & A. terminal 600-volt energy is taken from the underground conduit system. The Westinghouse motors are wound for 600-volt operation, but insulated for 1,200 volts, being connected permanently in series, so that speed is reduced on 600 volts. The free running speed on 1,200 volts is 60 m.p.h., so that half speed is ample in the District and Washington. Control current at 600 volts is obtained through a 600/1,200-volt dynamometer when operating from the high voltage trolley.

The doors are of mahogany, 1½ in. thick, double-folding inwardly. They are weather stripped, and the upper portion is glazed with ⅜-in. plate glass. They are equipped with National Pneumatic Company engines and may be controlled from the conductor's position or at the doors themselves. They are not interlocked with the control. There are three steps, which are all inside the doors and are stationary, with O. M. Edwards

hinged trap doors to close over them. All steps have Kass safety treads. The height from the rail to the underside of the first step, that at the sill, is 11 in. The step heights are 16 in., 11½ in., 12½ in. and 12½ in.

The Readers' Forum

President Sawyer Commends Graham Articles

EAST ST. LOUIS & SUBURBAN RAILWAY

EAST ST. LOUIS, ILL., March 10, 1927.

To the Editor:

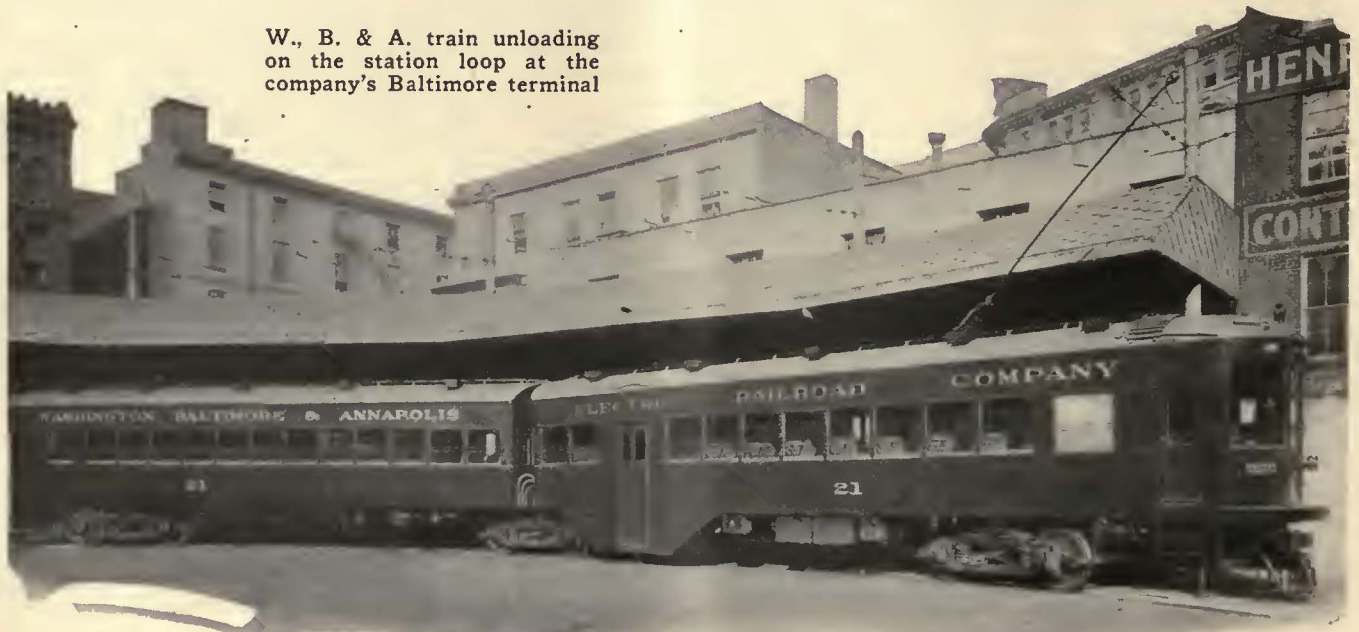
I, too, want to be recorded as one of those who believe that the two articles in the *ELECTRIC RAILWAY JOURNAL* by R. N. Graham, general manager of railways Pennsylvania-Ohio Electric Railway, represent an outstanding contribution to the discussion of one of the most important subjects before the local transportation industry, viz., "The Place of the Motor Vehicle."

We all agree that the motor vehicle has a place as a new and important transportation tool. Due partly to our own fault and partly to the fault of the motor vehicle manufacturers, few of us have as yet been able to arrive at definite conclusions as to the proper sphere or field of this most important tool.

We are doing neither ourselves nor the motor vehicle industry proper credit when we simply operate buses just to protect ourselves against irresponsible pirates, or because of the so-called "rubber urge," which has been largely an urge on the part of the bus manufacturers to sell rubber-tired buses.

The advantages and disadvantages of the bus have both been discussed in too broad terms, due to the fact that we have lacked definite experience and information. It has been used in places where it should not have been used and has not been used in places where it should have been used. Eventually the bus will take its place, regardless of past prejudices, either for or against. Electric cars will not continue to prevail sim-

W., B. & A. train unloading on the station loop at the company's Baltimore terminal



ply because we hide our heads in the sand and condemn the bus. The day will come when the bus will not be sold or oversold due to high-pressure salesmanship and distorted propaganda. The novelty and the glamor of the bus is fast fading, but not its value as a transportation vehicle.

Mr. Graham hit the keynote in his assumption that the problem is an economic one, and he well sums up the situation when he says that electric cars should not be operated where the bus can be used more effectively, nor should the bus be operated where the street car produces more satisfactory results—taking into account both service to the public and the financial results to the company. Our customers have a right to this service, which is most adapted to their needs, and Mr. Graham's articles, being based upon the actual experience of a progressive, unprejudiced manager, are most helpful in determining just how and where the bus can be fitted into our co-ordinated service.

W. H. SAWYER,
President.

Clean, Bright Cars Attract Riders

DES MOINES CITY RAILWAY

DES MOINES, IOWA, March 5, 1927.

To the Editor:

We are firm believers in the regular and systematic painting of cars, both inside and out, first to attract the attention of passengers and entice them to ride with us, and then from the clean, bright-appearing interior make them want to ride again, for it is always the repeat rides that count.

Several years ago we changed our color scheme from a green to a chrome yellow, with red letterboard and sash. We have found it much more satisfactory, both in appearance and from an accident standpoint, on account of greater visibility. It is our aim to keep all cars as nearly uniform as possible, especially the interior arrangement, as the passengers do not cause the congestion that would occur if several different plans were used. This also applies to the car mechanism, such as controller, brake, gong, etc., as the operator then knows just where to find things in an emergency. This is especially true with new men.

The necessity of changing cars on the road on account of car failure should be held to the lowest number possible, so that passengers will not be caused the inconvenience of changing from one car to another. Trolley wheels and poles are given the closest inspection as I do not believe any one thing can be more annoying to passengers than a trolley wheel that makes a noise multiplied many times by the roof and headlining, which act as a sounding board.

One other part of the equipment that is liable to cause passengers much discomfort is the motor resistance used in starting the car. It is very annoying to have the car give a violent lurch every time it starts, and also the jerking may cause damage suits by passengers falling.

In this day of fast schedules and heavy automobile traffic, flat wheels are more numerous than in years gone by, and must be given attention at once as they are not only uncomfortable to ride on, but are annoying to residents near the car line. We are giving the question of seat upholstery some thought, as clean and comfortable car seats will do much to get repeat riders.

C. R. MCMAHON,
Superintendent of Equipment.

A.E.R.E.A. Research Department Proposed

DEPARTMENT OF STREET RAILWAYS

CITY OF DETROIT, March 15, 1927.

To the Editor:

With the trend that events in the electric railway field are taking, succeeding demands for modernization and all the things which follow in its train, we become conscious of one very great defect in our cosmic scheme and that is lack of reliable, unbiased data on many engineering problems. The present method of attacking them is either such research as individual companies can make or investigation by committee of the A.E.R.E.A.

The first plan, or company research, will work satisfactorily for small problems and for that company, but for the industry it is not economic because normally the results are not broadcast, thus necessitating its repetition by other concerns. Nor would the results be acceptable to others because of suspected bias of the investigators and special conditions of tests. The second plan, or that of committee investigation, is much better for the industry at large, but it, too, is far from satisfactory. In the first place, committees are slow in functioning, not through lack of interest but from the inherent nature of the structure. The procedure is too apt to fall into the old stand-by of issuing a questionnaire and basing a report solely upon it. The fault with questionnaires is that in engineering problems individual opinions are given instead of proved statements. Committees are usually formed of men widely scattered throughout the field, which prevents frequent meeting. The members are loaded with the duties incident to their jobs, consequently the gratuitous committee work must be crowded in wherever possible, and this leads to postponement. Heaven knows, procrastination is easy enough without any encouragement! Then, again, committees are mostly without funds, though the recent policy of making appropriations is opening possibilities for adequate investigation heretofore out of reach. This policy means real progress and should be given every encouragement.

However, it is believed that this is not sufficient for the highest and most rapid development. In order to achieve the best, it is thought that the establishment of a research department of the A.E.R.E.A., under the guidance of a competent research engineer with an adequate staff and funds to carry on the work, would meet the challenge to our industry for its place in the field of transportation. It is unfair and certainly undignified that a small group of companies should have to assume the burden of research, and yet this is what they have been obliged to do at times. The very nature of the situation lends itself admirably to co-operative research. The problems to be solved are common throughout the country and there is no competition between companies. This is an ideal situation for correlation of effort.

Under such a plan the committees should be continued, but their functions would be more akin to those of a board of directors. They would outline policy, digest findings and act as the balance wheel. The actual work of investigation and study would devolve upon the research engineers, who, being engaged solely in this work, would be able to go deeper into the subject and produce quicker, and it is hoped better, results.

H. S. WILLIAMS,
Assistant Superintendent of Equipment.

Maintenance Notes

Some Shop Uses for the Oxyacetylene Torch

BY F. J. FOOTE

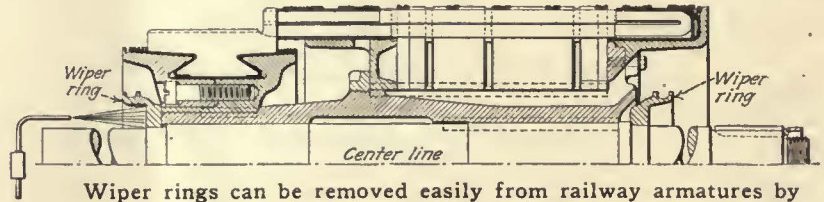
Superintendent of Motive Power and Equipment the Indiana, Columbus & Eastern Traction Company, Springfield, Ohio

QUITE extensive use is made of the oxyacetylene torch in the shop of the Indiana, Columbus & Eastern Traction Company, Springfield, Ohio, where it is employed to good advantage for several unusual operations. Wiper rings on railway armatures as a rule are not provided with any arrangement for removal, and they are sometimes stuck very tightly onto the shaft. By directing the flame from a torch against the inner face of the ring, and moving the flame around the ring several times, it is heated without appreciably heating the shaft. The expansion of the ring is sufficient to permit its removal easily with a pair of tongs. These rings are indicated on the accompanying sketch.

Dismantling of car trucks is a tedious and disagreeable job, as many of the nuts are rusted onto the bolts or the thread is somewhat distorted due to excessive strain. The removal of such nuts by the old method often requires the cutting of many bolts and rivets and the splitting of the nuts with chisels. This work can be done very quickly and neatly with a cutting torch, and the ruining of a few bolts that might be reclaimed by the old method is more than compensated for by the time saved.

Various metal parts of the truck require straightening, and a common method is to remove them from the truck for this purpose. By heating such parts with a torch they can be straightened with a wrench or a sledge while in place. Care must be exercised in this heating not to burn the metal. This can be prevented by keeping the torch in motion constantly. The writer has seen an area about 6 in. x 6 in. on a 1-in. steel plate heated to a bright red heat in this manner.

In cases of car wrecks the cutting torch is indispensable. Work that formerly required hours can be done



Wiper rings can be removed easily from railway armatures by heating with an oxyacetylene torch

with the torch in minutes. The element of time under wreck conditions is frequently of utmost importance, and the matter of cost is of little consequence compared with the necessity of clearing the wreck in the least possible time.

Another convenient use for the torch is the straightening of armature shafts and similar parts which must run true. To straighten a shaft, the complete armature is mounted on lathe centers and rotated slowly, the torch being held station-

ary and the flame directed to the point where the shaft is bent. Jacks or bars are used for the straightening, which is done as soon as the section is heated to the necessary temperature. Pressure is applied with the jack or bar and the heat from the torch can frequently be continued even while the pressure is being applied. The great convenience and time-saving feature is that the shaft can be tested repeatedly, marked, heated and straightened without removal from the lathe.

Tempering and Resetting Springs

BY C. A. KYLE

Wolf Street Shops, New York State Railways, Syracuse, N. Y.

SPRING repairs are facilitated and the cost of tempering and resetting springs has been reduced by a spring-tempering furnace of the gas-burning type that recently has been installed in the Wolf Street shops of the New York State Railways,

Syracuse, N. Y. The furnace has a cast-iron frame, 6 ft. long by 2 ft. wide by 14 in. high. This is lined with retort brick, capable of withstanding very high temperatures without crumbling. Gas is supplied by a 2-in. pipe which is fitted into



Tempering and resetting of springs at the Wolf Street shops of the New York State Railways, Syracuse

two manifold type burners, one on each side of the furnace. The flames from these burners are directed through port holes in the walls of the furnace.

To get the maximum amount of heat from the gas flame, air is mixed with the gas. The mixture is regulated by an inspirator which uses high-pressure air blown through a small opening in a Y fitting, one end of which is open to the atmosphere. This fitting is connected to the gas pipes ahead of the point where they reach the furnaces. It is regulated to furnish the right amount of air to obtain the pressure desired. A safety feature is a check valve in the gas meter that closes and automatically shuts off the flow of gas in case of a backfire in the pipes leading to the furnace.

Two of the principal troubles

the proper color, usually a dark red. They are then removed and dipped in a tank of oil.

The oil for tempering is kept cool by having it in a double-walled tank, the space between the inner and the outer wall being filled with running water. The water enters at the top and is discharged at the bottom, thus keeping a continuous flow of cool water. The tempering cannot be

done successfully if the oil gets warmer than 98 deg. F.

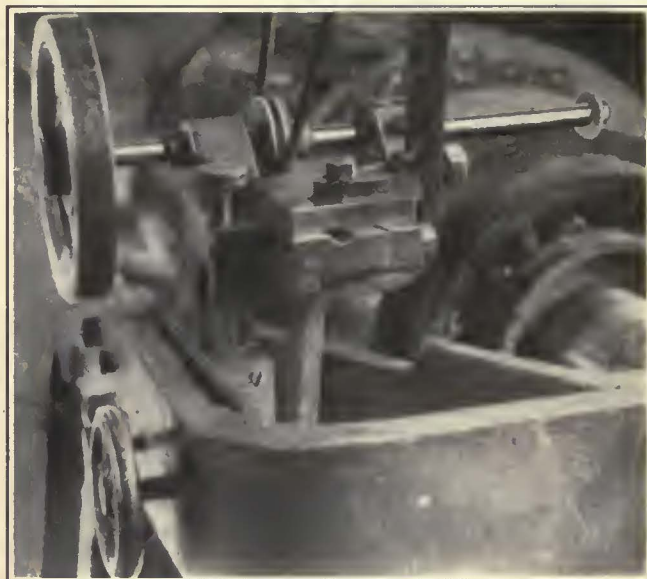
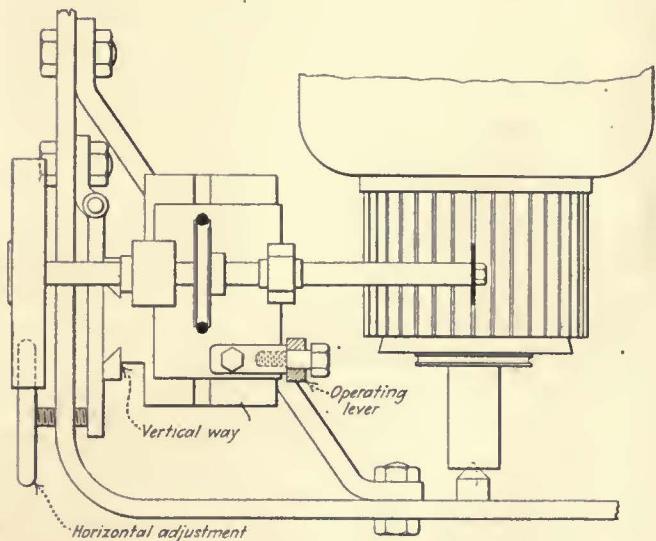
After the leaves have been removed from the tempering tank, they are assembled and retaining bands are shrunk on.

Where the leaves are broken the spring is taken apart and new leaves of the same material and dimensions are made and tempered for installation in place of the broken leaves.

Commutator Slotter with Alignment Adjustment

DESIGN of the commutator slotter built and used in the shops of the Los Angeles Railway combines simplicity with accuracy and ease of operation. In addition to the adjustments for depth of cut and length of stroke, it also permits of

raised and lowered by a screw. The depth of cut is controlled by a set screw on the top of the carriage. The main frame with its vertical way is carried in a casting that is hinged at one side and is moved in or out by an adjusting screw. It can be



This commutator slotter provides for convenient adjustment to suit conditions

Plan of commutator slotting apparatus that is mounted inside of the main frame which supports the commutator while the mica is being cut away.

Alignment is controlled by screw which swings entire slotting

apparatus in a horizontal plane about the hinged end of the supporting casting. The slotter spindle is driven by a round belt from an overhead shaft. A balance wheel is carried on the outward end of the spindle.

found with car and bus springs are flattening out due to loss of temper, and breaking of the leaves. Loss of temper is usually the result of improper tempering when the spring is first assembled. Over-tempering makes the steel too hard and causes breaking of the leaves when the car or bus is overloaded.

The practice in the Wolf Street shops when a spring becomes flat is to remove it and take it apart. Each leaf is reshaped individually to conform with specifications. The leaves are then placed in the tempering furnace, which has been heated to proper temperature, and are allowed to remain until they have obtained

alignment of the cut to take care of slight variations in segments.

The spindle carrying the milling cutter on one end and a balance wheel on the other is mounted on the main carriage of the machine. This carriage is moved back and forward by a lever, the spindle being driven throughout the travel of the carriage by a 1/2-in. round belt, which in turn is driven by an overhead pulley with an idler taking up the slack in the belt. The entire carriage may be

locked in any position by a set screw. With this arrangement the entire apparatus inside the supporting frame may be swung in a horizontal plane to obtain alignment of the cutter with the slot of the commutator.

Old Rattan Seats Stained Green

IMPROVEMENT in the appearance of the car interior has been effected by the Atlantic & Suburban Railway, Pleasantville, N. J., by staining old rattan seats green. The problem of restoring these seats was complicated by previous unsuccessful attempts to improve their looks. Sev-

*"Ask Dad, He Knows"
the value of systematic and regular inspection.*

eral years ago, when the rattan had become dirty, the seats were treated with mahogany stain. That color proved to be too dark to be satisfactory. Next the seats were painted, but the paint chipped off. Finally as much as possible of the previous treating material was removed. The seats were then given a coat of green Japan thinned with turpentine. This was immediately wiped off with a rag. Then a coat of Wilson's cane glaze was applied. As a result of this treatment the seats have a clean, fresh, green color, harmonizing well with the other interior fittings of the car.

New Equipment Available

Heavy-Duty Chassis

DESIGNED to meet the severe demands of constant starting and stopping and with abundant power and speed, a new heavy-duty chassis for the 21-passenger street car type bus has been announced by the Studebaker Corporation, South Bend, Ind.

The motor has a positive force-feed lubricating system and the chassis is lubricated by a high-pressure system. A specially designed 1½-in. double-jet, two-range carburetor is used. Current is supplied by a 12-volt generator, accessibly mounted at the right forward end of the engine, and by a threaded-rubber-separator storage battery. The distributor is at the left front of the engine and the entire ignition system is protected against moisture.

The starter is operated by a switch on the floor board. A 30-gal. gasoline tank is carried at the rear of the

frame and the fuel is fed to the carburetor through a vacuum tank system. A tubular radiator, four-blade 20-in. fan and a circulating pump system cool the motor.

The clutch is of the double-disk, dry-plate type and the transmission, a selective type with four speeds forward and one reverse, is in unit with the clutch and engine. The semi-floating rear axle has extra large chrome molybdenum shafts. The drive gear is of the spiral bevel type.

The use of the Hotchkiss drive principle eliminates torque tubes or radius rods. The torque and drive are taken through the springs and the propeller shaft is a 3-in. diameter steel tube, turning through three universal joints and with the angle of drive a minimum because of the low-hung chassis design. The springs are semi-elliptic, with fourteen leaves in the 36-in. front units and twelve leaves in the 56-in. rear units. Newly designed short shackles reduce side sway.

Mechanical internal expanding four-wheel brakes are used. These brakes are 3 in. wide by 17½ in. diameter and have three expanding shoes which utilize the speed of the vehicle to increase the braking action. Hand emergency brakes operate on the rear wheels. The steering gear is of the cam and lever type, designed for balloon tires. The pressed channel steel frame is narrow at the front to allow a short turning radius, with side members 8 in. deep and 3-in. flanges secured by nine stout cross members, of which two are tubular. The non-skid 34 x 7.50-in. balloon tires and dual rear wheels add safety and comfort. Without changing wheels this chassis may be equipped with 32 x 6-in. high-pressure tires if desired. There is sufficient space between the dual rear wheels to allow

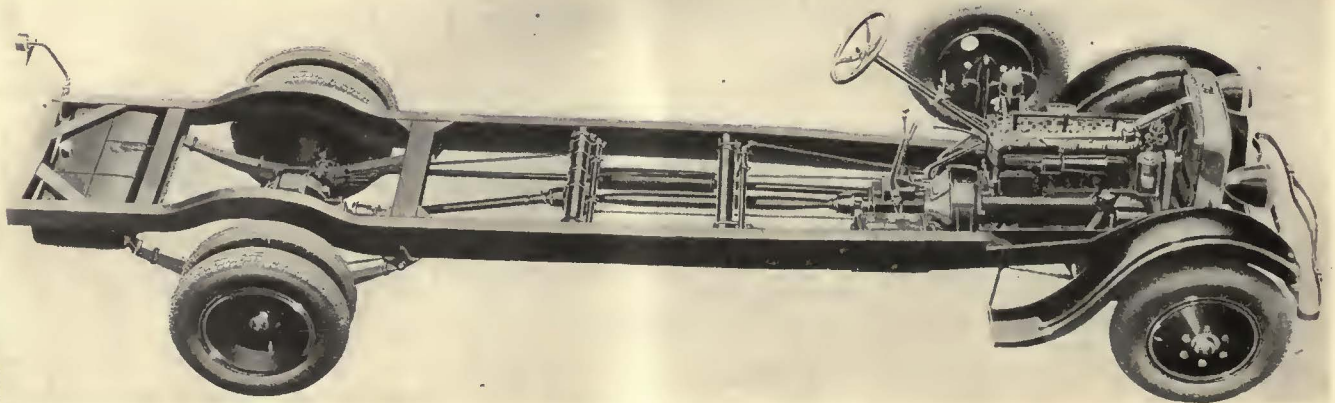
chains to be put on or taken off easily.

