

ELECTRIC RAILWAY JOURNAL

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Contents of This Issue

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Editorials	621
Transportation—a Fundamental of Land Values.....	624
By MARK LEVY	
Auto-Transformers Feed Reading Electrified System.....	626
By A. I. TOTTEN	
Higher Maintenance Standards and Lower Costs Are Objectives at Atlanta	627
Car Research Progressing.....	639
Montreal Tramways Extends Use of Mercury Rectifiers.....	642
By M. L. DE ANGELIS	
Public Sentiment Favors Loading Platforms in Cincinnati.....	644
Trolley Bus System Will Soon Serve Kenosha.....	645
Warning Sign Reduces Accidents.....	646
Sunday Passes Increase Riding and Revenue in New Bedford.....	647
By HAROLD E. POTTER	
Concrete Loading Platforms at Pittsburgh.....	648
The Readers' Forum	648
Practical Ideas for the Maintenance Man:	
H-B Lifeguard Assembly—By R. Walker and H. Smith... 650	Tread Guard Placed at Frog Joint—By E. B. Spenser... 652
Repairing Porcelains of Junction Boxes—By Farrell Tip- tan	Jack Handling Truck— By A. F. Pollard..... 652
650	Electrically Driven Fare Box —By Charles Herms..... 652
Rebuilding Tap Bolt Holes for Motor Housings— By J. Mondoux..... 650	Handy Wrench Rack..... 653
Armature End Play Calipers —By H. Cordell..... 651	Automatic Block Signals Limit Freight Traffic Across Bridge —By H. A. Brown..... 653
Brake Valve Handle Fastener —By A. R. Petrie..... 651	Dipping Tank Saves Paint— By W. R. McRae..... 653
New Equipment for the Railways' Use.....	654
Trend of Revenues and Expenses.....	656
News of the Industry	658



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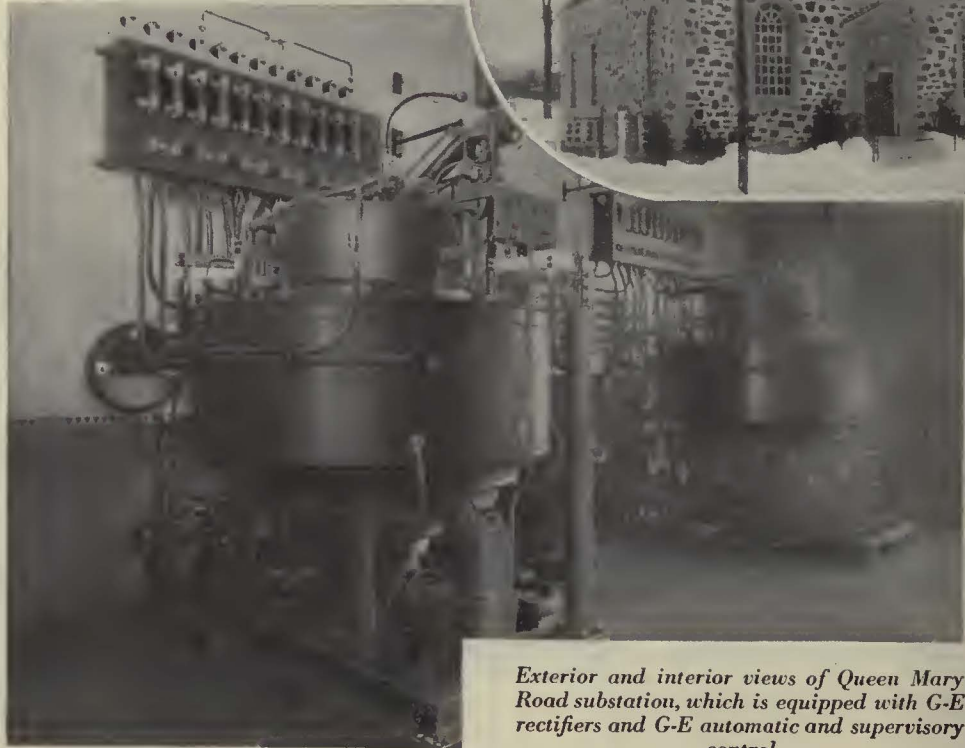
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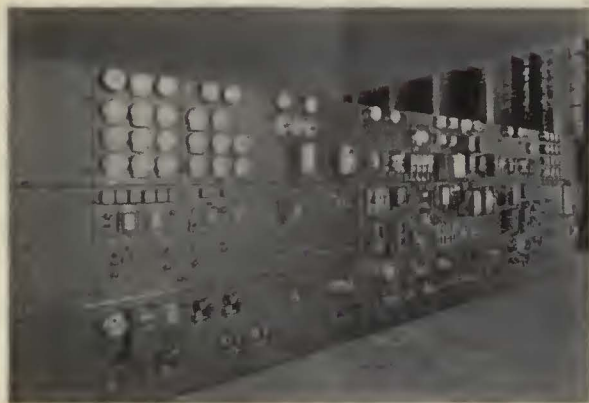
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SALES AND ENGINEERING SERVICE IN PRINCIPAL CITIES

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JOHN A. MILLER, *Editor*

Company Sustained in St. Louis Wage Decision

WITH evidence at hand that the revenues of the St. Louis Public Service Company were insufficient to maintain it in a solvent condition despite the numerous operating economies effected recently, the board of wage arbitration in its decision of Oct. 8 rejected the contention of the union employees that wages should be continued at the 1928 level, and voted in favor of a 10 per cent reduction. The board ruled also that a differential of 7 cents in favor of the operators of one-man cars and buses is adequate.