Two-beam acorn headlights are controlled from a switch on the instrument board. The new chassis is equipped with speedometer, eight-day clock, engine thermometer, ammeter and oil pressure gage grouped under an oval glass on the instrument board, rear traffic signal light, ignition switch on instrument board, automatic windshield cleaner, rear view mirror, front full width bumper, spare tire carrier and four-wheel brakes.

Improved Welding Electrode

WELDING electrodes of a new type which combine the characteristics of a fluxed electrode and the quality of bead finish and the cleanness in handling of a bare welding electrode have been introduced by the merchandise department of the General Electric Company, Bridgeport, Conn. Recommended for the general welding of steel, the electrode has a uniform flowing quality. The absence of sputtering or spattering, characteristic of the usual commercial bare welding wire, is said to be one of the features of the new material. The elimination of the erratic arc condition leads to a deposit of more material with the same consumption of electrode per kilowatt-hour. The electrode penetrates quickly and produces high tensile strength and unusual ductility and elongation.

The electrode, which has been designated GE type F, is furnished in ⅜, ½, ⅝, ⅞ and 1-in. sizes. The standard package is 50 lb., burlapped. It is also furnished on steel reels of approximately 200 lb., or in coils of approximately 150 or 200 lb.



Many desirable operating features have been incorporated in this chassis

Association News & Discussions

Illinois Utility Men Denounce "Home Rule"

WITH the Illinois Legislature in session and committees considering two so-called "home rule" bills, members of the Illinois Gas Association, Illinois State Electric Association and Illinois Electric Railways Association met in Springfield on March 17 and 18 and in no uncertain terms denounced both bills. That the Illinois utilities associations are not in favor of home rule, but are vigorously opposed to it, could be gained after the first few minutes of the opening session of the two-day convention. Throughout the meetings at both the general and the several sessions of the individual associations, papers read and discussion offered pointed out the fallacy and difficulty of municipal regulation of such extensive utilities as exist in the state.

Of as great importance to the electric railway men in attendance were the papers and discussions on subjects which, according to W. H. Sawyer, president of the American Electric Railway Association, mark a new era in transportation. Today, according to Mr. Sawyer, in discussing one of the papers presented at the first session of the railway meeting, railway men are studying traffic control, one-man car operation, bus operation and modernized cars. Railway executives who even five years ago prided themselves on their knowledge of operating problems today have many new lessons to learn. More opportunities present themselves for advancement in the industry than ever before, he said.

NEW CAR TRUCK EXHIBITED

This point of view was forcefully illustrated by a new type of electric railway car truck of the Chicago & Joliet Electric Railway, shown for the first time so that both railway men and manufacturers could see the advancement made in truck construction on the initiative of J. R. Blackhall, vice-president and general manager of the company.

Abandoning the conservatism which usually characterizes a railway executive at conventions, Mr. Blackhall explained why it was necessary for him, as an operating man, to design and have built a piece of railway equipment in order to improve operating efficiency and reduce the weight per seated passenger of the completed car. He enumerated some of the obstacles which he had to overcome in pioneering a truck, not the least of which was the general indifference toward fundamental improvements in rolling stock. With the co-operation of the Timken-Detroit Axle Company, the Westinghouse Electric & Manufacturing Company and the Westinghouse Air Brake Company, together with automotive

parts manufacturers, Mr. Blackhall was able to design his truck so as to make a large weight reduction from conventional construction. Reduction of noise by full inclosure of gearing, spring suspension of motors and easy riding qualities were other objectives sought.

HOME RULE SCORED

On the subject of home rule, which according to the bills now before the Illinois State Legislature means the regulation of utilities by municipalities rather than by a state regulatory body, S. I. McElhoes, attorney of Oklahoma City, Okla., gave an interesting statement of how the indeterminate or revocable franchise works in his state. That this type of franchise is equitable and just is shown by the relationship between the people of Oklahoma and the telegraph and telephone companies, which in that state have had continuous franchises for 35-year periods. Only in the last two years has the State of Oklahoma had the revocable franchise adapted to other utilities. At a recent referendum vote sponsored by the "anti" forces the people again indorsed the indeterminate franchise, and as a result all utilities are regulated by the corporation commission and not by the individual municipalities which they serve.

In addition to his active participation in the discussions of the railway section papers, W. H. Sawyer delivered a

paper at the opening joint session of the convention. In this paper Mr. Sawyer presented an outline of the utility situation in Australia, where last summer he made a detailed study of utilities operations in the Antipodes.

THREE IMPORTANT SUBJECTS DISCUSSED AT FIRST RAILWAY SESSION

E. J. McIlraith, staff engineer Chicago Surface Lines, opened the first afternoon session of the Electric Railways Association with an interesting technical discussion of traffic regulation for cities of all sizes. In the opinion of Mr. McIlraith, the problem needs practically the same treatment in all communities. As an example of the task which confronted the Chicago Surface Lines in establishing traffic regulations, Mr. McIlraith cited some figures on the pedestrians and vehicles making use of the downtown streets during a business day. More than 66,000 people pass between curb lines at State and Madison Streets in one hour. More than 800,000 vehicles, of which 90,000 are automobiles, come into the Loop district in twelve hours. It was Mr. McIlraith's suggestion that the railway management take up the burden of regulating street traffic.

Other factors in traffic regulation as brought out by Mr. McIlraith's paper, which will appear in a later issue, were discussed, tying them in specifically with conditions in Chicago and on the Chicago Surface Lines. According to Mr. McIlraith the traffic signals should be installed when there is a volume of 16,000 vehicles in the sixteen-hour period and only when traffic conditions warrant such installations for safety and speed.

In discussing Mr. McIlraith's paper, G. W. Welsh, vice-president, East St. Louis & Suburban Railway and president-elect of the Illinois Electric Railways Association, stated that the \$50,000-per-mile cost of constructing track includes day work under heavy traffic conditions. In view of the plea of Mr. McIlraith for more extensive night work, Mr. Welsh was of the opinion that a considerable part of the cost of track construction could be saved by night work.

Specific details relative to motor bus maintenance on the East St. Louis & Suburban Railway were given in a paper read by H. P. MacDonald, superintendent of automotive equipment of that property. Mr. MacDonald's paper, in which the importance of good house-keeping was stressed, was published in the March 19 issue.

Discussing Mr. MacDonald's paper, Fred Klock, in charge of the maintenance of motor coach equipment for the Chicago, North Shore & Milwaukee Railroad, stated that garage design and operation necessarily must be modified to meet individual requirements. He

COMING MEETINGS

OF

Electric Railway and Allied Associations

April 1—American Electric Railway Association, Metropolitan Section, Engineering Societies Building, New York City, 8 p.m.

April 26-29—Southwestern Public Service Association, convention, New Orleans, La.

May 31—June 1-2—Canadian Electric Railway Association, annual convention, Winnipeg, Man.

June 6-8—American Association of Engineers, annual convention, Tulsa, Okla.

June 24-25—New York Electric Railway Association, annual meeting, Hotel Champlain, Bluff Point, N. Y.

July 27-29—Association of Equipment Men, Southern Properties, 12th semi-annual meeting, Atlanta, Ga.

Oct. 3-7—American Electric Railway Association, annual convention and exhibit, Public Auditorium, Cleveland, Ohio.

suggested, however, that 150 ft. be the minimum width of the garage. Pits should be flush with the floor, with no curbing, thus providing for additional storage space with the pits not in use. An attempt has been made by his department to standardize small part fittings and units. He felt, however, that there was hardly a chance of standardizing the entire coach due to the rapid development in design and construction.

At the Springfield Engineers' Club dinner, Thursday evening, the new chairman of the Illinois Commerce Commission, David H. Jackson, spoke about the extensive work of that commission in giving fair regulation to 700 utilities, exclusive of bus lines and steam railroads, with a valuation of \$1,600,000,000. He contended that in the past railways have relied too much on legal help to obtain raises in rates, which could be obtained with less effort if the utility would improve its service, spending the money in betterments.

MUNICIPAL OWNERSHIP AIRED AT FRIDAY JOINT SESSION

Following the report of the Illinois Committee on Public Utility Information, read by J. F. Gilchrist, chairman, Prof. H. B. Dorau, research assistant Institute for Research in Land Economics and Public Utilities, Northwestern University, explained by charts and data the transition which is taking place with respect to municipal ownership of power companies. Changing conditions have been responsible for the installation of municipally owned plants and their subsequent acquisition by privately owned power systems.

Dr. H. M. Gray of the University of Illinois explained in detail the courses given there in public utility work. While the university can teach the fundamentals, it is necessary that the students, both undergraduate and graduate, be given practical experience in the public utility plants.

Methods developed and used in the shops of the Illinois Traction System at Decatur were explained by J. D. Barnhart, superintendent, in a paper dealing with "Interurban Maintenance and Shop Practices." Mr. Barnhart dwelt upon four shop practices, namely, moving trucks from under cars, removing compressors, babbitting armature bearings and painting the equipment. An abstract of Mr. Barnhart's paper will appear in a later issue.

MECHANICAL MEN MUST KEEP UP TO DATE

Henry Cordell, master mechanic Chicago, North Shore & Milwaukee Railroad, discussed Mr. Barnhart's paper with a description of shop practices on the North Shore Line as compared with those employed in the shops of the Illinois Traction System. He felt that the present-day mechanical force must look to its laurels if it is to keep abreast of modern car design and construction. He referred to the truck exhibited by Mr. Blackhall as an example of what to expect in the future.

What modernization in car equipment will do to an electric railway property was given in a paper read by M. J. Oswald, sales representative St. Louis Car Company. Mr. Oswald took the

facts and figures already presented in ELECTRIC RAILWAY JOURNAL'S new car story and supplemented these with suggestions of improvements on newer cars.

Following Mr. Oswald's paper, Mr. Blackhall gave figures on the result of new car operation by the Chicago & Joliet Electric Railway. For the six months period prior to installation of ten new cars costing \$170,000 on the interurban lines of the system, the revenue on the city lines increased 1 per cent and on the interurban lines 0.65 per cent. For the six-month period following installation of the new cars, the revenue on the city lines decreased 0.47 per cent, while the revenue on the interurban lines increased 6 per cent, or \$9,656. At this rate the new cars show an increased earning capacity of \$20,000 per year. During this six months, however, the cars showed a saving in operating expenses of \$17,000. If this continues for the next six months, the saving will amount to \$34,000 for the year. Thus, with an investment of \$170,000 the company has an indicated return of \$54,000 per year, or

almost 33 per cent on the investment.

How track is maintained on the largest electric railway property in the world was detailed in a paper read by Jonathan Wolff, assistant supervisor of track and roadway Chicago Surface Lines. Four points were brought out by Mr. Wolff as important in track-work. These were: (1) Improved organization, (2) use of power tools, (3) electric welding, (4) safety precautions. Mr. Wolff's paper will be abstracted in a later issue.

Officers elected for the Illinois Electric Railways Association for the coming year are:

President, G. W. Welsh, vice-president East St. Louis & Suburban Railway.

First vice-president, Ray Palmblade, Illinois Power & Light Corporation.

Second vice-president, C. H. Jones, Chicago, South Shore & South Bend Railway.

Executive committee, the officers and B. I. Budd, Chicago; W. H. Sawyer, East St. Louis, and H. M. Lytle, Chicago.

One Man Better than Two*

BY R. F. PALMBLAD

Manager Peoria Division Illinois Power & Light Company

ONE-MAN operation of city street cars is nothing new; in fact, as most transportation people well know, one-man operation of city horse cars was universal in early city transportation. However, development of the automatic pneumatic devices on street cars was, to my mind, the first attempt along sound engineering lines toward designing equipment with the working parts so co-ordinated and simplified that one-man operation of the unit as a whole was comparatively easy. After the car had been developed the first thought in the mind of the public was that the plan was simply one of eliminating the wages of one man on each car. This, in turn, suggested slower operation and less safe operation, for the reason that it seemed a natural deduction that two men could handle a car with more speed and in a safer manner than could one man. Some of you will, perhaps, recall that this view was shared, in part at least, by some of the executives in the industry. Of course most of us, as transportation men, knew that the theory of one-man operation was sound.

Let it be said, for the good judgment and loyalty of the car operators as a whole, when the new system was adopted they, as a rule, were not insensible of the advantages of this idea to the public, the companies and, directly and indirectly, to themselves, and, in general, they co-operated in a wholehearted way. Most of the foregoing applies to companies in cities of moderate size, which, of necessity, were usually the first to establish one-man operation. The idea is still growing, however, because, after all, facts are facts and cannot be controverted.

There still are, perhaps, areas so congested from a traffic standpoint that two-man operation is still necessary. In areas of moderate traffic density an approximation of two-man operation in those particular sections can be worked out, still retaining the one-man principle.

REDUCES ACCIDENTS

There are some advantages to the public in this scheme, most of which were elaborated upon when the cars were inaugurated. Notwithstanding the increase in the average fare compared to a few years ago, on most properties it would undoubtedly be higher if it were not for the one-man car. The positive decrease in accidents per unit of miles operated and the fact that boarding and alighting accidents are almost a negligible quantity on one-man operated properties that employ the latest automatic pneumatic devices on their cars is a positive advantage to the public and one not to be lightly considered. On the Peoria Division of the Illinois Power & Light Corporation they do not average over one or two accidents of this type per year on the property. The accidents mentioned are of an insignificant nature, comparatively speaking, such as a heel catching in a folding step, which is not the fault of the equipment nor the car operator.

In this day of automatic traffic signals in our city streets the rider on a modern one-man car has a decided advantage in time saved, as the car operator can immediately proceed with the green light without waiting for the customary bell signal, which is usually necessary on a two-man unit. The pneumatic safety devices on the car, in conjunction with the automatic platform signal, permit the one-man car operator to take advantage of seconds,

*Abstract of a paper read before the Illinois Electric Railways Association, Springfield, Ill., March 17, 1927.

which in the aggregate through a day's run total many minutes. This is an undoubted advantage to the passenger, as he feels the operator has a chance to be alert and avoid the little trifling delays that irritate the public. Perhaps, in addition to the time saved, there may be that a little psychology enters into the passenger's demand to be on the move. Notice the auto driver who fails to start instantly on the green traffic light and listen to the chorus of sirens and horns. In the old days traffic flow was measured in minutes, but it is now measured in seconds—consequently, every second gained by one-man equipment eventually redounds to the benefit of the public.

IMPROVED DEVICES SAVE TIME

In order to call attention to one of the advantages of one-man operation, it is perhaps permissible to dwell a moment on one of the arguments against the plan. For instance, it has been said that, in areas of heavy traffic density, one man on a street car cannot handle the business as rapidly as can two men. This is true if the unit is obsolete and old-fashioned schemes of handling fares and transfers are used. It has been demonstrated that if the one-man car has pneumatically operated twin front doors, so as to handle simultaneously outgoing and incoming files of passengers, and, in addition, has a rear door pneumatically operated where passengers can board with the assistance of a street fare collector, less time will be taken in loading the car than under the two-man system.

Ordinarily, with two-man operation, passengers board at one end of the car and pay their fare to one of the operators. With a street collector both he and the operator collect fares from separate files of passengers without interference from the outgoing file. It is needless to point out that the street fare taker is usually necessary only during the peak-load periods. This is a distinct advantage to the public because it facilitates loading beyond ordinary two-man operation and, again, time is saved to the passenger, to say nothing of largely eliminating crowding in boarding. Also, the advantage of prompt handling is available to the public when it really wants it, i. e., during the peak-load periods.

One-man operation has stimulated the development of the modern transfer, which has a higher degree of visibility through more simple arrangement, together with the elimination of cumbersome complex markings and punchings. The modern transfers require no punching by the operator while he is actually operating his car and may be torn off the pad as rapidly as giving out rain checks at a ball park. It seems to me that without the stimulus of relieving the one-man car operator of tedious duties the transfer would not be so far advanced in design. This is a direct advantage to the public, and further, it puts the one-man car on a parity with the two-man car in so far as speed in issuing transfers is concerned.

Speed in collection and registration of fares has been spurred by the widespread use of one-man cars in city

service. Where registration is still followed automatic, speedy equipment has made it easier for the passengers to file into the cars without confusion and delay in loading. This all tends to a better relationship between the public and the company.

The passenger-actuated and pneumatically operated treadle exit on the rear of modern one-man cars permits the passenger to leave by the rear without waiting until a conductor has determined whether the car has stopped before opening the rear door. With this new device, immediately upon the car coming to a stop the rear door exit is at once available and there is no waiting for the conductor to close the rear exit and give the motorman the starting signal. This selectivity at the personal convenience of the passenger has a tendency to please, which is most assuredly an advantage to the public.

In cities where one-man operation has been given a fair test with modern equipment it has been proved to the entire satisfaction, not only of the operating companies but of the public as well, that one-man cars produce a more economical, a safer and a more satisfactory transportation service. The time may come when a man on the rear end of a street car will be unnecessary except perhaps in extreme cases. Even these extreme conditions have a way of solving themselves, due to advancement in the design of equipment and accessories.

The average American of today has developed what might be termed an "automobile sense." He likes decision, alertness and speed, to say nothing of safety, in his city transportation. The automobile driver will brook no interference in the handling of his car, particularly from the back seat. It is not the duties a driver performs in running

an automobile that distract his mind, because these duties become mechanical, but rather the interference from other occupants of the car. So the average individual is content to permit one man to handle a public vehicle, knowing that it is an advantage to him as a passenger to have one man absolutely responsible. He knows that there will be no confusion resulting from a multiplicity of bell signals to the motorman, and that there will be no back-seat driving. The psychology is apparent.

ADVANTAGES OF ONE-MAN OPERATION

Our experience has shown that with the one-man operation it is possible to furnish more frequent service by the use of a larger number of smaller transportation units; a faster service by the use of a lighter car, capable of quicker acceleration; a more comfortable ride, by reason of the supplying of modern type of carrier; a safer ride, because of the automatic air brakes and the various pneumatically operated devices that have been outlined, including door-closing and step-raising equipment.

From the standpoint of the company, the use of the one-man car has decreased the cost of operation, since it uses less current and because of lighter weight does not require the high maintenance cost for track and roadway. While the saving in wages paid to car operators is negligible, because of the larger number of units operated, and a higher basic wage paid to the operators, still there has been some economy effected from the wage standpoint.

Were it not for the one-man type of operation the public would be paying much more today for a street car ride and many transportation systems would long since have passed out of existence.

Decision on Inspection and Testing of Electric Locomotives

PURSUANT to a petition of the American Electric Railway Association a hearing was held before the Interstate Commerce Commission Nov. 1, 1926, in regard to the rules and instructions for the inspection and testing of locomotives propelled by power other than steam. A decision has just been rendered. The primary question involved was whether or not the railway companies included in the membership of the association are subject to an order of Dec. 14, 1925, in so far as it relates to electric locomotives used or permitted to be used on lines operated by members of the American Electric Railway Association.

Questionnaires were sent to the respective carriers calling for data showing the general character of their lines, the equipment used thereon and the nature of the traffic handled. The association contended that the locomotive inspection law as enacted does not apply to electric locomotives or electric apparatus and, second, that the law as enacted does not apply to any electric railway unless such railway is being operated as an integral part of a general steam railroad system.

The Interstate Commerce Commission decided that this ruling applied to 116 carriers. To decide which were street, suburban or interurban electric railways, the carriers were considered individually. Returns to the questionnaires indicated that only one of the carriers is operated as a part of any other railroad. After careful consideration of the matter, it was decided that the carriers listed below, as at present operated, are street, suburban or interurban electric railways, not operated as a part of a general railroad system of transportation, and that they do not fall within the scope of the locomotive inspection act as enacted:

Berkshire Street Railway.
Hudson Valley Railway.
Hull Electric Company.
Kansas City, Clay County & St. Joseph Railway.
Key System Transit Company.
Massachusetts Northeastern Street Railway.
Milwaukee Electric Railway & Light Company.
Muskogee Electric Railway.
Omaha, Lincoln & Beatrice Railway.
Quebec Railway, Light & Power Company.
San Francisco, Napa & Callstoga Railway.
Southern Indiana Gas & Electric Company.
Tennessee Electric Power Company.
United Electric Railways Company.
Wiles-Barre & Hazleton Railway.

Wisconsin Power & Light Company.
York Utilities Company.
Kansas City Public Service Company.
Springfield Street Railway.
Worcester Consolidated Street Railway.

The record shows that no locomotives are used on the lines of the following carriers and therefore it is not necessary, at this time, to determine whether these carriers are subject to this act:

Alabama Power Company.
Androscoggin & Kennebec Railway.
Auburn & Syracuse Electric Railroad.
Augusta-Aiken Railway & Electric Corporation.
Aurora, Elgin & Fox River Electric Company.
Bacon Hydro-Electric Company.
Beaver Valley Railroad.
Benton Harbor-St. Joe Railway & Light Company.
Capital Traction Company.
Chicago, South Bend & Northern Indiana Railway.
Cleveland Southwestern Railway & Light Company.
Cortland County Traction Company.
Cumberland County Power & Light Company.
Dayton & Western Traction Company.
Denver & Interurban Railroad.
Elgin & Belvidere Electric Company.
Fresno Traction Company.
Indiana, Columbus & Eastern Traction Company.
Indiana Service Corporation.
Indianapolis & Cincinnati Traction Company.
Lehigh Valley Transit Company.
Marion and Bluffton Traction Company.
Michigan Electric Railway.
New Castle & Lowell Railway.
New York & Stamford Railway.
Northern Ohio Power & Light Company.
Ohio Public Service Company.
Ohio Valley Electric Railway.
Olean, Bradford & Salamanca Railway.
Peninsular Railway.
Northwestern Electric Service Company of Pennsylvania.
Rochester, Lockport & Buffalo Railroad.
Sioux City Service Company.
Southern Ohio Public Service Company.
Springfield & Xenia Railway.
Stenberville, East Liverpool & Beaver Valley Traction Company.
Toledo, Fostoria & Findlay Railway.
Toledo, Ottawa Beach & Northern Railway.
Union Traction Company of Indiana.
Washington, Baltimore & Annapolis Electric Railroad.
Washington-Virginia Railway.
Western Ohio Railway.
Winona Service Company.
Lima-Toledo Railroad.
Central California Traction Company.
Milwaukee Northern Railway.

The carriers listed below failed to file returns to the questionnaire, and no evidence was offered at the hearing with respect to the character of such lines, the equipment used thereon or the nature of the traffic handled by them. In the absence of evidence in these respects the Interstate Commerce Commission expressed no opinion as to whether these carriers are subject to the act and the rules and instructions established thereunder. To such carriers the relief granted herein does not apply.

Atlantic City & Shore Railroad.
British Columbia Electric Railway.
Cincinnati & Dayton Traction Company.
Cincinnati, Lawrenceburg & Aurora Electric Street Railroad.
Dayton & Troy Electric Railway.
Dayton, Springfield & Xenia Southern Railway.
Empire State Railroad.
Holyoke Street Railway.
Lake Shore Electric Railway.
New York State Railways (Rochester Lines).
Rochester & Syracuse Railroad.
Rockford & Interurban Railway.
Scioto Valley Railway & Power Company.
Trenton-Princeton Traction Company.
West Chester Street Railroad.
Youngstown & Suburban Railway.

The Interstate Commerce Commission found that the carriers listed below cannot properly be classed as street, suburban or interurban electric railways and are therefore subject to

the locomotive inspection act, as amended:

Arkansas Valley Interurban Railway.
Bamberger Electric Railroad.
Chicago, Aurora & Elgin Railroad.
Chicago, North Shore & Milwaukee Railroad.
Des Moines & Central Iowa Railroad.
Detroit United Railway.
Fonda, Johnstown & Gloversville Railroad.
Illinois Traction, Inc.
St. Louis Electric Terminal Railway.
Interstate Public Service Company.
Lackawanna & Wyoming Valley Railroad.
Northeast Oklahoma Railroad.
Pacific Electric Railway.
Portland Electric Power.
San Francisco-Sacramento Railroad.
Southern New York Railway.
Terre Haute, Indianapolis & Eastern Traction Company.
Tide Water Power Company.
Waterloo, Cedar Falls & Northern Railway.
Sacramento Northern Railway.
Salt Lake & Utah Railroad.
Cedar Rapids & Iowa City Railway.
Utah Idaho Central Railroad.
Chicago, South Shore & South Bend Railroad.
Pacific Northwest Traction Company.
Yakima Valley Transportation Company.
Visalia Electric Railroad.
Petaluma & Santa Rosa Railroad.
East St. Louis & Suburban Railway.
Evansville & Ohio Valley Railway.
Grand Rapids, Grand Haven & Muskegon Railway.
Mason City & Clear Lake Railroad.
Pittsburg County Railway.
Toledo, Bowling Green & Southern Traction Company.
Washington & Old Dominion Railway.

At the hearing testimony was offered on behalf of the carriers attempting to show that some of the rules and exceptions included in the order of Dec. 14, 1925, should be changed in order to make them applicable to locomotives used on their lines. The commission decided that Rules 223, 225, 226, 227, 238 (d), 239 (b) and 253 should be given further consideration before they are made effective on locomotives used by such of these lines as are subject to the act, but that the remaining rules should be made effective promptly.

The order of the commission was that on and after the first day of June, 1927, except as otherwise specified, the

rules and instructions for the inspection and testing of locomotives propelled by power other than steam, together with such tables, drawings and forms approved by said order of Dec. 14, 1925, shall be effective and shall be observed by each and every common carrier subject to the act aforesaid as minimum requirements except with respect to locomotives used on the lines particularly named below, the specified dates included in the rules 213 (b), 214 (a), 231 (f), 317 (a) 328 (a), 329 (a) and 337 shall be extended for a period of eighteen calendar months and until further order the requirements of rules 223, 225, 226, 227, 238 (d), 239 (b) and 253 shall not be effective.

The carriers referred to above are:

Arkansas Valley Interurban Railway.
Bamberger Electric Railroad.
Chicago, Aurora & Elgin Railroad.
Chicago, North Shore & Milwaukee Railroad.
Des Moines & Central Iowa Railroad.
Detroit United Railway.
Fonda, Johnstown & Gloversville Railroad.
Illinois Traction, Inc.
Evansville & Ohio Valley Railway.
Grand Rapids, Grand Haven & Muskegon Railway.
Mason City & Clear Lake Railroad.
Pittsburg County Railway.
Toledo, Bowling Green & Southern Traction Company.
Washington & Old Dominion Railway.
St. Louis Electric Terminal Railway.
Interstate Public Service Company.
Lackawanna & Wyoming Valley Railroad.
Northeast Oklahoma Railroad.
Pacific Electric Railway.
Portland Electric Power Company.
San Francisco-Sacramento Railroad.
Southern New York Railway.
Terre Haute, Indianapolis & Eastern Traction Company.
Tide Water Power Company.
Waterloo, Cedar Falls & Northern Railway.
Sacramento Northern Railway.
Salt Lake & Utah Railroad.
Cedar Rapids & Iowa City Railway.
Utah-Idaho Central Railroad.
Chicago, South Shore & South Bend Railroad.
Pacific Northwest Traction Company.
Yakima Valley Transportation Company.
Visalia Electric Railroad.
Petaluma & Santa Rosa Railroad.
East St. Louis & Suburban Railway.

American Association News

Exhibit

PLANS for the annual exhibit at the 1927 convention were made and adopted at a meeting of the exhibit committee of the American Association held in the office of Col. J. H. Alexander, Cleveland, Ohio, on March 18. Those present were J. H. Alexander, chairman; C. E. Morgan, vice-chairman; T. O. Kennedy, vice-chairman entertainment committee; J. W. Welsh, executive secretary; F. C. J. Dell, director of exhibits; F. W. Campbell, secretary Cleveland convention committee; F. B. Bullock, assistant secretary Cleveland convention committee; J. W. Kellison, L. D. Bale, John Bender representing Herman Bender, C. P. Billings, R. M. Campbell, C. H. Clark, S. G. Down, Charles Gordon, R. N. Graham, H. F. Flowers, R. A. Hauer, C. S. Hawley, B. A. Hegeman, Jr., A. P. Jenks, J. E. Lytle representing H. J. Kenfield, A. F. Paul representing T. W. Casey, L. C. Paul representing J. C. McQuiston, A. L. Price, A. M. Robinson, S. P. Seward, L. W. Shugg and R. L. Twit-

chell. Mr. Dell was elected secretary of the meeting.

Mr. Dell presented a report outlining the work which has been done already. A contract has been drafted under which the exhibition is to function. In general this follows that of last year. The local contractors have been reappointed and the rates for service are in line with those quoted last year. Resolutions of the executive committee passed at its meeting on Feb. 4 were referred to, relative to outside bus demonstrations and other exhibits away from the convention, the setting aside of a special day for exhibits and arrangements for inspection trips. Mr. Dell's report was accepted and ordered spread upon the record.

Minutes of a special sub-committee to lay out a floor plan for the exhibit met at Cleveland on March 17. On account of building operations it was recommended to erect a temporary structure on East Sixth Street to be used as the exclusive entrance, with exits at the St. Clair end of East Third Street and at the St. Clair end of the auditorium



Representatives present at the meeting of the exhibit committee held in Cleveland, Ohio, March 18

on East Sixth Street. Several changes from last year's layout of meeting rooms and exhibit facilities were made. It was recommended to retain the Arena layout of last year. A plan for Exhibition Hall, the floor below the arena, was presented by the sub-committee and adopted. It was decided to provide rooms on this floor for meetings of the Accountants', Claims, Engineering and Purchasing Agents and Storekeepers. The balance of the space on this floor is to be used for exhibits. It was felt by the committee that this arrangement would be more satisfactory to exhibitors than that of last year.

The 1926 track layout was approved. Since a large car exhibit is expected, additional track space will be provided, if necessary, by closer spacing of the cars. The committee was in favor of stimulating by every means possible the exhibition of truck and car improvements by both manufacturers and operators. The chairman outlined a plan for squaring off the West Wing in the event that the Cleveland and Industrial Exposition's sale of space warrants. After discussion it was recommended that the meeting room space of last year be divided into exhibition space and that the American and T. & T. meetings be held in a new building to be erected on the north plaza, just north of the esplanade. If this building is not erected, it was voted that the meeting rooms of these two associations be retained in the same location as last year. In the event that the West Wing is extended, the committee voted authority to the director of exhibits to subdivide and sell the space to exhibitors. It was decided that Wednesday, Oct. 5, be designated as Exhibit Inspection Day.

Mr. Welsh outlined the budget for this year as compared with 1926 and explained that while the rental for the buildings will be reduced other expenses will increase. These include a greater expenditure for entertainment, general printing, including registration books not published last year, and contingencies. Having in mind that there was a deficit last year it appeared desirable to charge the same rates for space. It was voted to recommend to the executive committee rates of 75 cents per square foot for inside space, the same as last year; 45 cents per square foot for outside space and \$3 per lineal foot for track space.

After considerable discussion a motion was passed unanimously recommending to the executive committee that the exhibits be opened at noon on Saturday, Oct. 1, instead of on the following Monday morning, when the convention itself is opened. Members of the committee representing various important exhibitors were in accord with this proposal, since it permits delegates arriving early to have additional time for inspection of the exhibits and tends to encourage early arrival by delegates and full attendance at the convention meetings.

It was voted that diagrams be prepared and contracts be submitted by Mr. Dell to prospective exhibitors on May 16, with the understanding that they have until June 15 to return formal space applications. It was further voted that a meeting of the committee for the purpose of assigning space be held in Cleveland at 10 a.m. on June 22.

W. & S. Special Committee No. 9

WAY and structures special committee No. 9 met in association headquarters in New York on March 2 and 3, with the following present: J. R. McKay, chairman; Adrian Hughes, Jr., L. F. Parlette, A. J. Blackburn, W. W. Wise, G. H. Haldeman and G. C. Hecker, association representatives.

Practically the entire meeting was devoted to a complete review and discussion of the effect of garage design on insurance rates. The tentative draft of the regulation for bus garages which has been prepared by the general garage committee of the National Fire Protection Association was carefully examined and discussed. Mr. Hecker, who is the association's representative on the N.F.P.A. conference committee on motor bus garages and hazards, explained the regulations and answered a number of questions concerning them.

It was decided that in addition to the assignment of garage design and its effect on insurance rates, the committee would consider only the three additional subjects of (a) door design, (b) bus washing facilities, (c) ideal layouts for various street frontage conditions. Sub-committees were appointed to obtain the necessary data for the investigation.

A tentative plan for a meeting in Pittsburgh in the latter part of April was proposed.

Service Betterment

REPORTS of sub-committees occupied the meeting of the committee on service betterment of the Transportation & Traffic Association held at association headquarters in New York on March 1. The following were present: S. E. Emmons, chairman; C. D. Smith, vice-chairman; A. C. Spurr, W. L. Barclay, Jr., representing E. A. Palmer, J. R. Ong representing J. B. Stewart, Jr., C. A. Burleson representing J. C. Thirlwall and W. B. Wheeler representing W. E. Thompson.

The meeting began with a report on "Convenience and Attractiveness of Service," by C. D. Smith, chairman of the sub-committee on this subject. Eight main topics were given consideration as essential. In the discussion which followed a number of additional topics were suggested for inclusion in an appendix to the report.

In the absence of J. A. Dewhurst, Mr. Smith also presented the report of the sub-committee on car design. In the discussion which followed quite a number of elements in car design were advanced as being very desirable in modern car design. The suggestions made covered in detail the following:

1. Adherence to A.E.R.A. standard double-truck car design.
 2. Adequate ventilation should be more carefully studied.
 3. Noise reduction should be carefully studied, taking into consideration noises caused by gears, air compressors, brake rigging, etc.
 4. Cars should be designed so that they may easily be kept clean.
 5. Careful attention should be given to interior and exterior finishes.
 6. Giving cars names instead of numbers, as the possibility of stimulating local interest and friendly comment on small properties.
 7. Push buttons should be in convenient reach of every seat.
 8. Cars should be comfortably heated.
 9. Cars should contain a maximum number of cross seats, spaced far enough for comfort.
 10. The question of de luxe seats should be considered.
 11. Cars should be illuminated so as to give the most restful and efficient lighting to passengers.
 12. The design of hand straps, hand stanchions, bell cords, register cords, etc., should be carried out to give the least offense to passengers.
 13. Ample floor space should be provided for passengers during fare payment.
 14. Aisles should be of liberal width.
 15. Circulating movement of passengers should be provided whenever possible.
 16. Side windows should be provided with shades.
 17. Floor levels should be kept down to a minimum.
 18. Double-truck cars are preferable to single-truck cars in selling service, even on the small properties.
- The final report of the session on "Speeding Up Service" discussed eleven points which should be given consideration whenever the question of speed is taken up. Later discussion by the committee emphasized the difference between the viewpoints of the operator and the public on the problem of speed.

The News of the Industry

\$300,000,000 Subway Measure Passed by New York Legislature

Following favorable action by the New York Assembly, the Senate on March 23 passed by unanimous vote the resolution for the constitutional amendment to extend New York City's borrowing capacity by \$300,000,000 for subway construction.

With the passage of the \$300,000,000 amendment came word that Mayor Walker was planning a speaking tour to make sure that people throughout the state should become acquainted with the merits of the proposal before the referendum next fall. He is to open his campaign at Niagara Falls, where he will address the Summer Conference of Mayors on May 31. Several other dates for speaking engagements up-state will be arranged.

Mayor Schwab of Buffalo and Mayor Hanna of Syracuse, both of which cities have stakes in the amendment on account of provisions for increasing their debt limits, will join Mayor Walker on the stump. Since they are Republicans it will be a non-partisan effort to get voters outside of the cities to ratify the measure.

McChord Report on Philadelphia Presented

Charles C. McChord's report on the transit situation of the city of Philadelphia was submitted to the Public Service Commission of Pennsylvania on March 23. He suggests acquisition by condemnation of the underliers of the Philadelphia Rapid Transit Company as a step toward the city's becoming landlord of the existing system. He further suggests "condemnation of the P.R.T." While he apparently regards these steps as essential, he says that the rest of the plan should be carried forward immediately so as to achieve at once the following results:

1. Immediate operation of Broad Street subway without increase in fare.
2. Limitation of P.R.T. earnings to present dividends with payment of all surplus to the city.
3. Provision for increased sinking fund, sufficient by 1957 to purchase the P.R.T.
4. Local initial control by the city of all questions of service, fares and finance.

He would set up as a machinery to accomplish these results a local body with some such name as the Philadelphia Transit Conference Board, to consist of three members, one to be appointed by the city, one by the Public Service Commission and one by the company.

He says that it may be the wisest plan to acquire the underliers by condemnation with borrowed money and to acquire the P.R.T. in 1957 under the 1907 contract option "with the accumulated surplus." He feels that this latter step should be coupled with a definite limitation of dividends and complete control by the city of all

the railway company's surplus earnings.

Through the direct expedient of underlier condemnations Mr. McChord sees an annual saving of \$4,500,000 in the charges against gross revenue. According to him, this saving would be sufficient to permit a substantial reduction in present fares and very possibly an early return to the 5-cent fare "if this is desired."

Mr. McChord and his staff have been engaged in the survey for the last three months. During this same period the engineering bureau of the commission has been at work on a survey of

service conditions of the Philadelphia Rapid Transit Company. A report based on these findings is expected to be filed within the next few weeks.

As the Philadelphia *Ledger* sees it, "the report justifies the hope that it will be made the basis for permanent adjustment of the relations between the city and the P.R.T., for it points the way not only to the lifting of the millstone of the rentals from the necks of the car riders but to a fair division of the cost of the city's high-speed transit facilities between the riders and the taxpayers."

Kansas City Franchise Passed

New 30-Year Grant in Favor of Kansas City Public Service Company Signed by Mayor—Reduction of Fares Effective Upon Franchise Acceptance

BY a unanimous vote on the night of March 21 the City Council of Kansas City, Mo., granted a new 30-year franchise to the Kansas City Public Service Company. Mayor Albert I. Beach signed the document. It will become effective on March 31, if accepted. The new franchise replaces the old franchise of the Kansas City Railways, known as the Jost franchise and passed in 1914 in the Jost administration.

Under the terms of the new grant a small reduction in fares is to be made immediately upon acceptance of the grant. The new rates will be fifteen tickets for \$1, ten tickets for 70 cents. Until acceptance present fares, at the rate of two tokens for 15 cents and a cash fare of 8 cents, will remain effective. When purchased in the form of tickets in the larger quantities, fares will be one-third of a cent less than the present rates.

The city administration was for a time loath to grant any new franchise or an extension of the old one. With a change in the character of city government last summer, the new City Council granted a twelve-year extension to the Jost franchise, but a demand arose for a public referendum in the matter. Subsequently, the officials of the Kansas City Public Service Company asked that an entirely new franchise, mutually satisfactory to the city and to the operating company, be drafted and passed.

Since that time a special franchise committee of the City Council has been engaged in drafting a new instrument, details of which have been up for discussion almost every week in hearings to determine the public attitude toward the various tentative provisions of the new grant.

W. G. Woolfolk, president, has indicated that the Kansas City Public Service Company will accept the franchise at once.

Some of the principal provisions of the new franchise follow:

Time limit of the grant is 30 years, replacing the old franchise, which had eighteen years of unexpired term.

Bus franchise is considered separate from this grant, the company being required to follow the provisions of the present bus grant, which has an unexpired term of 1½ years.

No valuation on the properties is stipulated, but a return of \$2,000,000 a year is permitted, plus 8 per cent on any new capital invested.

Fares are to be: Fifteen tickets for \$1; ten tickets for 70 cents; two tokens for 15 cents and one cash fare for 8 cents; conductors on all cars to have the \$1 books of tickets for sale.

The universal transfer system must be continued after the manner now in vogue here.

In accepting the franchise, the company agrees to consider income from the fare schedule of the franchise sufficient compensation, without recourse to the State Public Service Commission for increase in fares.

When the fare-reduction fund reaches an amount of \$100,000, fares must be reduced by one-sixth of a cent; any surplus over the stipulated \$2,000,000 a year and 8 per cent of the new investment must be added to the fare reduction fund.

The company must spend \$6,600,000 on the property within the next three years, half for betterment of the service and equipment and half in repairs only. The first of these amounts is to be added to the capital account, but not the second.

Ordinary maintenance and repairs are to be taken care of by setting aside 16 per cent of the gross income each year, in addition to the \$3,300,000 mentioned in the preceding paragraph, the unused amount of the 16 per cent to revert to the fare reduction fund.

Before the company may undertake any program of extraordinary maintenance, and then only in great emergencies, it must set aside a reserve fund of \$400,000, interest on which, at 5 per cent per annum, must be paid into the fare reduction fund.

Two members of the company's board of directors are to be appointed by the city. Violation of any single provision will be sufficient reason to rescind the entire grant upon a vote of the City Council.

The company may mortgage its property up to \$17,500,000 plus 75 per cent of new capital invested.

Possible proceeds from the sale of any of the property are to be spent in improvements of the remaining property and cannot be considered in the capital account upon which the 8 per cent dividend is allowed; while such proceeds remain unspent as provided, the company must pay

5 per cent of the amount per annum into the fare reduction fund.

Should extraneous causes increase the average operating costs by 5 per cent in any one year, the company may apply to the Public Service Commission for an increase in fares.

Paving Relief Measure Lost in Grand Rapids

Despite the loss of the measure to relieve the Grand Rapids Railway, Grand Rapids, Mich., from some of the costs of paving between its tracks, submitted to the voters on March 7, the Grand Rapids *Herald* regards it as a far cry from the old days of universal antipathy to public utilities to the results of the election, "when 3,375 out of 7,987 who voted favored a measure for relieving the railway from a tax load." The *Herald* says that "twenty years ago no scheme that offered even a crumb to any utility corporation could have hoped for one out of ten votes in a municipal election, whereas Monday's results show more than 40 per cent favorable to the railway."

The proposal lacked only 815 votes to carry, being a majority proposition. Analysis reveals that the adverse vote was probably due to the short time permitted for the railway's campaign, after the issue was initiated, in which to inform and educate the voters. The wording of the amendment also is believed to have had something to do with negative voting. City officials and prominent citizens supported the amendment by speaking in its behalf, but they were faced with an optional clause in the amendment that left a doubt in the mind of the property owners of how the cost was to be apportioned in all paving contracts. This was difficult to wipe away. The belief exists now that even if there had been a clean-cut elimination of costs with the paving expense charged to the general tax fund, the result might have been different.

The day of the election was not conducive to voting. It was so rainy and dismal that many women voters friendly to the company were kept away from the polls. Another thing, a 2½ mills tax levy to aid the city in meeting major improvements was initiated just before the primaries and injected a factor into the campaign.

In commenting the *Press* said:

The *Press* is of the belief that when voters have been cured of the delusion about a "guarantee" and are able to look at this problem in the right light, it will not be difficult to change the slight minority of Monday's balloting to a majority. But that will require a greater interest on the part of intelligent citizens than was displayed in the turnout at this primary.

The *Herald* said:

Upon the matter of paving between street car tracks, the probabilities are that the point which was deemed strongest in favor of the proposition is the real cause of its defeat. Those who advocated the charter amendment pointed out that it would not assuredly remove the paving burden from the railway, but rather would place upon the City Commission the responsibility of deciding each individual paving project separately. Commissioner Sweet, who earnestly advocated the amendment, believed that the railway should continue to pay for paving on residence streets. But there was nothing in the proposed amendment which guaranteed such procedure. That being the case, the voters, in order to protect owners of residence property on car lines from being burdened with increased taxes, voted against the plan.

Decision Becomes Indecision in Iowa One-Man Car Issue

When the Iowa Supreme Court on March 15 handed down a decision affirming Judge Joseph Meyer of the Polk County (Iowa) District Court, who ruled in favor of the local street car men's union in their fight to prevent the institution of one-man car service by the Des Moines City Railway, it was thought the question was settled until 1940, the date of the expiration of the two-man car agreement between the car men and the traction company. But when the high court on March 19 withdrew the opinion "for correction" it was discovered that the justices had disposed of the one-man car controversy by quoting a section of the street railway franchise of 1916, which was succeeded and replaced by the new franchise adopted in 1921 and under which the Des Moines City Railway is now operating. While the court in its brief order withdrawing the opinion give no inkling of what changes it intends to make in the ruling, it is believed by attorneys familiar with the case that the court may be forced to reconsider the entire one-man car controversy and to decide it on its merits.

The franchise of 1916 provided "that in the operation of its railway by electricity each motor passenger car shall be in control of a motorman and a conductor." In the corresponding section on motive power in the 1921 franchise this clause does not appear. Neither is it contained in any other section of the franchise. Obviously, the court overlooked this in making its decision. Referring to the discarded franchise of 1916, the court emphasized that as long as the wording of the franchise was practically identical with that of the contract between the men and the company "all parties are bound thereby," and the court finds "no ground for equitable intervention." In this manner the court passed by the question of public policy raised by the company, which contended in its arguments before both the District Court and the Supreme Court that in a city where a service-at-cost franchise is in effect any contract which prevents the city from instituting economies which would result in lower fares contravenes public policy.

The one-man car recent decision was referred to in the *ELECTRIC RAILWAY JOURNAL*, issue of March 19, page 548.

Through Service on Fox River Line

The Aurora, Elgin & Fox River Electric Company installed half-hour through service from 6 a.m. to 11 p.m. connecting Aurora, Elgin and Carpentersville on March 20. John W. Gunderson, general manager, said the new schedule was in keeping with the company's policy to extend and improve its Fox River Valley service. Eight of the regulation interurban cars went into service, all one-man operated. Recent wage increases were in the nature of recompense for the added duties. Fares are scaled to the zone system, the passenger upon entering the car paying fare to a zone and upon leaving the

car returning the stub to the operator. Coincident with this service, a de luxe motor coach system is to be put into effect between Elgin and Aurora, with a running time of an hour. A Fageol motor coach has been added to the equipment. Only one or two stops will be made between the terminals, affording faster time than the half-hour interurban system.

North Shore Announces Rate Increase

An increase in interstate passenger rates on the Chicago North Shore & Milwaukee Railroad, Highwood, Ill., from 3 to 3.6 cents a mile has been announced effective at once. The new rates are made effective by authorization of the Interstate Commerce Commission, acting on the petition recently filed by the company. However, it is announced, round trip tickets between Chicago and Evanston stations and Kenosha, Racine and Milwaukee will be sold at the present rates until April 1. Intrastate commutation rates in both Illinois and Wisconsin are in no way affected by the increase, it is pointed out. The new interstate rates will make the fare one way between the Chicago Loop and downtown Milwaukee \$3.06, the same as on the steam railroads, which is 49 cents more than the present rate of \$2.57.

Charles E. Thompson, vice-president, in commenting on the rate increase said that recent capital expenditures in giving the public additional service through construction of the Skokie Valley route, purchase of new equipment and extensive improvements had made the advance imperative. The new rates merely placed the cost of service on a parity with that of other carriers serving the same territory.

Philadelphia Ordinances Before Commission

Two ordinances passed by the City Council at Philadelphia, Pa., were signed by the Mayor on March 10. The first authorizes the removal of tracks from Filbert Street to make way for the city of Philadelphia-Pennsylvania Railroad boulevard and a \$52,000,000 terminal development. The second gives to the Philadelphia Rapid Transit Company and the Pennsylvania Railroad bus franchise rights on the proposed boulevard. The agreement and bus ordinances now go to the Public Service Commission for approval. Signing of the agreement and ordinance by the Mayor was realized after more than a year of negotiations with the underlying companies of the Philadelphia Rapid Transit holding franchises in Filbert Street. The track ordinance authorizes the removal of rail from Filbert Street between Twelfth and Twentieth Streets. Filbert Street will become part of the Pennsylvania Boulevard connecting Broad Street with the new West Philadelphia station of the Pennsylvania Railroad. The Pennsylvania officials refused to carry out the improvement unless the tracks were removed. Abandonment of the plans meant that the plans for beautifying the city would fail.

New Jersey Paving Bill Becomes a Law

Senate bill No. 82, relative to paving obligations by electric railway companies, was passed on March 22 by the New Jersey Legislature over the veto of Governor Moore. The bill, which becomes a law immediately, states that whenever any street railway or traction company disturbs the pavement of any street, road or highway for the construction, reconstruction, repair or removal of its tracks it must pay for the restoration of that pavement, including the base or foundation.

Work must be done to the satisfaction of the board or body having charge of such street, road or highway. A clause says that whenever any part of the pavement between the tracks and 18 in. outside of any street upon which is located the tracks has been or shall be damaged by reason of the operation of railway cars and such company at the time of the passage of this act is obligated to repair such damage and fails to repair, any state board or any political subdivision of the state having control of any such street may apply to the Board of Public Utility Commissioners for an order directing the company to make restorative repairs and this board is given jurisdiction to determine the reasonableness of any orders given.

Whenever any municipality, board or body having authority to do so shall pave or repave any street upon which are located the tracks of any railway, the company must at the same time and at its own expense put its tracks and track structure in good operating condition, but is not compelled to put down new paving around its tracks. Continuing, the bill reads:

The obligations imposed by this act shall be and are in lieu and substitution of any and all other obligations of any such company to pave, repave or repair any street, road or highway, or to pay any part of the cost thereof except as herein provided, and may be enforced in the same manner as similar obligations are or may be enforced under the laws of this state. Nothing herein contained shall be construed to relieve any such company from the repayment of any money which has heretofore been advanced or expended by any state, county or municipal board or body having control of streets, roads or highways, for any paving heretofore done under and by virtue of a specific contract or agreement made and entered into between any such board or body and such company providing for the repayment thereof, but the obligation for such repayment shall be and remain enforceable as if this act had not been passed.

Prizes Offered for Buffalo High School Art Students

An art poster contest open to all students of Buffalo high schools is now under way, conducted by the art department of the public schools and the International Railway, Buffalo. The contest closes March 25. The winner will be announced on April 1. Prizes will be awarded as follows: \$25 first prize, \$15 second prize and \$10 third prize. The designs submitted are to be in two colors of suitable size for display purposes in the company's cars. The subjects selected are to be some interesting or outstanding points of Buffalo or the Niagara Frontier which can be reached by I.R.C. cars or buses. The purpose of the contest is to stimu-

late interest in the scenic and historical points in Buffalo and the Niagara Frontier.

North Shore Line Erects Illuminated Signboard

In carrying its message of speed to the public traveling between Chicago and Milwaukee the North Shore Line is using a novel advertising medium in the shape of a "scene in action" sign. It is an electrically illuminated sign, the high-speed electrically operated train being painted in colors on glass. A patented disk revolving around the light to the rear makes the train appear in motion, "full speed ahead." These signs are being displayed with telling effect in various stations and store windows throughout the territory served by the company.

M. O. Advocates Urge Traction Fund for Car Line Purchase

Appropriation of the \$45,000,000 traction fund of the city of Chicago for the purchase and construction of local street car lines, as opposed to its use for downtown subway building, is the plan advocated by the Detroit Traction Plan Purchase Club in a report issued on March 8 announcing its proposal for solving the city's transportation problems by resort to municipal ownership.

In launching a campaign for city ownership of the entire surface lines system, the club, which was organized in January, urges that the city acquire these properties on the same basis the city of Detroit purchased its railway lines in 1922. According to the club's report, no constitutional amendment or new legislation, such as required by the joint surface and elevated lines franchise which is now awaiting action in the City Council, would be necessary in event of purchase by the city. Neither would it be necessary for the city to borrow money to make initial payment, if the traction fund should be appropriated, it is urged.

The plan proposes that the city take over the lines under contract, the companies to retain title until the property is paid for in installments from earnings. The purchase price would be the actual cost of the property now used and useful for street railway purposes, less depreciation from time to time.

In the purchase plan, it is also suggested that the present \$16,000,000 depreciation reserve of the companies be deducted from the suggested \$75,000,000 valuation, leaving a purchase price of \$59,000,000. The municipal ownership advocates would have the city pay \$40,000,000 from the traction fund as down payment, leaving \$19,000,000 to be paid off in installments from operating profits. The remainder of the traction fund, they maintain, could be used in making immediate extensions and improvements.

With the estimated net receipts of \$12,000,000 of the surface lines, the remaining \$19,000,000 of the purchase price could be paid off in about five years, the plan suggests, and "leave over \$7,000,000 a year to use in making extensions, improvements and renewals from earnings."

Akron Rerouting for Economy

Beginning March 16 the first of the proposed rerouting changes in the bus transportation system of the Northern Ohio Power & Light Company, Akron, Ohio, became effective. Changes were made in the Summit Hill, Diagonal Road and the Brown Street-Lover's Lane line.

In discussing the changes in the issue of *Service News* for March 19 the company says:

Every car and bus rider in the city of Akron is interested in keeping down fares. So is the Northern Ohio Power & Light Company!

The lower car fares can be kept the better off all of us are. It is a community interest.

Because of this a number of changes have been suggested in an effort to cut down the mileage that has been growing more and more month by month without a corresponding increase in riding. By cutting down the mileage, costs can be reduced and this naturally helps hold down fares. At the same time headways can be improved without much additional expense if the present duplication of service is eliminated.

Accidents Reduced in New Orleans

Street car accidents in New Orleans, La., have virtually been cut in half since April, 1924, when the New Orleans Public Service, Inc., started its safety first campaign. The company awards a safety pennant to the carhouse which shows the lowest percentage of accidents each month. Thus far the Poland carhouse has won the pennant fifteen times and the Canal carhouse twelve times. Reduction of accidents in last four years' is shown in the following figures announced by the company:

	1926	1925	1924	1923
Street car accidents.....	4,729	5,774	7,260	8,509
Accidents per 100,000 passengers.....	3.5	4.4	5.58	6.36
Accidents per 100,000 car-miles.....	34.1	41.8	52.2	58.3

Vote of People Required in Tacoma

Mayor M. G. Tennent and the City Council of Tacoma, Wash., have signed an agreement not to enter into a purchase contract with the Tacoma Railway & Power Company without a vote of the people, nor to relieve the company of any franchise requirements, nor to increase the tax levy above that of the current year. The resolution was offered to kill all sorts of misleading statements made during the recent city charter campaign. Franchise requirements, which it is promised will not be altered without direction of the voters, are those regarding gross earnings tax, pavement between and along tracks and payment of half the cost of bridges.

"Street Railways—Major Method of Passenger Transportation"

Attention has been called by the New York Trust Company, New York, in the March issue of the "Index" published by it, to the present status of electric railways. The writer reminds his readers this is still the major method of transporting passengers. Among other things the item includes a summary of the operating statistics of the 327 principal companies given in the bulletin of the American Electric Railway Association.

Brady Awards to Be Continued

Nicholas F. Brady has authorized the resumption of the Anthony N. Brady Memorial Medal awards, through the American Museum of Safety, to the American electric railway organization which does the most to conserve the safety and health of the public and its employees. The next award will be for the year ended Dec. 31, 1926. As in previous years, the American Electric Railway Association is giving its entire co-operation. A committee has been appointed from within the industry to determine the conditions of the competition; there is also to be a committee to pass on the award.

completion. The structure, which has seen 25 years service, will be replaced by a \$250,000 passenger station for patrons of the West Side elevated lines and the Chicago, Aurora & Elgin interurban line.

The new terminal has many unusual features. The waiting room will be on the third floor at train level. On the mezzanine floor will be a ladies' restroom, men's smoking room and trainmen's room. Space on the main or street floor will be given over to a ticket office, telephone booths, restaurant and concession counters.

A block-long, glass-enclosed steel bridge is to be erected along Wells Street, linking up the new third rail terminal and the Quincy Street station on the "L" loop. This means that passengers will be able to disembark from "L" trains at Quincy, walk a block sheltered from the weather, and step on to their suburban trains without descending to the street level.

Terminal Under Construction in Seattle

Active construction on the proposed \$500,000 interurban and bus terminal for the Pacific Northwest Traction Company in Seattle, Wash., has been started by the engineering department of Stone & Webster, working under the direction of W. D. Shannon, chief engineer. This terminal, to be built for the subsidiary company of the Puget Sound Power & Light Company, maintaining head offices in Seattle, and of which Alton W. Leonard is president, will be of fireproof, class A construction, covering an area 62 ft. x 260 ft., two stories in height. It will be located on the south side of Stewart Street, covering a block from Eighth to Ninth Avenue.

Plans for the improvement were prepared by John Graham, a Seattle architect, who has designed other utility structures, including substations for the Puget Sound Power & Light Company. Mention of this project has been made previously in the pages of the ELECTRIC RAILWAY JOURNAL.

Work Started on \$250,000 Chicago Terminal

Razing of a famous landmark of downtown Chicago—the Wells Street terminal of the Chicago Rapid Transit Lines, near Quincy Street—is nearing

Vote in Detroit Deferred

The plans of the Rapid Transit Commission to bring the question of subways before the voters of Detroit, Mich., at the April 4 election have been delayed. Action rescinding authority to submit the proposal was taken after Mayor Smith had pointed out possible obstructions. The plan was to construct and equip the so-called Woodward-Fort and Grand River-Griatiot subways at a total cost estimated at \$125,000,000.

The Rapid Transit Commission acquiesced in the suggestion, but expressed regret that conditions seemed to make the action necessary. Mayor Smith stated that the complete lack of interest on the part of the people at the election on March 7, together with questions that have been raised, tending to cloud the issue in their minds, moved him to ask the postponement. It is further cited by the Mayor that the employment situation in Detroit is such that the mental attitude of voters might be unfavorably influenced toward undertaking large city projects.

The Rapid Transit Commission was commended by Mayor Smith for its work. He said that the recommendation for a postponement was in no way to be considered as disapproving its labors. The commission will continue its work and if, in the fall, untoward conditions do not exist the matter will be brought up again for the consideration of the Mayor and City Council with a view to putting the question to a vote.

It was the feeling of some of the city officials that the proposal was not sufficiently understood by the public to assure a favorable vote. The plan was condemned by the Mayor's finance committee in a recent report which urged that nothing be done until further study had been made. Full-page advertisements were being run in the local papers indicating the routes of the proposed system, the distribution of total cost between general taxation, special assessments and mortgage bonds, and the application of the special proximity assessments and the scale of rates recommended.

Last Five-Cent Fare Line in Massachusetts Passes

The last electric railway in Massachusetts operating under a 5-cent fare notified the State Department of Public Utilities on March 15 that its financial condition will no longer permit such a fare and that it proposes a new fare schedule to become effective on April 15. The road is the Union Street Railway, New Bedford, which has continued the low fare except to Dartmouth and Westport, where the fare has been 10 cents long after all other electric railways increased rates. It now proposes to charge a 10-cent fare throughout.

Under the old fare the company has sold tickets at the rate of twenty-one rides for \$1, except to Dartmouth and Westport, where the ticket rate has been 7½ cents per trip. The tickets to Dartmouth and Westport will be continued at the same rate, but the strip tickets in the territory generally will be sold at the rate of four rides for 25 cents, or 6¼ cents per ride.



Interurban and bus terminal to be erected in Seattle

California Companies Seek Fare Increase

The Peninsular Railway, operating in the vicinity of San Jose, has applied to the Railroad Commission for an increase in rates. It alleges that the present rates are inadequate, that the utility had a net operating loss during 1926 of \$90,952 and that its properties have a reproduction cost as of Dec. 31, 1926, of \$4,525,082. Applicant asks the Railroad Commission to establish rates that will produce a fair return upon its investment in addition to operating expenses and fixed charges.

The San Jose Railroads, operating a street railway system in the city of San Jose and vicinity, has applied to the Railroad Commission for an increase in rates, alleging that it had a return during 1926 of only \$12,245 and that its properties are estimated to have a reproduction cost as of Dec. 31, 1926, of \$1,588,099. The commission is asked to establish rates that will produce a net return of 8 per cent.

The Stockton Electric Railroad has applied to the Railroad Commission for an increase of its rate of fare on its lines in the city of Stockton and vicinity, stating that the present fares do not produce a reasonable return upon the investment. The applicant sets forth that its properties have a reproduction cost new as of Dec. 31, 1926, of \$1,160,461, and that it had a net income during 1926 of \$30,089. It seeks a fair return upon the investment.

News Notes

Continuance of Sale of Tickets Ordered.—The Public Service Commission of Pennsylvania on March 8 instructed the Schuylkill Railway, Pottsville, Pa., to continue to sell reduced rate ticket books containing seventeen tickets for \$1. The order was issued following a complaint of the Merchants' Association of Shenandoah and the Borough of Shenandoah against a new tariff rate in which the company planned to discontinue the sale of tickets.

Men Seek Wage Increase.—Trainmen of the Memphis Street Railway, Memphis, Tenn., are seeking a wage increase of 10 cents an hour. Under the contract signed last year, the wage section of which expires on April 1, the scale in cents per hour is, first year men, 47½; second year men, 52½, and third year men and older, 57½. Sections of the contract pertaining to working conditions will remain in effect for another year.

New Station Opened.—The new Seventh Avenue station of the Queensboro subway, operated by the Interborough Rapid Transit Company, New York, N. Y., was opened officially on March 23 under an order of the Transit Commission. The service which formerly terminated at Fifth Avenue will be continued to Times Square. It seems destined to become one of the most important transfer points in the rapid transit systems. The platform is 480 ft. long and extends under 41st Street

from Broadway to a point west of Seventh Avenue. At present the Queensboro subway and its branches carry about 28,000,000 passengers a year.

Wage Increase in Aurora.—Employees of the Aurora, Elgin & Fox River Electric Company, Aurora, Ill., have accepted the two-year contract offered by the company, which gives them an increase of 2 cents an hour to a 62-cent basis for city force employees and a 4-cent raise to 64 cents for interurban employees. The present contract expires on June 1.

No Opposition to Fare Increase.—No protests were presented at the hearing before the Public Utilities Commission of Utah, at Ogden, on March 14 of the Bamberger Electric Railway's request to raise one-way and round-trip first-class fares between Salt Lake and Ogden 10 per cent. Officials of the road announced that the increase would not affect student tickets. They also testified that the present revenue falls short of bringing in 6 per cent on the investment by fully \$150,000 a year. The increase, they said, will bring in only an additional \$12,000 a year. It is understood that the road expects its bus line to ease the burden to some extent.

Fare Testimony in Council Bluffs.—Special Master Claude R. Porter began collecting testimony on March 1 in the federal court at Council Bluffs, Iowa, pertaining to the fare issue of the Omaha & Council Bluffs Street Railway. In 1924 the company obtained an injunction restraining the city of Council Bluffs from interfering with increased fares the company proposed to put into effect. The city thereupon took an appeal to the United States Circuit Court of Appeals and this court sustained the injunction. The reasonableness of the fares is now up for determination. The issue involves the value of the property used in the public service, revenues, expenses and net income.

Traveling Habits Will Be Disclosed.—Information on the traveling habits of the shoppers of South Bend, Ind., is to be sought shortly by the Chicago, South Bend & Northern Indiana Railway in co-operation with five large department stores in South Bend. Each patron entering one of the stores will be asked by girls stationed at the entrance: "How did you come downtown to shop today? Did you walk, come by automobile, come by bus or on the street car?" The answers will be checked on a form and in this way it is expected accurate information on how people go to shop will be obtained. The totals will be made public when they are completed.

Motorman Honored.—Clarence Hayworth, a motorman in the employ of the United Railways & Electric Company, Baltimore, Md., has been awarded \$50 for making the best record among the employees of the company in rendering painstaking, helpful public service. The award of \$50 is made anonymously by "Citizen," who also made awards for bravery to members of the fire and police departments and an employee of the gas and electric company. The year for which the

awards are made ended March 1. Mr. Hayworth was selected specifically for the assistance he rendered elderly persons, especially women, in boarding and alighting from his car. It was said that on one occasion he left his car to assist an aged woman into a church. The award is the fifth that has been made by "Citizen" and on each previous occasion it went to a conductor with one exception, when it was given to the operator of a one-man car.

Students Paint Car.—Students of Rice Institute at Houston, Tex., have painted and decorated a car of the Houston Electric Company in regular operation on the line that serves the

morning for the purpose of listening to lectures and discussing various subjects in connection with their own work. The lectures cover various subjects of broad scope, given by prominent citizens of Salt Lake City. Trainmen and other employees are invited to attend these meetings.

Commotion Over Fitchburg Line.—Following a request from the City Council of Fitchburg, Mass., that the Worcester Consolidated Street Railway hold in abeyance its plans to discontinue the line from Fitchburg to Worcester, Clark V. Wood, president of the company, has sent word that the request will be taken before the board of directors. Efforts are being made to have the city of Fitchburg take over the line from Fitchburg as far as Leominster. The present uncertainty as to whether the line will continue has caused widespread interest in Leominster and Fitchburg. In Leominster four petitions have been received from bus men who want to operate over the Consolidated territory in that city, but action has been held in abeyance pending developments. In Fitchburg the City Council has instructed the members of the public safety committee to do all in their power to prohibit the discontinuance of the railway either temporarily or permanently.

Recent Bus Developments

Railway at Indianapolis Said to Seek Coach Company

Details of contracts for purchase of the Peoples Motor Coach Company, Indianapolis, Ind., by the Indianapolis Street Railway are being worked out, it is said. The bus company now operates four main lines, some in direct competition with the railway's own motor bus routes, and has petitions before the Indiana Public Service Commission for other lines. It is said the railway would take over the buses and all leases and assets of the coach company and assume responsibility for payments of \$100,000 on buses.

It was learned that the general value of the buses such as those used by the motor coach company has been held at about \$10,000 to \$12,000 each. With a total of 37 buses the value of the physical property of the company would be approximately \$440,000, leaving approximately \$60,000 to be charged to garage equipment and supplies and good will and for the certificate, if the price of \$500,000 which has been mentioned is agreed upon for the deal.

Truck Competition Hearings Held in Chicago

The Illinois Commerce Commission is soon to decide if it shall establish the precedent of permitting motor truck systems to operate as freight-hauling agencies in competition with railroads, as a result of a hearing on petitions which opened in Chicago on March 10 before Commissioner J. Paul Kuhn. Complaints have been filed by several railroads operating out of Chicago against the operation of the Interstate Trucking Company without a certificate of necessity and convenience from the commission. The trucking company has filed a petition for such a certificate.

Rules Buses Operating Through Park Are Poor Man's Rolls-Royce

The Minneapolis, Minn., park board acted "reasonably and within its rights" when it gave bus companies the right to transport passengers over city parkways upon payment of a tonnage fee to the board, according to a district court decision. The ruling was made in connection with the motion of A. S. Dowdall, as citizen, to have the fee ordinance voided.

"The parks and parkways of the city," Judge Leary declared in his decision, "are for the recreation and enjoyment of the public—for those who can view their beauties as well from a bus as from a Rolls-Royce."

The bus concession ordinance, Mr. Dowdall contended, not only is a menace to the rights of the public but also extends to commercial transportation companies privileges beyond the powers and contrary to the traditions of the Board of Park Commissions.

The ordinance in question was passed by the park board in November of last year. It grants bus companies the right to operate through the city parks or parkways upon receipt of a permit and payment of a fee at the end of each year. This fee is limited to a minimum of \$10 and a maximum of 20 per cent of the state motor vehicle tax for the particular bus.

Buses Will Replace One-Man Cars.—The Portland Electric Power Company, Portland, Ore., will substitute buses for the present one-man cars now in operation in the Parkrose district. The Parkrose line is to be torn up to make way for a new paved roadway along the east end of Sandy Boulevard.

Would Substitute Buses.—The Public Service Commission has granted the petition of the Westchester Street Transportation Company, Inc., to substitute buses for street cars on what is known as the Rosedale route in White Plains. At the hearing of this application, it was shown that by the use of buses connections could be made with the New York, Boston & Westchester line.

Would Extend Bus Service.—Expansion of the bus system of the Rochester lines of the New York State Railways is indicated in the petition to extend its Rochester-Penfield line to the villages of East Penfield and Marion and a movement for bus service in the Ridge-way Avenue section of Rochester. The petition for extension of the Penfield line was made to the Public Service Commission by the Rochester Interurban Bus Company, a subsidiary through which the railway operates its interurban bus system. Citizens of Ridge-way Avenue have applied to the Council for bus service.

New Service Schedule May Be Installed.—The Connecticut Company may install permanently a new type and schedule of service between New Britain, Conn., and Berlin, Conn., if the trial service started on March 6 meets the general requirements and approval of the traveling public. Under the plan buses will leave New Britain every twenty minutes and every other bus will continue to Meriden, as at present, but will operate through Franklin Square, New Britain. Service by trolley will be used to Berlin only when the traffic is heaviest.

Abandons Coach Lines.—The Pacific Electric Railway, Los Angeles, Cal., has been authorized by the Railroad Commission to abandon operation of its Clearwater-Bellflower, its Rosemead-San Gabriel and its Del Mar-New Avenue coach lines. It was decided these lines were not required by public convenience and necessity. The railway has also been authorized to discontinue operation of its coach service between Twentieth Street and Long Beach Avenue in the city of Los Angeles and the Union stock yards.

Bus Services Enlarged.—The Sioux Falls Traction System, Sioux Falls, S. D., has taken over the operating rights of the Worthington-Sioux Falls Transportation Company, operating buses between Sioux Falls and Mankato, Minn., by way of Worthington, according to R. C. Mills, manager of the railway. The company plans to put on its own equipment about April 1, Mr. Mills said, and will add this line to its expanding motor coach service. The addition of this new route will give the Sioux Falls Traction System a total of 1,726 miles daily on its various intercity motor coach lines operating over six different routes and reaching into four states, South Dakota, Iowa, Nebraska and Minnesota.

Buses to Be Substituted.—The Worcester Consolidated Street Railway has decided to abandon its railway between Worcester and Webster, Mass., and will substitute bus service. The New England Transportation Company, bus subsidiary of the New York, New Haven & Hartford Railroad, is expected to furnish the bus service. It is also announced that the Worcester Consolidated would abandon service over its Blackstone Valley line between Worcester and Woonsocket, R. I. In this case also the New England Transportation Company will furnish transportation by bus.

Must Abandon Bus Service.—The Key System Transit Company, Oakland, Cal., has applied to the Railroad Commission for permission to abandon its bus service between Los Angeles Avenue and Spruce Street, and Alta Road and Spruce Street in Berkeley. This service was established under a franchise granted by the City Council of Berkeley on Sept. 14, 1926, with the approval of the commission, and it was proposed to operate said service for a period of 180 days to determine if the patronage of the line would warrant its continuance. The company reports that the earnings have averaged \$150 a month, while the cost of operation has averaged approximately \$1,160 a month.

Permit Granted.—The Board of Public Works has granted the St. Louis Bus Company, auxiliary of the United Railways, St. Louis, Mo., a permit to operate buses on Watson Road from Penrod Avenue to the city limits. It has taken under advisement the application of the same company for a permit on South Kingshighway between Delor and Devonshire Avenues.

Bus Service Suggested.—Abandonment of the electric railway line connecting Springfield and Worcester, Mass., is proposed. Clark V. Wood, the president of the Springfield Street Railway, has petitioned the Transportation Board in Springfield for bus licenses to replace the trolley service. He said the bus line would parallel the present trolley line through Palmer, Brimfield and Southbridge. The electric line would still be run between Springfield and Palmer, but east of Palmer the removal of tracks and wires was deemed probable. This forms part of the New Haven Railroad's rehabilitation program, he said, and would be put in effect as soon as licenses could be obtained.

Financial and Corporate

Extension of Public Control at Boston Suggested

First official indication from the Massachusetts Legislature is that the public control period of the Boston Elevated Railway, Boston, Mass., will not be extended 50 years, as the Harriman commission proposed. An extension of 25 years is favored by the committees on metropolitan affairs and on street railways, sitting jointly. There are 30 members on these committees and twenty of them are in favor of the 25 years. Ten members may formally dissent. The discussion of the measure, as now framed, will be before the ways and means committee of the Senate.

A financial reconstruction is proposed by the committees along the lines suggested in the Harriman bill. In this refinancing there would be an annual saving of \$1,061,813 in dividends and taxes. It is proposed to issue 4½ per cent 40-year debentures to be exchanged for the 7 and 8 per cent preferred stock; this would save the road \$454,050 annually in dividend payments. Dividends on the common stock are to be reduced from the present rate of 6 per cent to a new rate of 5½ per cent. This would result in an additional saving of \$119,397 a year. The saving on federal income taxes on the preferred dividend would be \$225,920. The state franchise tax, amounting to \$262,375 a year, would be saved.

Out of this annual saving the bill applies \$250,000 to a sinking fund to extinguish the debentures, \$750,000 a year for about three years to pay back what the company owes cities and towns on what they advanced when the company was running behind. After this indebtedness has been paid the \$750,000 would be used for rentals and charges on the Governors Square subway and the Lechmere Square, Maverick Square and Huntington Avenue extensions, and it is suggested that this money be applied also to the purchase of the Revere branch of the Eastern Massachusetts Street Railway.

At present the reserve fund of the company is \$2,132,495. It is proposed to use this to buy new equipment.

Five trustees are provided for, the same number as in the present board, and they would be elected for two, four, six, eight and ten years respectively at the outset, reappointments to be for a term of ten years.

Financial features are made contingent upon the approval of the Elevated stockholders. Their attitude toward the matter is of course not known, but it was argued some weeks ago that they should not be required to make the sacrifices in income return called for in the original 50-year bill, a measure which has been the subject of comment before in the JOURNAL.

Lake Shore Electric Sold

The Lake Shore Electric Railway, Cleveland, Ohio, was sold on March 23 to F. W. Coen and associates by the Union Trust Company, Cleveland, acting for E. W. Moore. Recently the company applied to abandon its line between Sandusky and Norfolk because of decreased receipts. A proposal was advanced to supply the residents of this section with a bus service operated by the Lake Shore Motor Coach Company, a subsidiary organized by the railway.

The Lake Shore Electric Railway, with general offices at Sandusky, covers 183 miles of territory operating in 25 cities and towns. It controls the Lorain Street Railroad and the Sandusky, Fremont & Southern Railway. F. W. Coen, one of the new owners of the line and a former official of the railway, has declared his faith in the future of the interurban in the growing freight business and in the decline in automobile competition owing to parking difficulties in the cities.

\$3,027,694 Net for 1926 in Philadelphia

P. R. T. Gross Revenue, Including Eight Months of Taxicab Operation, Was \$57,196,610—\$20,285 Transferred to Surplus—Estimated Earnings by 1930 Are \$70,000,000

PASSENGER revenue of the Philadelphia Rapid Transit Company, Philadelphia, Pa., for 1926, including subway-elevated, street cars and buses, with eight months of taxicabs, was \$57,196,610. Operating expenses and taxes were \$44,915,254. As usual there was a deficit on bus operation, through providing needed but unprofitable transportation service in the more sparsely settled areas of the city. This amounted in 1926 to \$274,247. Taxicab net income for the eight months ended Dec. 31 was \$198,339, being at the rate of approximately \$300,000 per annum, thus offsetting the deficit from bus operation. After providing for payments to city sinking fund, rental for Frankford elevated, fixed charges, 7 per cent dividend on preferred stock and 8 per cent dividend on common stock, there remained \$20,285 to be transferred to surplus.

In the annual report, issued under date of Feb. 28, the statement is

made that the net income of the entire system for 1926 was \$3,027,694. This figure was, of course, reached by adding to the net income of the Philadelphia Rapid Transit Company the net earnings of the taxicabs and subtracting the deficit due to bus operations.

During 1926 the company made considerable progress toward its goal of a fully rounded system of co-ordinated transit. It now co-ordinates every phase of Philadelphia's public passenger transportation, operating about 660 miles of surface track, 39 miles of elevated and subway track and 362 buses over a system of routes in Philadelphia which totals 244 miles and also connects Philadelphia with New York, Atlantic City, Baltimore, Washington and intermediate points. As a necessary step in co-ordination P. R. T. entered the field of taxicab operation by the purchase of the Yellow Cab Company, Philadelphia, for \$3,000,000. More than 1,100 cabs are now operated,

INCOME ACCOUNTS OF PHILADELPHIA RAPID TRANSIT SYSTEM AS COMPARED BY THE "ELECTRIC RAILWAY JOURNAL"

	1926	1925
Gross passenger earnings.....	\$57,196,610	\$49,911,702
Other operating revenue.....	830,942	691,883
Total.....	\$58,027,552	\$50,603,585
Maintenance and depreciation.....	\$9,278,331	\$8,760,903
Power operation.....	3,613,393	3,738,720
Conducting transportation.....	20,566,841	16,612,472
General.....	8,047,590	5,350,881
Taxes, including paving tax.....	3,409,097	3,070,879
Total.....	\$44,915,254	\$37,533,858
Operating income.....	\$13,112,298	\$13,069,727
Non-operating income.....	707,505	416,857
Total.....	\$13,819,803	\$13,486,585
Frankford Elevated rental and sinking fund—city contract.....	867,610	648,119
Total.....	\$12,952,193	\$12,838,466
Fixed charges, dividends, etc.....	\$12,931,918	\$12,525,459
Surplus.....	\$20,285	\$313,006

STATEMENT OF CAPITALIZATION AND INDEBTEDNESS OF THE PHILADELPHIA RAPID TRANSIT COMPANY AS OF DEC. 31, 1926

Capital Stock	Paid In	Unpaid	Total
Common.....	\$29,996,235	\$3,765	\$30,000,000
7% cumulative preferred.....	13,982,600	4,017,400	18,000,000
Total.....	\$43,978,835	\$4,021,165	\$48,000,000
Funded Debt:			
Collateral trust 5 per cent bonds due 1957.....			\$4,108,000
Sinking fund 5 per cent gold bonds due 1962.....			576,000
Sinking fund 6 per cent gold bonds due 1962.....			8,933,000
Equipment trust series "D" 1919-1929.....			27,000
Equipment trust series "E" 1919-1929.....			87,000
Equipment trust series "F" 1922-1932.....			1,800,000
Equipment trust series "G" 1923-1933.....			3,325,000
Equipment trust series "H" 1924-1934.....			2,160,000
Equipment trust series "J" 1926-1936.....			1,700,000
Real estate mortgage.....			150,000
Total.....			\$22,866,000

*Figures for 1926 include taxicab earnings for eight months while those for 1925 are based solely on electric railway and bus earnings.

STATEMENT OF WAGE TREND IN PHILADELPHIA

Calendar Year	Maximum Hourly Wage, Cents	Passengers Carried per Trainman	Calendar Year	Maximum Hourly Wage, Cents	Passengers Carried per Trainman
1911	23 1/2	72,405	1919	58	137,785
1912	25	77,561	1920	72 1/2	150,785
1913	30	85,762	1921	65	137,432
1914	30	89,790	1922	69	141,528
1915	30	96,106	1923	70 1/2	146,658
1916	32	107,800	1924	71 1/2	148,264
1917	35	113,940	1925	77	148,632
1918	48	120,102	1926	77	151,173

this co-ordination tending to protect the system against the inroads of competitive operation and consequent diversion of earnings to which electric railways are now being increasingly subjected. It was stated that the absorption of all taxicabs in the city, when effected, will work toward the elimination of cruising and a corresponding lessening of vehicular congestion in the streets.

Nine new bus routes, operating 127 miles, had been established during 1925. The system was further added to in 1926 by the installation of nine additional routes, operating 101 miles over city streets—a net addition of 32 per cent to P. R. T.'s route mileage accomplished within two years. In assuming the burden of the deficit incident to its bus operation the company has had in view the necessity of establishing a more complete transportation service to newly developed outlying areas, where population is not sufficient to warrant the expense of car tracks and where rubber-tired vehicles—with a seat for a fare—are necessary to supply a type of transportation more nearly comparable to the private automobile.

The company estimates that the system's earnings should reach \$70,000,000 by 1930, of which 25 per cent may be earned by taxicabs and buses. If bus and cab service had not been developed by P. R. T., it is believed that 1930 would find the company with earnings entirely insufficient to enable it to supply adequate city-wide transit without endangering its own present financial position.

During this present year the company has purchased 218 new gas-electric buses. In 1926 P. R. T. purchased 50 new surface cars and 135 gas-electric buses. More than \$2,000,000 was expended in constructing and equipping track extensions to the Sesqui-Centennial grounds. This was done with the twofold purpose in view of serving the exposition and of pushing forward the development of the too-backward southern section of the city. While the actual number of passengers carried to and from the Sesqui was only about 15 per cent of those for which provision was made, the immediate losses sustained by the company in this respect are not regarded as of a permanent character, but rather as an investment made in advance of the immediate needs of the section served.

The company extended itself during 1926 to meet the views of the city. The bankrupt Frankford, Tacony & Holmesburg Street Railway was taken over to supply increased feeder service to the Frankford "L." A single fare from the city center, by means of a free transfer with the "L," was extended northerly to Rhawn Street and a bus service with 10-cent fare and

3-cent exchange ticket was started to serve the sections from which the non-paying car lines were removed.

At the urgent request of the city the company agreed to increase its rental for the Frankford elevated from \$780,200 to \$936,850 per annum. The city desired that this be done in order that its borrowing capacity might be released to the extent of some \$14,000,000, to accomplish which it was then necessary that the lease be extended to 1957. It was determined by the Public Service Commission to withhold its approval of this lease extension until the completion of its investigation now being conducted into P. R. T. matters. This decision was approved by the company.

Included in the report is a restatement of the three basic principles of Mitten Management, namely:

To the Public: To furnish an adequate system of transportation, operated efficiently and courteously; to improve service to the fullest extent that improvement can be supported by the fare collected, and to offer the fullest opportunity to the car rider to share in the ownership of the property.

To the Employees: To pay wages adequate to the necessities of life and comfort, and sufficient to permit of reasonable savings. To provide opportunity for participation in increased earnings made possible by the increased effort of the employees, and to encourage the investment of this added compensation in such a way as to make the employees owners as well as workers.

To the Owners: To pay a reasonable return on the actual value of P. R. T. property, in justice to those who make P. R. T. possible, and to keep the credit of P. R. T. at a point necessary to support a high standard of public service.

Then follows a summary of accomplishments which have been made under these three heads during the sixteen years in which Mitten Management has been in charge of transportation matters in Philadelphia. These results are set forth in the comparisons shown in the following:

STATEMENT OF INCREASED RIDING IN PHILADELPHIA

Calendar Year	Revenue and Transfer Passengers	Rides per Capita
1911	517,697,478	329
1912	549,674,683	343
1913	580,011,057	357
1914	581,297,949	352
1915	594,220,409	354
1916	669,008,258	392
1917	726,936,340	419
1918	763,008,395	432
1919	866,944,336	483
1920	908,482,135	501
1921	836,547,351	451
1922	848,883,512	450
1923	918,775,871	480
1924	913,855,751	469
1925	926,928,994	468
1926	966,469,223	480

The P. R. T. report for 1926 is concluded with a reprint of an article on the "Underlying Companies of the City Transit System," by Edmund Stirling, a local newspaper authority on transit matters, which appeared in the *Public*

Ledger. There has been much agitation in Philadelphia to eliminate the "underliers" and with them the heavy rentals which P. R. T. must pay each year. Whether this latter step could be accomplished without heavy payments which would wipe out any savings is frankly questioned, but, at any rate, P. R. T. officials, city authorities and the general public are all agreed that some step should be taken to place the original franchises and charters, now controlled by the underliers, under a unified ownership. To dispel the false notion that confiscation proceedings could be instituted against the underlying companies, P. R. T. has quoted Mr. Stirling, in part, as follows:

The fairness and equity of these rentals are not here an issue. It is well known that the grant of the charters was in many instances clouded by corruption and the execution of the leases was attended by the infusion of a vast amount of water. Some of the contracts were deliberately made to escape tax and other legal obligations of the companies. But these maneuvers were all carried through under the forms of law,

INCREASED RETURNS TO STOCKHOLDERS OF THE PHILADELPHIA RAPID TRANSIT COMPANY

Calendar Year	P.R.T. Surplus	Preferred Per Cent	Common Per Cent
1911	\$358,250		
1912	260,236		
1913	676,849		
1914	930,564		
1915	1,128,017		
1916	2,987,975		\$1,348,656-44
1917	4,345,900		1,499,277-5
1918	4,482,119		1,499,290-5
1919	4,482,532		1,499,290-5
1920	4,195,356		
1921	5,748,980		
1922	5,640,664		1,799,148-6
1923	5,616,833		1,799,148-6
1924	5,652,582		1,799,575-6
1925	6,178,916	\$60,871-7	2,399,639-8
1926	6,489,188	607,766-7	2,399,644-8

and the validity of the contracts and leases has been repeatedly confirmed by legislative action.

Had their legal status been assailed at the time, something might have been accomplished toward lifting the burden of excessive fixed charges from the car riders. But while the crookedness of transit policies and the selfishness of the financing methods of the street railway owners were notorious, the people went on electing officials who gave these transactions a binding force.

Furthermore, the persons who profited by the juggling of street-railway leases and finances have long since disappeared from the stage. Their holdings were unloaded upon the public, until today it is doubtful whether any of the stocks and bonds of the underliers are held by the descendants of original purchasers. Bought as safe investments, under repeated guarantees, the greater part of them are to be found in trust estates. It is inconceivable that any court today would permit their condemnation at less than their present-day, fair market value. And if the effort to cancel the original charters were to be made, under the state's constitutional right to alter, revoke or annul charters of incorporation, that power and right are definitely limited by the same fundamental law, so that it can only be exercised in such a way that "no injustice shall be done to the corporators."

Few will question the desirability of getting rid of the traction underliers. But only those agents of a selfish propaganda which is designed to confuse the public mind about the real facts of the case have dared suggest this can be accomplished by other than legal means and without doing justice to innocent investors.

Takes Over Another Line. — The United Railways & Electric Company, Baltimore, Md., will take over the Lorraine Cemetery car line on April 1 and improve the service. This line has been operated by the Lorraine Cemetery Company for some time.

New Members Elected to Eastern Massachusetts Board

At the annual meeting of the stockholders of the Eastern Massachusetts Street Railway, Boston, Mass., recently held, the following directors were elected:

Charles Hayden, Lester Watson, Roger Amory, Franklin T. Miller, Albert A. Harrison, Robert B. Stearns, Henry G. Lapham, A. W. Pinkham, L. Sherman Adams and Cornelius J. Corcoran. Only three of the former directors are carried in the new board. They are L. Sherman Adams, Roger Amory and Franklin T. Miller.

Charles Hayden and Lester Watson are members of the firm of Hayden, Stone & Company, which acquired a substantial financial interest in the company after the so-called Adams suit.

Balance in Detroit Shows Increase

The operating revenue of the Department of Street Railways at Detroit, Mich., for the year ended Feb. 28, 1927, was \$24,651,578 against \$23,756,099 for the year previous. These figures included a railway operating revenue of \$22,213,412 and a coach operating revenue of \$2,438,166 in 1927 against \$22,734,840 and \$1,021,058 for a railway and coach revenue respectively in 1926. Total operating expenses increased from \$17,934,835 to \$19,070,140 in 1927. The railway operating expenses decreased from \$16,938,688 in 1926 and \$16,788,206 for the year ended Feb. 28, 1927. Coach operating expenses increased from \$996,147 for the year ended Feb. 28, 1926, to \$2,281,933 for the year

ended Feb. 28, 1927. Net revenue was \$5,858,149 against \$6,019,663 in 1926. Net income fell from \$3,357,854 to \$3,187,287 for the current year. The balance was \$587,060 for the year ended Feb. 28, 1927, and \$571,810 for the year ended Feb. 28, 1926. Total railway passengers numbered 476,716,753 in 1927 and 488,589,883 in 1926. Total coach passengers numbered 13,611,347 in the 1926 period to 30,714,819 in 1927.

Loss in Alliance in 1926

Abandoning buses, scrapping the machines which were practically worthless and disposing of antique equipment during 1926 increased overhead expenses for the Stark Electric Railroad, Alliance, Ohio, to \$153,851 and resulted in a net loss for the year of \$80,141. The financial summary as made public was as follows:

	1926	1925
Gross earnings	\$460,865	\$467,223
Operating expenses	387,155	361,474
Operating revenue	73,709	105,748
Taxes and fixed charges	153,851	113,631
Net Loss	\$80,141	\$7,882

From this summary it is seen that gross earnings in 1926 were nearly \$7,000 less than 1925. Operating expenses last year were about \$26,000 greater than 1925 and fixed charges about \$40,200 greater.

Last year the Stark Electric Railroad, with about 30 miles of track, in addition to the city bus routes in Alliance was patronized by 2,845,996 persons, compared with 2,871,730 persons during 1925. Last year this number was divided, 1,897,101 being carried on interurban cars and 948,895 being carried on

city cars. In 1925 interurban patrons were 1,965,228 and city patrons 906,502.

During the greater part of 1925, when the larger number of passengers were transported, street cars were operated in Alliance on a regular schedule over about 2 miles of city lines. During the latter part of 1925 and the majority of 1926 buses were used.

For 1927 the outlook is very good for a small loss or a possible profit. This is due mainly to steps taken by the company during the last few months. Discarding buses, which proved a loss instead of a gain, and returning to street cars is believed to be a big step in reducing the operating cost due to the large expenses in maintaining buses. At the same time the company abandoned a number of old cars.

Although it serves two cities and one fair-sized town, the Stark Electric operates city cars only in Alliance. Interurban service is run between Canton and Salem, in addition to the city cars in Alliance.

New Directors at Louisville.—At the annual meeting of the stockholders of the Louisville Railway, Louisville, Ky., Ralph C. Gifford, vice-president of the First National Bank, and William C. Campbell, manager and chief engineer of the Kentucky & Indiana Terminal Railroad, were elected directors. S. T. Culver, an interurban motorman, became employee representative on the board, to replace J. J. Blackerby.

Net Income Increases.—For the eight months period ended on Feb. 28, 1927, the total operating revenues of the Brooklyn-Manhattan Transit System, Brooklyn, N. Y., was \$30,714,101, against \$29,522,318 for a similar period of the previous year. Total operating expenses increased from \$19,249,877 to \$19,829,161 for the eight months period ended Feb. 28, 1927. After a consideration of income deductions a net income remained of \$4,137,106 for the eight months ending Feb. 28 of the current year, against \$3,648,345 in 1926.

Line Will Be Abandoned.—General Manager John McIntosh announced recently that in consequence of an annual operating deficit of \$30,000, the Chicago & Interurban Traction Company operating from 63d and Halsted Streets, Chicago, to Kankakee, Ill., will be discontinued before April 30. Failure of the line to pay, he said, was in part due to automobile competition and in part to being forced to pay the same high wage scale as that received by employees of Chicago surface lines. Coincident with the announcement was the granting by the Illinois Commerce Commission to the Schappi Bus Lines, Inc., an Insull company, of a certificate permitting it to operate between Chicago Heights, Halsted and 63d Streets.

Abandonment of Asbury Park Belt Line Authorized.—Abandonment of the inside belt line, operated by the Coast Cities Railway in Asbury Park, N. J., has been sanctioned by the Board of Public Utility Commissioners. Suspension of the service and surrender of charter has already been approved by a municipal ordinance. Evidence indicated the line is not well patronized and is operated at a heavy deficit.

Conspectus of Indexes for March, 1927

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

	Latest	Month Ago	Year Ago	Since War	
				High	Low
Street Railway Fares* 1913 = 4.84	Mar. 1927 7.43	Feb. 1927 7.45	Mar. 1926 7.36	Feb. 1927 7.45	May 1923 6.88
Electric Railway Materials* 1913 = 100	Mar. 1927 152.1	Feb. 1927 154.0	Mar. 1926 156.4	Sept. 1920 247.5	Oct. 1924 148.5
Electric Railway Wages* 1913 = 100	Mar. 1927 226.7	Feb. 1927 226.7	Mar. 1926 224.1	Sept. 1920 232	Mar. 1923 206.8
Am. Elec. Ry. Assn. Construction Cost (Elec. Ry.) 1913 = 100	Mar. 1927 203.0	Feb. 1927 202.9	Mar. 1926 202.0	July 1920 256.4	May 1922 167.4
Eng. News-Record Construction Cost (General) 1913 = 100	Mar. 1927 208.8	Feb. 1927 210.2	Mar. 1926 207.6	June 1920 273.8	Mar. 1922 162.0
U. S. Bur. Lab. Stat. Wholesale Commodities 1913 = 100	Feb. 1927 146.4	Jan. 1927 146.9	Feb. 1926 155.0	May 1920 246.7	Jan. 1922 138.3
Bradstreet Wholesale Commodities 1913 = 9.21	Mar. 1927 12.55	Feb. 1927 12.52	Mar. 1926 13.40	Feb. 1920 20.87	June 1921 10.62
U. S. Bur. Lab. Stat. Retail Food 1913 = 100	Feb. 1927 156.0	Jan. 1927 159.3	Feb. 1926 161.5	July 1920 219.2	Mar. 1922 138.7
Nat. Ind. Conf. Bd. Cost of Living 1914 = 100	Feb. 1927 165.2	Jan. 1927 166.9	Feb. 1926 169.5	July 1920 204.5	Aug. 1922 154.5
Steel Unfilled Orders (Million Tons) 1913 = 5.91	Feb. 28 3.597	Jan. 31 3.800	Feb. 28 4.617	July 31 11.118	July 31 3.187
Bank Clearings Outside N. Y. City (Billions)	Feb. 1927 16.72	Jan. 1927 18.89	Feb. 1926 16.73	Oct. 1925 20.47	Feb. 1922 10.65
Business Failures Number	Feb. 1927 18*9	Jan. 1927 2227	Feb. 1926 1669	Jan. 1924 2231	Aug. 1925 1353
Liabilities (Millions)	Feb. 1927 65.42	Jan. 1927 75.06	Feb. 1926 40.98	Jan. 1924 122.95	Aug. 1925 27.27

*The three index numbers marked with an asterisk are computed by Mr. Richey, as follows: Fares index is average street railway fare in all United States cities with a population of 50,000 or over except New York City, and weighted according to population. Street Railway Materials index is relative average price of materials (including fuel) used in street railway operation and maintenance, weighted according to average use of such materials. Wages index is relative average maximum hourly wage of motormen, conductors and operators on 137 of the largest street and interurban railways operated in the United States, weighted according to the number of such men employed on these roads.

Personal Items

Changes Among Chicago Division Superintendents

Three important changes in the transportation department of the Chicago Surface Lines have been announced by the management. Michael Harrington, who has been in the service since 1884, resigned his position as division superintendent at the Kedzie depot, division No. 7, and took a furlough from the service. R. J. McKinney, division superintendent at Elston depot, division No. 10, was transferred to Kedzie in Mr. Harrington's place, and Walter M. Kroll, assistant superintendent of the tenth district, succeeds Mr. McKinney as superintendent in that district. E. E. Victorson, connected with the downtown supervisory force, was made assistant division superintendent to succeed Mr. Kroll.

Mr. Harrington entered the service as a horse car driver and became a motorman after the electrification of the lines. He was appointed supervisor in 1901 and made foreman at Kedzie depot in 1903. He became division superintendent at Kedzie in 1914 and was sent to the general office as assistant superintendent of transportation in 1923, returning to Kedzie as division superintendent two years later.

Mr. Kroll entered the Surface Lines service as a motorman in 1894 and has been foreman at the Elston depot, assistant superintendent, assistant superintendent of train service employment and division superintendent.

Mr. Victorson entered the service with the track department in 1905 and was transferred to the train service as a conductor in 1910. He served in the army during the World War and upon his return was employed by the Elgin, Joliet & Eastern Railway, re-entering the Chicago Surface Lines service three years later as a starter at the Kedzie depot.

Deane Ackers Local Manager at Topeka

To fill a newly created position Deane Ackers, formerly local manager of the Kansas Power & Light Company's properties at Atchison, has been made local manager of the company's properties in Topeka, it has been announced by A. M. Patten, vice-president and general manager of the company.

Starting in 1924 with the Illinois Power & Light Company, the parent company, Mr. Ackers was made local manager at Atchison, to succeed C. A. Leland, Jr., who had been transferred to Topeka.

A graduate of the school of engineering at the University of Kansas in 1917, Mr. Ackers attended the first officers' training camp and was commissioned a second lieutenant in the infantry in August, 1917. Later he was promoted to the rank of first lieutenant and finally to the grade of captain. He served with the Sixteenth Infantry of the First Division.

After two years overseas, taking part in all engagements with the First Division Mr. Ackers returned to the United States in 1919. He joined the United Power & Light Corporation and had headquarters at Abilene with the position of construction engineer. He was there until 1924, when he joined the Kansas Power & Light Company.

Dr. A. A. Mitten Will Carry On Industrial Democracy

Dr. A. A. Mitten, whose succession to the chairmanship of the executive committee of the Philadelphia Rapid Transit Company, Philadelphia, Pa., was referred to in the *ELECTRIC RAILWAY JOURNAL*, issue of March 19, page 548, has been the silent influence and power in the company's co-operative welfare and public relations work. He



A. A. Mitten

is as much at ease with a track employee as with an official and is eminently qualified to maintain contacts between men and management. His activity with the company began on May 1, 1919, when he became secretary of the Co-operative Welfare Association. Ever since that time he has taken an active part in the co-operative activities of the company and is personally known and highly regarded by thousands of the company's employees. At the same time Dr. Mitten became secretary of the employees' Co-operative Association he also assumed the duties of supervisor of welfare and employment.

T. E. Mitten's only son was educated as a physician and surgeon. He entered the electric railway industry in 1915 as industrial surgeon with the company in Milwaukee. When the United States entered the World War Dr. Mitten went to France as a captain of an ambulance company, was twice severely gassed, was wounded and then captured in August, 1918. He was imprisoned at Villingen until after the armistice was signed.

On May 15, 1922, Dr. Mitten was elected a director of the company and he has served in that capacity without

interruption since that time. Until his election as chairman of the executive committee he acted as secretary of the board of directors. Dr. Mitten has also served for several years as vice-president of Mitten Management, Inc., which operates both the Philadelphia Rapid Transit Company and the International Railway, Buffalo, N. Y.

Now the time has come around when T. E. Mitten sees fit to relinquish some of the overwhelming mass of details which constantly spring into being on a property the size of the Philadelphia one. For sixteen years Mr. Mitten has served as chairman of the executive committee. Now his son has stepped into this position. The father will continue as chairman of the board of directors of the company.

At the annual meeting of the stockholders at which Mr. Mitten relinquished his post to his son other officers, in the main, were re-elected. C. J. Kelley replaced W. D. Witt as auditor of the company. Coleman J. Joyce and Leon Jewell were replaced on the board of directors by J. A. Queeney and Ralph T. Senter respectively. However, both will continue their services with the company. As a matter of fact, no particular significance attaches to the absence this year of the names of Mr. Joyce and Mr. Jewell from the board of directors. It is a policy of the management to assign men to meet the exigencies of the particular situation at hand. When an expert on rates and valuation was needed on the P. R. T. board, Mr. Joyce was the logical man to fill the post. This year the Philadelphia problems will chiefly be matters of operation, while in Buffalo the questions of valuation and rate-fixing were never more pressing than at this time.

Andrew Marshall Resigns as Boston Elevated Trustee

Andrew Marshall has resigned as a member of the board of public trustees of the Boston Elevated Railway, Boston, Mass. He was appointed by Governor Fuller on Aug. 26, 1925, to succeed former chairman James F. Jackson, and it was the Governor's intention that he should serve as chairman of the board.

Mr. Marshall opposed the original proposition for the reorganization of the company because of the sacrifice which he felt would be imposed on the stockholders to obtain a 50-year extension of the public control law. He argued the case exhaustively before the legislative committee, and the 25-year control plan which finally came out of the committee is a little closer to what he urged, but it is not his plan and he has not expressed himself regarding it.

Mr. Marshall was not elected chairman of the board, as that designation was given to Samuel L. Powers by the other trustees, who contended that they, and not the Governor, had the power of electing a chairman.

In his letter of resignation to the Governor Mr. Marshall explained that the demands of his law practice, consisting in part of the trial of cases which occasionally are of extended length, are such that it is difficult to

meet these demands and at the same time to perform the duties of the public trusteeship in a manner which he considered adequate.

It is understood that no successor to Mr. Marshall will be appointed by Governor Fuller until the Legislature has acted upon the pending plans for the reorganization of the Elevated.

S. B. Irelan Transferred to Kansas City

S. B. Irelan, vice-president and general manager of the St. Joseph Railway, Light, Heat & Power Company, St. Joseph, Mo., for the past four years, has been appointed Western manager of the securities department of the Henry L. Doherty interests, with headquarters in Kansas City.

In the course of his career he has been identified in an executive capacity with Doherty properties in almost every section of the country. From Denver he went to Fremont, Nev., and thence to New York to the engineering and statistical department, where he engaged in special work of revising the classification of accounts and report system. In 1914 he became vice-president and general manager of the Bartlesville (Okla.) utilities, but two years later he was transferred to Sedalia, Mo., in a similar capacity. From 1917 to 1923 Mr. Irelan was connected with the companies at Montgomery, Ala., which in the latter year were sold to the Alabama Power Company. It was at this time that he removed to St. Joseph as vice-president and general manager.

As manager of the securities department of the Western division, he will have charge of all the territory west of the Mississippi River.

Francis X. Sullivan was appointed to the Board of Transportation, New York, N. Y., by Mayor Walker, on March 23. The new incumbent succeeds William A. De Ford, a holdover from the Hylan administration, who resigned last November. Commissioner Sullivan has been prominent for many years as an attorney for labor unions and at present is counsel for the State Federation of Labor. He was graduated from Union College in 1901. From 1917 to 1921 he was Commissioner of Public Works in Queens. For two years he served as a member of the Home Rule Commission of New York.

T. H. Steffens, vice-president of the Sand Springs Railway, Sand Springs, Okla., for the past fifteen years, has succeeded the late Charles Page as president. Mr. Steffens has been with this property since its organization. Prior to that time he was connected with the St. Louis-San Francisco Railroad, St. Louis, Mo.

Ralph H. Love, manager of the Hiawatha, Kan., properties of the Illinois Power & Light Corporation, has been appointed local manager of the Kansas Power & Light Company's property at Atchison, Kan., to succeed Deane Atkins, transferred to Topeka. Mr. Love will continue in charge of the Hiawatha plant.

Changes Announced in New Jersey Property

Changes in personnel of the Public Service Railway and the Public Service Transportation Company, Newark, N. J., were announced recently by Arthur T. Warner, general manager in charge of traffic. They are: Morton H. Dean, formerly superintendent of time-tables, as traffic engineer; Herbert E. Conway, formerly traffic investigator,



M. H. Dean

as superintendent of time-tables; Harold B. Whitman, formerly assistant manager, Passaic Division, as passenger agent.

Morton H. Dean, the new traffic engineer, began work for the Public Service in 1906 in the time-table department at Newark. Later he became a schedule maker and then chief clerk in that department. In 1925 he was appointed superintendent of time-tables.

Herbert E. Conway, who has replaced Mr. Dean as superintendent of time-tables, entered the Public Service Railway employ in 1910, upon leaving Stevens Preparatory School. He took a position in the time-table department and three years later was transferred



H. E. Conway

to the traffic department as traffic investigator. In 1917 he returned to the time-table department as schedule maker and became chief clerk of that department in 1925.

Harold B. Whitman, passenger agent, became a checker in the traffic department after returning from the Mexican border in 1917. He served as ser-

geant in the Argonne during the World War and returned to Public Service in 1922, becoming superintendent of the Market Street carhouse in Paterson. He was appointed assistant manager railway and transportation, Passaic Division, Nov. 1, 1925, and recently has been attached to the traffic department in Newark.

Frank T. Freeman, who for the past two years has been superintendent of bus maintenance and repairs of the Public Service Transportation Company, subsidiary of the Public Service Railway, Newark, N. J., resigned on Feb. 25. At one time he was in the garage business in Florida and later he built and equipped a modern plant at Rahway for general machine, foundry and electrical contracting and automobile repair work. For many years Mr. Freeman has been identified with the maintenance of automotive fleets, having previously worked in that capacity with the Standard Oil Company of New Jersey and Kaufman's Department Store, Inc., Pittsburgh, Pa. Mr. Freeman has not announced any plans for the future.

Obituary

Wallace Heckman

Wallace Heckman, a vice-president of the Chicago Railways and former business manager and general counsel for the University of Chicago, died in Chicago on March 7. As a member of the operating board of the Chicago Surface Lines Mr. Heckman served as an arbitrator in several labor controversies involving the railways.

Mr. Heckman was born at Moscow Mills, Ohio, May 2, 1851. He was admitted to the Illinois bar in June, 1876, and from 1885 to 1908 was senior member of the law firm of Heckman, Elsdon & Shaw. In 1903 he was made counsel and business manager of Chicago University, which position he held until 1924, when he became associated with the Chicago Surface Lines.

Oren Joseph Smith, at one time chief engineer of the Denver Tramway, Denver, Col., died recently in Denver. He was 74 years old.

Joseph J. Heim, financier of Kansas City, Mo., and at one time an important figure in transportation, died in Kansas City recently after a year's illness. Mr. Heim's specialty was railway construction. With J. W. Ground, T. K. Irwin, W. W. Calhoun and Fred Fitch he constructed the Joplin & Pittsburg Railway, of which he later became president. Some ten years ago he was the principal owner in the Kansas City, Kaw Valley & Western Railway, which he also built. More than 30 years ago Mr. Heim built the East Side Railway of Kansas City at his own expense. The road extended from the north side business district of Kansas City to the East Bottoms district. An amusement park served by the railway was erected shortly afterward near the Heim Brewery.

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

Dr. Gilbreth Urges Psychological Test for Workers

Stressing the need for more attention to the psychological aspects of the worker when building an effective industrial organization, Dr. Lillian Gilbreth, of Gilbreth, Inc., consulting engineer, New York City, made the principal address before the New York Railroad Club in the Engineering Societies Building on March 18. Mrs. Gilbreth is one of the three women members of the American Society of Mechanical Engineers.

In the opinion of the speaker, the first step necessary in building an effective organization is to inculcate a healthy philosophy toward work. The worker is pessimistic, especially when production is being pushed. He has an undeveloped economic theory. He must know whether or not he is going to suffer if he increases production. From the standpoint of the speaker, motion-study, stop-watch analyses are not half so effective as a deep study of the psychological effects caused by the pressure of work, worry, friction, fatigue, financial troubles, isolation, and lack of appreciation. Dr. Gilbreth also pointed out that a man might display ability for a certain job, yet not like the job, because it had no emotional appeal for him.

It is highly important to determine whether the nervous stability of the worker is of the kind that would make him benefit by the work he is engaged in. After such studies are made, and the man selected on the basis of these psychological facts, then the workers must interlock in so far as their jobs are concerned. In other words the

worker must be teaching the man below him, while he is learning the job up ahead of him. Dr. Gilbreth laid great emphasis on the necessity of making a study of machines before planning better methods. In her opinion, the betterment of machine design has never been given the attention it deserves.

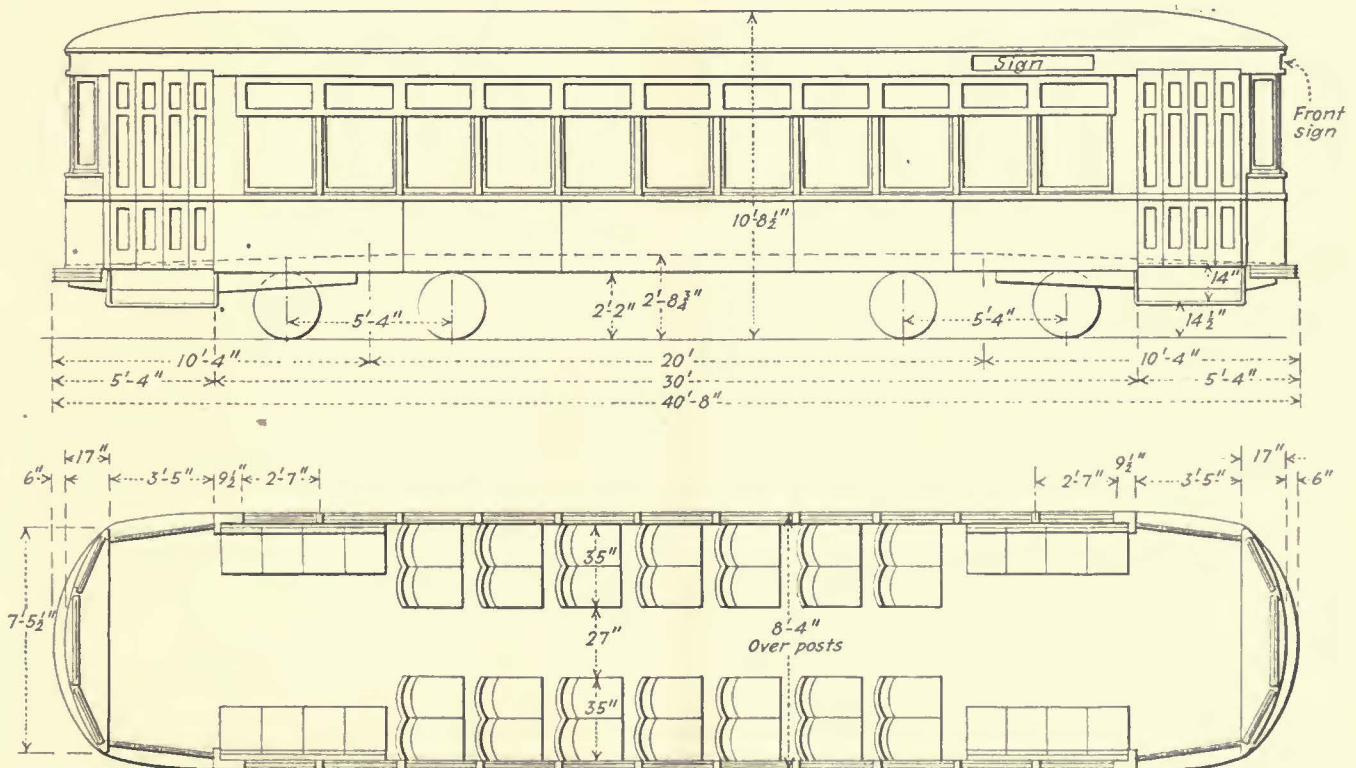
The psychological test to be absolutely effective and practical must begin at the top, said the speaker. It must be good for everybody, and records of each test are essential. In illustrating the point that rapidity of motion and nervous energy often resulted in lost motion, Dr. Gilbreth cited the case of the lazy man who, he said, often makes good by reason of his laziness.

Springfield-Worcester Car Order Placed

Total Cost of 100 New Vehicles Will Be \$1,650,000—50 Cars to Be Built by Osgood-Bradley and 50 by Wason
—Delivery Promised July 1

PROMISES made by the New York, New Haven & Hartford Railroad to improve the facilities of its street railway subsidiaries in Springfield and Worcester, Mass., culminated on March 22 in the placing of orders for 100 cars costing \$1,650,000. As forecast in the JOURNAL of March 14, contracts for 50 cars for the Worcester Consolidated Street Railway were awarded to the Osgood-Bradley Car Company and 50 for the Springfield Street Railway to the Wason Manufacturing Company. They will be of the double-truck, light-weight, one-man, city type, semi-steel construction.

Aside from the accompanying specifications, general specifications issued by the two companies call for four longitudinal seats and fourteen cross-seats of the deep cushion type with welts on the cushions to give individual seat effect. The backs of the cross seats are to be concave and scalloped to give individual seat effect. Panels under longitudinal seats are to be of aluminum. The railway company is to have the option of genuine leather or best quality Chase mohair upholstery. Rico rigid retrieving sanitary car straps are to be provided over each longitudinal seat. The wainscot of



Exterior and floor plan of new Worcester-Springfield cars

the car from the top of the seat support panels to the window sills is to be 3-in. mahogany-faced three-ply Haskelite.

All movable windows are to have Rex brass removable sash. Root, Wason or Bradley air-operated scrapers will be installed at the option of the companies. Specifications with respect to the trucks call for the car body to be mounted on low-level trucks to be selected by the railway company, the trucks to have solid forged side frames and cast-steel bolsters. The proposals of the car companies must contain estimates for both plain and roller bearings. Brakeshoes are specified as A. B. S. & F. Co. Diamond "S," pattern D-67. Safety car devices are to be manufactured by the Safety Car Devices Company. The floor is to be covered with 3/8-in. battleship linoleum. Automatic window wipers are to be supplied in the center front vestibule window.

Each car is to be equipped with double-faced advertising sign racks to carry public notice cards attached to car lines and extending across the center of the inside car body. An outside color scheme of yellow, cream, and red for lettering, has been specified. All mahogany interior finish is to be stained mahogany. Weights of the cars have not yet been announced.

General specifications are as follows:

Number of cars ordered.....	50 each
Date order was placed.....	March 22, 1926
Builder of car body.....	Osgood-Bradley Car Co., Wason Manufacturing Co.
Type of car.....	Double truck, city type, light Weight, one-man, two-man
Seating capacity.....	44
Bolster centers, length.....	20 ft. 0 in.
Length over all.....	40 ft. 8 in.
Truck wheelbase.....	5 ft. 4 in.
Width over all.....	8 ft. 4 in.
Height, rail to trolley base.....	10 ft. 10 1/2 in.
Body.....	Semi-steel
Interior trim.....	Mahogany
Headlining.....	3/8-in. Agasote
Roof.....	Arch
Air brakes.....	General Electric Co. or Westinghouse Elec. & Mfg. Co.
Axles.....	A.S.T.M. spec. annealed carbon steel
Bumpers.....	7-in. Hedley anti-climber
Car signal system.....	Faraday
Car trimmings.....	Bronze
Curtain fixtures.....	Curtain Supply Co.
Curtain material.....	Brown denim
Designation signs.....	Hunter
Door mechanism.....	National Pneumatic Co.
Energy-saving device.....	Arthur
Pare boxes.....	Cleveland Model 5
Hand brakes.....	Peacock staffless
Heater equipment.....	Railway Utility
Headlights.....	Golden Glow or General Electric
Motors.....	Four 35-hp. General Electric or Westinghouse
Paint.....	Vitrallite
Seats.....	Brill, Heywood-Wakefield or Hale-Kilburn—optional
Step treads.....	Kass Safety
Trolley catchers.....	Ohio Brass
Trolley base.....	Nuttall No. 20 or Ohio Brass
Ventilators.....	Garland, Railway Utility or Nichols-Lintern
Wheels.....	A.E.R.A. standard 26 in.

\$7,000,000 Additional Insurance Carried by G. E. Employees

More than \$132,000,000 in life insurance was carried by employees of the General Electric Company under the free and additional group plans on Dec. 31, 1926. During the first two weeks of 1927 a canvass of employees resulted in securing 5,000 additional names for a total of about \$7,000,000 insurance, increasing the number of all employees of the company insured to 83 per cent of those eligible.

Since the additional insurance has been in force, 340 employees have died. They had free insurance to the amount

of \$390,825, and 255 held additional insurance totaling \$354,500, making a grand total of \$745,325.

Approximately 64,000 employees were insured under the free insurance plan, and 46,300 employees under the additional group policy. The average policy under the free insurance was \$1,108 and the average under the additional plan was \$1,331, making an average of \$2,439 per employee for the 46,300 in the additional group.

A.E.R.A. Exhibit Blanks Will Be Mailed In May

Fred C. J. Dell, director of exhibits, American Electric Railway Association, is now preparing a new application form for exhibition space for the annual convention of the association at Cleveland, Oct. 3-7. The form will be sent out on May 16 and must be returned within the 30-day limit.

Industrial Exposition in Cleveland

Joseph H. Alexander, president of the Cleveland Railway, Cleveland, Ohio, is the president of the committee in charge of the Cleveland Industrial Exposition, to be held in the Cleveland Auditorium from Aug. 6 to 28. The exposition committee is composed of men prominent in the financial and industrial activities of the Cleveland district.

The purpose of the exposition is to present to the world a concentrated picture of the industrial activity and human progress achieved by northern Ohio; in other words, to "sell" the Cleveland district, its products and its opportunities, to itself and to the world. It is expected that the exposition will inspire not only constructive thought in the community but will open to individual exhibitors new market fields, new accounts and increased consumption of the products displayed.

The exposition will be open from 10:30 a.m. to 10:30 p.m., daily and Sunday. Exhibition space is available to products made or sold in the northern Ohio district.

Heads of Electrical Industry Hold Policy Meeting at Briarcliff

Nearly 300 executive officers of the electrical manufacturing industry attended a two-day meeting of the Policies Division of the National Electrical Manufacturers Association, held at Briarcliff, N. Y., March 17 and 18. John H. Trumbull, Governor of Connecticut and president of the Trumbull Electric Manufacturing Company, Plainville, Conn., made the keynote address. Governor Trumbull flew from his home in Connecticut to attend the meeting. An outstanding result of the conference was a definite set-up for the three major divisions of the industry, namely, apparatus, radio and supplies.

Gerard Swope, president of "Nema," was authorized to appoint a committee to study the patent cross-licensing as practiced in the National Automobile Chamber of Commerce, and formulate a plan whereby an interchange of patents in the electrical industry may be achieved. The investigating committee

is to report back to the policies division for further action.

In the opinion of those present price cutting has been found to be distinctly uneconomic for both buyer and seller. "We don't like to do business with a merchant who has three prices," said one speaker. "That is one reason for the tremendous growth of department stores. They have one price, based on actual cost and a fair profit, and they stick to it." The consensus of opinion was that a more accurate knowledge of costs will increase sales because it will not result in unintelligent shifting of prices, and it will not cause companies to go into bankruptcy when they should be making money.

The business policies committee reported on such subjects as cash discounts, terms of payment, length of guarantee terms, consigned stocks, freight allowances, service charges, appraisers, charges, and similar items.

Among other speakers were Owen D. Young, chairman of the boards of the General Electric Company and Radio Corporation of America; Clarence L. Collens, vice-president in charge of the Policies Division of "Nema"; H. D. Crouse, president of the Crouse-Hinds Company of Syracuse; A. Penn Denton, president of the Denton Engineering and Construction Company of Kansas City; F. L. Nicholson; H. P. Kirkland; Marle Thorpe, editor of *Nation's Business*; Robert A. Brannigan, manager of the patent department of the National Automobile Chamber of Commerce; L. B. F. Raycroft, vice-president in charge of the association's Radio Division, and others.

Virginia Electric & Power Company Parades New Cars

With various city officials and business and civic club representatives as guests, the Virginia Electric & Power Company, Norfolk, Va., staged a parade for five of its new cars recently ordered from the American Car Company, St. Louis, Mo. The cars will be put in service on the Norfolk and Pinner's Point run. This equipment is part of an order for ten cars placed Dec. 1, 1926. Illustrations and full specifications will be carried in a later issue of the JOURNAL.

Diesel Prize Announced for Oil Power Week

Edgar J. Kates, chairman of the national committee in charge of Oil Power Week, has announced that it will be observed this year from April 18 to 23. It is also announced that the national committee will award a cash prize of \$100, accompanied by suitable certificates, to be known as the Rudolph Diesel award. This award will be made for the best contribution toward the advancement of oil engines, either in the form of a paper presented at one of the meetings throughout the country under the auspices of Oil Power Week, or a written discussion of a paper, by any one attending any of the meetings. Manuscripts should be in the hands of the national committee not later than June 1, 1927, and

the award will be announced by Aug. 1. All persons interested are asked to get in touch with Mr. Kates at the national committee headquarters, 29 West 39th Street, New York City.

Oil Power Week observance will consist of meetings throughout the country for a discussion of subjects of oil-engine fuels, engine design, operation, economics, research problems, etc.

Fifty Cars and Five Buses for St. Louis

Application for authority to build 50 street cars at an estimated cost of \$510,000 was filed in the United States District Court on March 21 by Rolla Wells, receiver for the United Rail-

ways, St. Louis, Mo. Federal Judge Faris referred the application to Special Master Fred L. Williams for investigation and recommendation. Mr. Wells pointed out that they are needed to take care of traffic requirements.

If permission is granted the company will build the cars in its own shops. The company has built no new cars since July, 1924, and since that time 71 old cars have been retired and scrapped. Mr. Wells informed the court that funds are in reserve sufficient for the construction of the cars.

Application was also filed for permission to purchase five additional buses at a cost of \$41,000. This expenditure was also referred to Mr. Williams for approval.

M. L. Sindeband Now Vice-President American Brown Boveri

Maurice L. Sindeband has been elected a vice-president of the American Brown Boveri Electric Company. Since 1915 he has been in the engineering department of the American Gas & Electric Company and he was recently elected a vice-president of this company in charge of the electrical engineering department.

Mr. Sindeband was educated at Columbia University. He started his engineering career in 1907 with the New York Central Railroad. His next occupation was station-design work with the Brooklyn Edison Company, and in 1915 he entered the engineering department of the American Gas & Electric Company. His rise here was rapid, and he was made electrical engineer in 1918. The rapid growth of the American Gas & Electric system called for working out large-scale interconnection plans and the building up of a consolidated operating organization. In this executive engineering work Mr. Sindeband was so successful that he was made a vice-president. Several patents attest his ability as an inventor. He has been very active as a writer of articles for the technical press and has presented several papers before the American Institute of Electrical Engineers.

Trends in the Metal Markets

COMMENCING with this issue of ELECTRIC RAILWAY JOURNAL, through the courtesy of and in cooperation with *Engineering and Mining Journal*, there will be published in these columns a weekly review of the non-ferrous metal markets. The prices quoted and the general situation will be as of Wednesday preceding date of issue.

Major non-ferrous metal markets with the exception of zinc have been generally dull during the week ended March 23, according to *Engineering and Mining Journal*. This is the third quiet week for copper, whereas lead has heretofore been moderately active. Zinc buying was close to the average in volume. Zinc, tin, silver and antimony closed the week at prices differing little from those of last Wednesday. Both copper and lead prices are lower; copper is available at 13.25 cents and lead has been cut to 7.55

the low range of the market. A general disposition on the part of consumers, who bought heavily during February, that they can afford to wait is said to be the reason for the present situation of the market. Some of the consumers question the authenticity of the reports of curtailment and say they have been deceived by such rumors before. On the other hand, the attitude of the producers indicates that they have confidence in the belief that demand will exceed the current supply in the next few months and that they do not need to lower their present price to get business. The exporters' price remains unchanged at 13.65 cents c.i.f., though the volume of business has declined sharply during the week.

Lead demand during the last week has been much quieter than usual. With the February rate of world lead production even greater than that of January, producers feel keenly any dull period, and a pronounced tendency to shade prices to effect sales has been in evidence for the last few days. Corroding grades of lead have been somewhat scarcer than chemical lead and have generally commanded about \$3 a ton premium in the Middle West. The leading producers in the Middle West have receded from the 7.40 cents, St. Louis, level of a week ago, and on March 23 were at 7.30 cents. Lead at 7.30 cents has been available all week from Friday on, first as resale lots and then from the producers. In the East what little demand there was was satisfied at the American Smelting & Refining Company's price, which continued at 7.65 cents, New York, until March 23, when the price was reduced to 7.55 cents.

Consumers took little interest in tin, either for prompt or future delivery, and dealers were not particularly active. Spot and prompt Straits sold during most of the week slightly above 69 cents, with June about 2½ cents less. The 99 per cent grade is now only slightly less than a cent below Straits, owing primarily to decreased supply from China.

Zinc prices have fluctuated within narrow limits except for one large sale on Monday, which brought 6.60 cents. There has been some recovery since, although the price is still below that of a week ago. High-grade is quoted at 8½ cents delivered in New York.

Car and Bus Order at Houston Held in Abeyance

Recent advices are to the effect that the purchase of twenty street cars and ten buses reported in the March 19 issue of the JOURNAL as having been bought by the Houston Electric Company, Houston, Tex., is included as part of a \$1,500,000 program of expenditures dependent for its consummation upon a readjustment of the relations between the city of Houston, Tex., and the Houston Electric Company, as reviewed in the JOURNAL for March 12, page 464.

Foreign Trade Convention Set for May 25

The fourteenth national foreign trade convention will be held in Detroit, Mich., on May 25, 26 and 27. A call for the convention, issued by the chairman, James A. Farrell of the United States Steel Corporation, states that the object is "to afford opportunity for thoughtful examination of the present condition and future possibilities of our foreign trade; to stimulate co-operation in the best use of our resources, and to secure the judgment of practical and experienced traders on the problems that confront us."

All Americans concerned in the development of foreign trade as a factor in national prosperity, whether in agriculture, commerce, education, industry, finance or transportation, all chambers of commerce, boards of trade, national and state associations, and other industrial and commercial organizations, as well as firms and individuals, are invited to participate. A full opportunity will be afforded for free discussion from the floor. The secretary of the National Foreign

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

Metals—New York		March 22, 1927
Copper, electrolytic, cents per lb.	.....	13.025
Copper wire, cents per lb.	.....	15.25
Lead, cents per lb.	.....	7.55
Zinc, cents per lb.	.....	7.03
Tin, Straits, cents per lb.	.....	68.875
Bituminous Coal, f.o.b. Mines		
Smokeless mine run, f.o.b. vessel, Hampton Roads, gross tons	.....	\$4.625
Somerset mine run, Boston, net tons	.....	1.925
Pittsburgh mine run, Pittsburgh, net tons	.....	1.85
Franklin, Ill., screenings, Chicago, net tons	.....	2.25
Central, Ill., screenings, Chicago, net tons	.....	1.875
Kansas screenings, Kansas City, net tons	.....	2.50
Materials		
Rubber-covered wire, N. Y., No. 14, per 1,000 ft.	.....	\$5.50
Weatherproof wire base, N. Y., cents per lb.	.....	16.75
Cement, Chicago net prices, without bags	.....	2.05
Linseed oil (5-bbl. lots), N. Y., cents per lb.	.....	10.80
White lead in oil (100-lb. keg), N. Y., cents per lb.	.....	14.50
Turpentine (bbl. lots), N. Y., per gal.	.....	\$0.76

cents, New York. The sinking of a vessel carrying about 800 flasks of quicksilver has created keen demand in the American market and the price has soared to about \$115 per flask.

As regards copper, the large producers during the present week have consistently maintained their asking price of 15.375 cents and some business had been done at that level until March 23. On the other hand, secondhands and custom smelters have been willing to shade this price. As low as 13.275 cents delivered in the East was done, but 13.30 cents represented fairly

Trade Council, under the auspices of which the convention will be held, is O. K. Davis, 1 Hanover Square, New York, N. Y., from whom further details may be secured.

Bakelite Caravan Trekking Through Central States

Bakelite Corporation, New York City, announces that there is now in progress throughout the Central States a traveling exhibition of Bakelite in industry. The exhibition includes the products of some two hundred manufacturers throughout the United States who have contributed their devices to be used in this demonstration of Bakelite's varied function. From March 10 to March 26 the caravan visited the following cities: Columbus, Dayton, Canton, and Cleveland, Ohio, and from March 28 to May 7 the itinerary will be as follows: Toledo, Ohio; Hotel Commodore Perry, March 30-31; Ann Arbor, Mich., University of Michigan, April 4; Hotel Tuller, Detroit, Mich., April 6, 7 and 8; Lansing, Mich., Hotel Olds, April 11; April 13, Hotel Pantlind, Grand Rapids, Mich.; Hotel Keenan, Fort Wayne, Ind., April 18-19; April 21, Hotel Grand, Anderson, Ind.; April 25-26, Hotel Lincoln, Indianapolis, Ind.; April 28, Purdue University, West Lafayette, Ind.; May 2-3, Hotel Seelbach, Louisville, Ky.; May 6-7, Hotel Sinton, Cincinnati, Ohio.

Rolling Stock

Beaver Valley Traction Company, New Brighton, Pa., will purchase six new passenger cars. They are to be double truck, one-man operated. Delivery is to be made by June. This purchase of cars follows the reseating of ten of twenty recently purchased single-truck cars that were found not to conform to the standard of ease and refinement set by the company for its patrons. The new seats are Kemisuede covered and replace those of the wood slat type. The improvement is meeting with public approval.

Pittsburgh Motor Coach Company, Pittsburgh, Pa., a subsidiary of the Pittsburgh Railways, has placed an order for ten type X parlor coaches with the Yellow Truck & Coach Manufacturing Company of Chicago. The new coaches are the 20-passenger type and are similar to those now in service between East Liberty, Point Breeze and the downtown section of Pittsburgh. Delivery will be made at an early date.

Indiana Service Corporation, Fort Wayne, Ind., has announced, through its president, Robert M. Feustel, that ten new city street cars will be purchased this year for operation in Fort Wayne. This is part of a \$1,600,000 improvement program outlined for the city. A general plan of \$2,000,000 improvement includes rehabilitation of interurban lines running through northern Indiana.

Yellow Truck & Coach Manufacturing Company, Chicago, reports the following bus sales to electric railways: Seven gas-electric buses, Portland Electric Power Company, Portland, Ore.;

three type Z city service coaches, Los Angeles Railway Corporation, Los Angeles, Cal.; three 21-passenger city coaches to the Louisiana Electric Company, Lake Charles, La.; four 21-passenger Yellow coaches, Oklahoma Railway, Oklahoma City; three 21-passenger city service coaches, Eastern Texas Electric Company, Beaumont, Tex.

Track and Line

Fresno Traction Company, Fresno, Cal., has been granted a certificate of public convenience and necessity by the Railroad Commission of California to exercise the right and privilege granted by an ordinance of the city of Fresno to extend its lines upon McKenzie Avenue from the intersection of Fresno Avenue, easterly to Ninth Street and McKenzie Avenue and along Fresno Avenue from Fresno and Belmont Avenue to Olive Avenue, or the edge of the city limits of Fresno.

Stark Electric Railroad, Alliance, Ohio, is now laying 300 tons of new rail in and about Alliance and expects to make approximately 7,000 tie renewals during the summer months. According to a statement recently issued by E. W. Sweeney, general manager, the materials for the new work represent an expenditure of \$17,000.

Rome Railway & Light Company, Rome, Ga., is planning an expenditure of \$75,000 on railway improvements in Rome.

Arkansas Central Power Company, Little Rock, Ark., is planning to lay new rails and paving between its rails on Prospect Avenue from Lee Avenue to St. Mary's Academy. Work will commence as soon as the City Council of Little Rock grants the necessary permission. The improvement, entailing a cost of approximately \$150,000, will be one of the major construction jobs of the company's 1927 program. Rail of a heavier section will replace the present 70-lb. rail, and in addition all joints will be welded.

Dallas Railway & Terminal Company, Dallas, Tex., has received approval from the City Commission of Dallas for an additional expenditure of \$1,100 on an extension of the Vickery Place street car line. The extension from Vickery Boulevard to Ridgedale Street was included in the extensions to be made under the Everman Plan No. 4. It was completed two months ago, but when its cost was disclosed it was found to have exceeded by \$1,100 the estimated cost of \$9,770. The additional expenditure authorized by the commission will be credited to the improvement fund of the traction company.

Newport News & Hampton Railway, Gas & Electric Company, Hampton, Va., recently installed eight heavy ground-throw electric switches manufactured by the Cheatham Electric Switching Device Company, Louisville, Ky. Three of the switches have been placed on Washington Avenue, three on Chestnut Avenue, one on Virginia Avenue, and the two remaining switches on Hampton Avenue, and King and Queen Streets.

Trade Notes

Waukesha Motor Company, Waukesha, Wis., furnished the engines for the new Twin Coach designed by Frank R. Fageol of Oakland, Cal., and described in the JOURNAL of Feb. 26.

Robert C. Lanphier has been elected president of the Sangamo Electric Company of Springfield, Ill., to succeed the late Jacob Bunn. He had been vice-president and general manager ten years. Mr. Lanphier is also president of the Sangamo Electric Company of Canada, Ltd., and a director of the British Sangamo Company, Ltd. Otis White, general superintendent, was elected vice-president in charge of manufacturing, and Fred C. Holtz, chief engineer, was elected vice-president in charge of engineering.

Safety Car Devices Company, Wilmerding, Pa., during the past eight months has furnished safety car devices for the following rolling stock orders other than those reported in detail in the ELECTRIC RAILWAY JOURNAL: Five cars, Gary Railway; 50 cars, Pittsburgh Railways; six cars, Roanoke Railway & Electric Company; five cars, Williamsport Passenger Railway; three cars, Alabama Power Company, Birmingham, Ala.

Armco Culvert Manufacturers' Association announces the opening of two new district offices, one in Lincoln, Neb., with Mont C. Noble, formerly chief of bureau of roads and bridges, Nebraska State Department of Public Works, as district engineer in charge, and the other office in East Point, Ga., with Tom M. Neibling, formerly research engineer, Georgia State Highway Department, as district engineer in charge. This office will be in charge of association work in Alabama, Florida, Georgia, Louisiana, Mississippi, Tennessee, North Carolina, and South Carolina, and the Nebraska branch that of the work incident to Nebraska, Kansas, Iowa and Missouri.

The Lincoln Electric Company announces the following changes in its sales personnel: G. N. Bull, formerly with the Worthington Pump & Machinery Company in its Washington, D. C., office, has been made district manager of the New York office; C. S. Freeman, previously in charge of the Lancaster office, has been transferred to the Buffalo office and made district manager; S. W. Shultz, formerly of the Philadelphia office, has been put in charge of the Lancaster office, and E. J. Pfister, formerly of the Buffalo office, has been transferred to the Philadelphia office.

Nichols-Lintern Company, Cleveland, Ohio, is now prepared to furnish the N-L bus heater, which has been under development in practical service and according to the maker has proved its capacity to provide a comfortable heated vehicle and exceptional ventilation.

Bragg-Kliesrath Corporation, Long Island City, N. Y., has recently furnished 100 brakes to the Chicago Motor Coach Company and 37 brakes to the Fifth Avenue Coach Company, New York City.

"PEACOCK"

Reg. U. S. Pat. Office.

STAFFLESS BRAKES

*Are standard equipment on
nearly all Modern Cars!*

Modern car design demands them because of their many advantages, such as: Maximum braking power (three times that of the ordinary hand brake), Ample chain winding capacity (144 inches if necessary), least platform space, simple operation, unfailing reliability, light weight, low installation and maintenance costs.

There are other advantages which especially adapt "Peacock" Staffless Brakes to modern cars. Look over the specifications of modern cars. In almost every instance you will find "Peacock" Staffless Brakes.

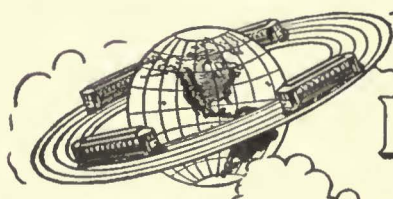
We will be pleased to mail detailed information upon request.



National Brake Company, Inc.
890 Ellicott Square Buffalo, N. Y.

Canadian Representative:
Lyman Tube & Supply Co., Ltd., Montreal, Can.

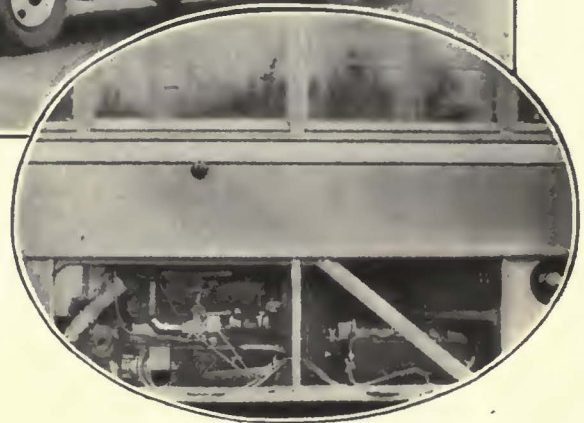
JUST as the electric railway companies have to compile and be guided by exhaustive statistics as to peak loads, traffic densities, costs per mile, and so forth, we must constantly keep ourselves informed as to purchasing power, density of population and all vital market information in order to maintain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



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Announcing—

The TWIN COACH

by F. R. FAGEOL

The history of progress tells an age-old story of new and better methods superseding methods that were good for a time but have been surpassed.

Now comes the Twin Coach—the work of the same man who was so prominently identified in giving the Safety Type Coach to the transportation world.

Glance over these outstanding features of the Twin Coach. They tell in outline why motor coach designers and operators hail the Twin Coach as forerunner of a new era in motor transportation.

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| <ol style="list-style-type: none"> 1. Seating capacity 42. 2. Weight per passenger seat reduced 40%. 3. Chassis and body are combined in one unit. 4. All stresses are equally distributed. 5. Safety increased by placing driver in extreme front end. | <ol style="list-style-type: none"> 6. Two 60 HP. motors mounted mid-ship in each side of body. 7. Each rear wheel is driven direct by each motor. 8. All driving stresses reduced one-half. 9. Load equally distributed on all 4 wheels and springs. |
|--|--|

For further information address—

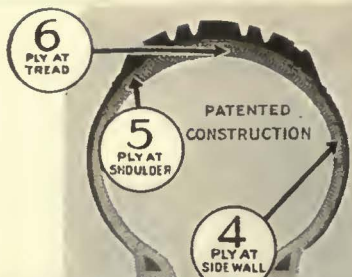
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TWIN COACH



*This simple stunt
adds many miles
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It's hard to guess how much mileage you will get from balloon tires. They look much alike—on the outside.

But from a cross-section as shown up in the corner—it is easy to see why INDIA Balloons give the ideal combination of comfort and long wear.

In the smaller passenger car sizes, four plies of cords at the side-walls—bending like a Damascus blade—easily allow and still defy that extreme flexing action at the low air-pressures which make balloon tires more comfortable. And six plies of cords under the tread give real protection against punctures and road wear.

INDIA quality of materials and ideals of workmanship make this patented construction feasible.

Go to an INDIA dealer. See and feel how an INDIA Balloon tire is made. Try one—with a True-Blue [HEAT-PROOF] Inner Tube (another exclusive India feature).

Then you'll understand why INDIA can give you the utmost uninterrupted mileage you can buy in a balloon tire.



**INDIA
TIRES**



INDIA TIRE & RUBBER CO. AKRON, OHIO

Announcing the New

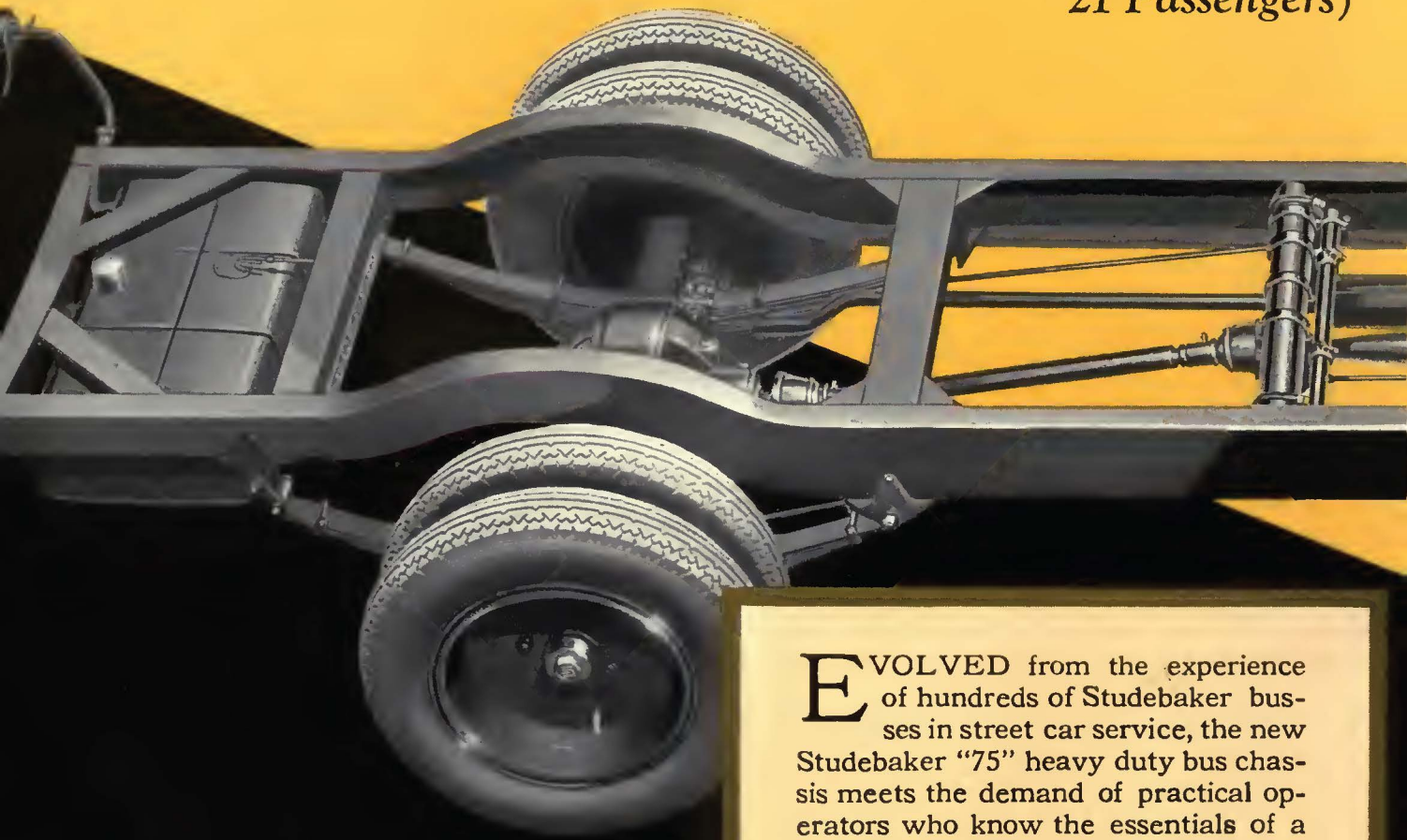
Studebaker



Bus Chassis
For Heavy City Service

Built for the of street car

(Seating Capacity
21 Passengers)



EVOLVED from the experience of hundreds of Studebaker buses in street car service, the new Studebaker "75" heavy duty bus chassis meets the demand of practical operators who know the essentials of a successful street car type chassis.

The Studebaker "75" chassis is a masterpiece of rugged construction. Its stamina has been proved by thousands of miles of gruelling tests across the United States and on Studebaker's million dollar proving ground.

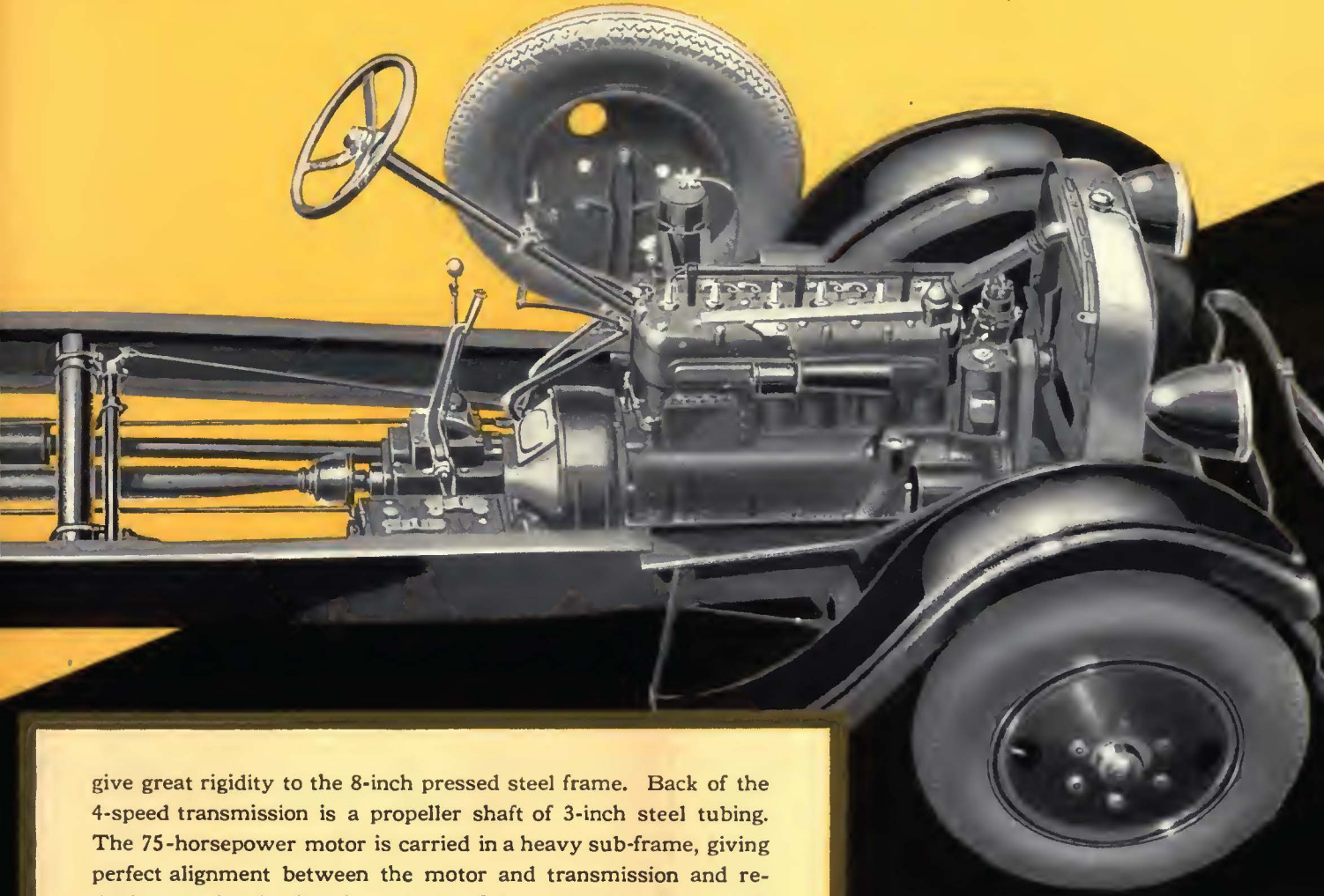
A lower center of gravity is obtained and the rear ramp eliminated by dropping the frame back of the wheel housing. Nine stout cross-members, including two large tubular units

The New

STUDEBAKER

75

heavy demands type service



give great rigidity to the 8-inch pressed steel frame. Back of the 4-speed transmission is a propeller shaft of 3-inch steel tubing. The 75-horsepower motor is carried in a heavy sub-frame, giving perfect alignment between the motor and transmission and reducing torsional vibration. Powerful, mechanical four-wheel brakes of the self-energizing type, supplemented by a hand brake acting on the rear wheels, give positive control.

Riding comfort is insured by the extra heavy, six-ply full balloon tires and improved springs. The front tread is 67 inches giving a short turning radius. Wide spacing of the rear dual wheels allows chains to be applied quickly and easily.

For further information write Dept. B
The Studebaker Corporation of America
South Bend, Indiana

Heavy Duty Chassis

The New Studebaker "75" Street-Car-Type Bus

(Seating Capacity: 21 Passengers)

Chassis Price
\$3275.00
F. O. B. Factory

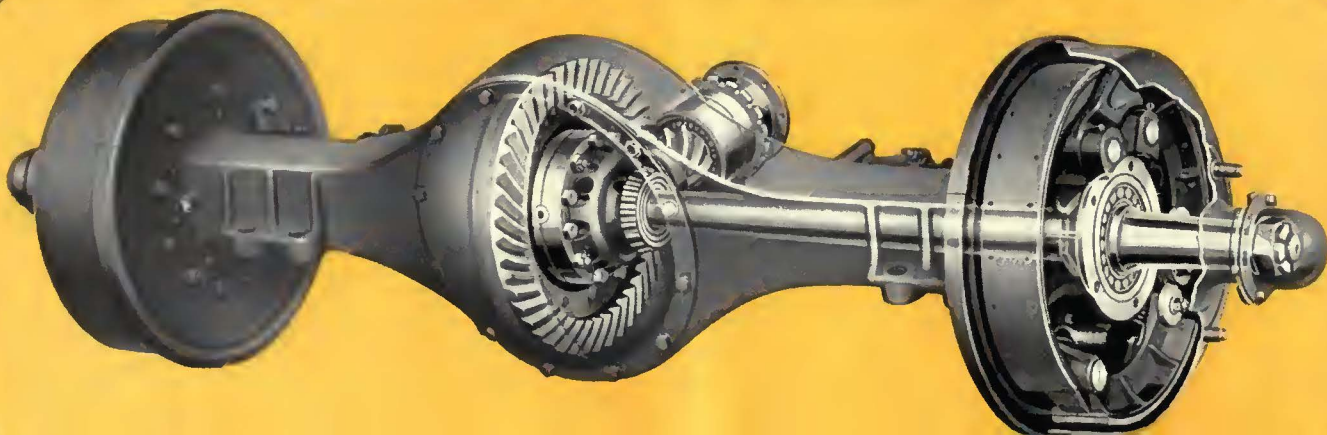


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(Below)

A spiral bevel, semi-floating type rear axle, specially designed for the new Studebaker "75" chassis, is carried in a cast steel housing of great truss strength.





Above—Concrete Signal Tower,
Southern Pacific Railroad,
Oakland Pier, California.

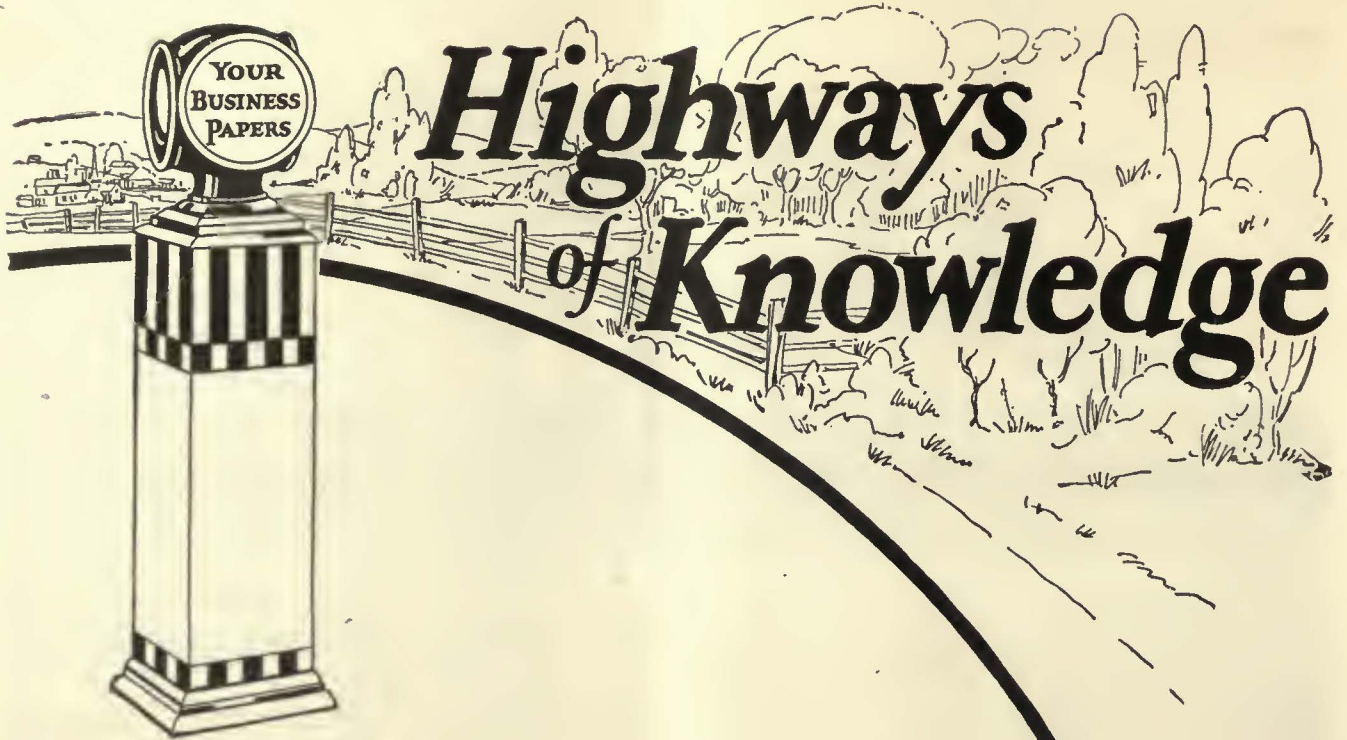
At left—Interior view of Con-
crete Signal Tower, Oak-
land Pier, California.

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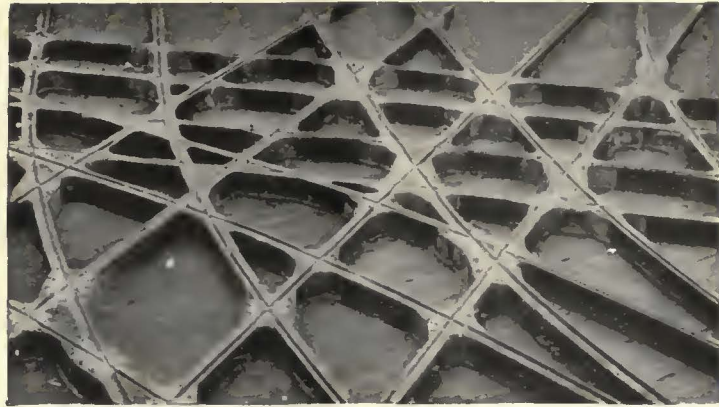
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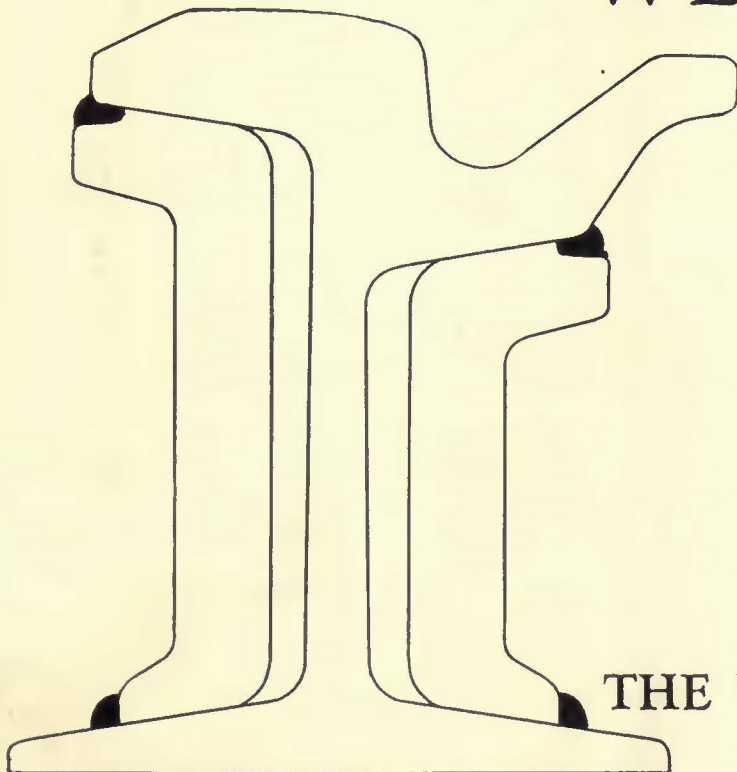
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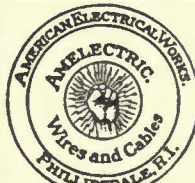
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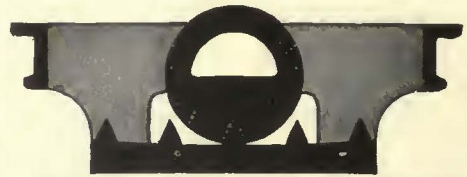
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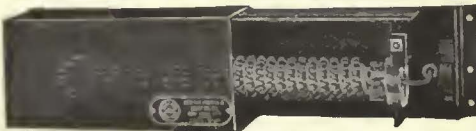
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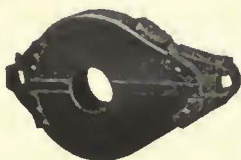
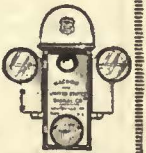
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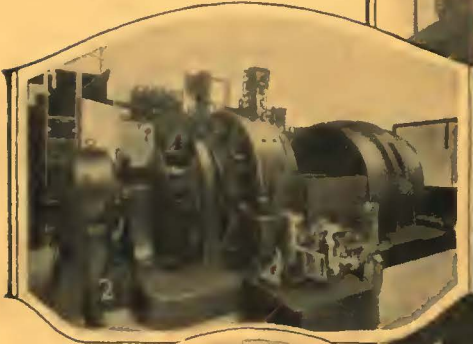
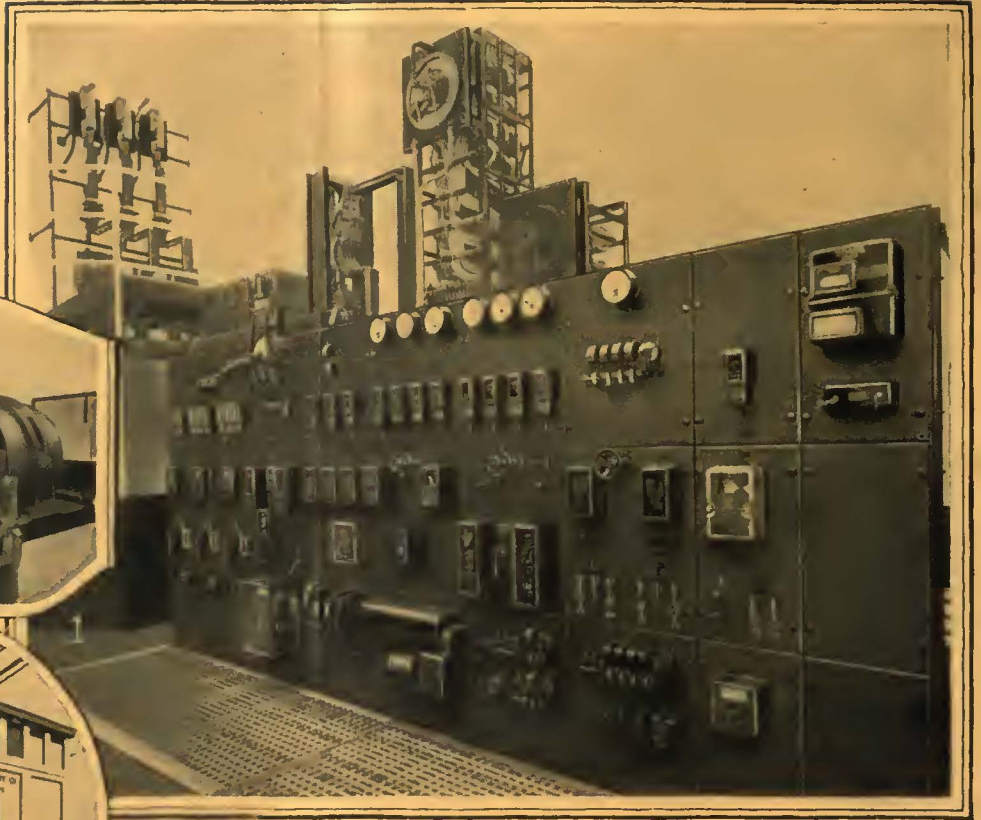
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