Faced with a probable deficit of more than \$800,000 if wages remained unchanged until the expiration of the contract next May, the company asked its employees some months ago to accept a 10 per cent reduction in wages contingent upon the earnings of the company. The union resisted this proposal and threatened a strike, but later agreed to arbitration. In the arbitration proceedings, it was contended by the union that 69 cents per hour, the existing wage for two-man operation, was not sufficient for the employees to maintain a reasonable standard of living, that 7 cents per hour was not a sufficient differential for one-man operation, and that the financial condition of the company was not such as to justify the proposed reduction.

On its part, the company maintained that earnings were inadequate to meet the requirements for operation, taxes, interest on indebtedness and depreciation, and that the only alternatives to a reduction in wages were to increase the fare, reduce service or further reduce maintenance costs. An increase in fares was regarded as of very doubtful efficacy. It would pass the burden of maintaining the existing wage level of railway employees to others whose wages and incomes had already suffered a decline. To reduce service would result in a further decline of patronage, and to reduce maintenance would impair the reliability and safety of the service.

In considering the issue, the majority of the arbitrators discussed the affairs of the railway at length and concluded, despite the dissent of the union representative, that the reduction was no more drastic than was necessary to permit the company to continue operation and to meet its fixed obligations. That this reduction will cause

actual hardship to the employees seems unlikely, for the cost of living in St. Louis has fallen more than 10 per cent since the time when the 69-cent wage rate was established. Moreover, as the board points out in its report: "In a financial crisis, an employee fares better under a solvent employer than he is apt to do under a receiver." While the reduction in wages is regrettable, it appears to have been necessary to keep the property in operation by the company. "In so holding," the decision reads, "we recognize the company's claim that its fare boxes being its only source of revenue, diminished revenues are bound to sound its death knell unless relief is granted."



Objectives of Car Research Becoming Clearer

AS PROGRESS in car research continues under the auspices of the Electric Railway Presidents' Conference Committee, the scope and objectives of the undertaking are becoming better understood by the industry. An idea was prevalent at first that the aim of the committee was to revolutionize car design—to produce a vehicle utterly different from that which the industry is using at the present time. It is now realized that the principal objective is to evolve equipment designs which are an improvement on existing ones, rather than to wave a magic wand and create something entirely new.

Among the specific needs receiving intensive study are (1) faster and smoother acceleration and braking, (2) noise reduction, (3) improved appearance, and (4) reduced construction cost. Experiments have been under way in the field laboratory at Brooklyn for several months past for the purpose of finding out how these ends can be attained. The work has not yet progressed far enough to permit publication of the results of the tests, but their general nature is outlined in an article appearing elsewhere in this issue.

That this study and investigation of the whole subject of car design should have acted to some extent as a deterrent to the purchase of equipment now on the market is easily understandable. No one wants to buy something today if it is going to become obsolete tomorrow. The idea that revolutionary changes in design are in

prospect, however, is now seen to be an exaggeration. Important improvements may confidently be expected to result from this research, but they are not likely to be such as to necessitate the scrapping of the rolling stock of modern design that is now in operation.

It must be remembered also that research is a continuing process. Substantial progress has been made in car design during recent years. Efficient and economical equipment is available today at price levels much lower than they were some time ago. If a railway needs new cars now, the time to buy them is now. Whatever improvements may be developed by the committee's study, its findings will not be the final word in car design. Other improvements will follow as the need for them arises and ways are found to solve other problems. The management which waits for the final word before buying new cars, will still be operating its old cars when the last trumpet sounds.



Atlanta Makes Outstanding Record in Winning Maintenance Award

FOR its high standards of maintenance in all departments the Atlanta division of the Georgia Power Company was awarded the company trophy in the 1931 Maintenance Contest sponsored by *ELECTRIC RAILWAY JOURNAL*. In thus being adjudged the winner among 42 competitors, the company received well-merited recognition for its excellent work. Although they did not win the trophy, many of the other competing companies also deserve high praise for their excellent records.

In view of the present economic situation and the consequent decreases in riding, the Georgia Power Company has been faced with the problem of curtailing expenses sharply. Its success in reducing all maintenance costs is in large part attributable to the use of the budget system. Department heads, in making special efforts to keep within the budget, have in most instances saved considerable amounts from the budgeted figures.

While reducing its costs, the Georgia Power Company has steadily raised its standards of maintenance. The company has adopted a definite policy of deferring no maintenance and has insisted on work of an even higher quality than has been done in the past. Evidence of the effective observance of these principles is shown in the remarkable pull-in records for vehicles, the excellent condition of the roadway, and the small number of wire breaks.

Following the principle that it is more economical to prevent equipment pull-ins than to repair vehicles as they fail in service, the company has insisted on rigid inspections and thorough overhauls. All work in the shops, and in the roadway and overhead line departments, has been facilitated by the use of modern machines, tools and methods. To increase the interest of the employees in their work and to eliminate carelessness, the company has placed a definite responsibility on each

individual employee by tracing every failure of equipment to its source.

The special effort made during 1930 which resulted in winning the award furnishes an excellent example of what it is possible for a railway to do in improving its maintenance methods and facilities. It augurs well for the industry that an increasing interest in this important part of railway operation is being shown on properties all over the country.



Making Taxicab Operation Safer

PREVENTION of traffic accidents is a matter of such importance that it has attracted the attention of many groups interested in transportation. A recent contribution to the subject is the report drawn up by the Safety Committee of the National Association of Taxicab Owners in collaboration with the Policyholders' Bureau of the Metropolitan Life Insurance Company. While only 80,000 of the 26,500,000 motor vehicles registered in the United States are taxicabs, they run about 1 per cent of the total annual motor vehicle mileage. Practically all the operation is concentrated in cities where traffic congestion is greatest. In New York, for instance, the report states that 32 per cent of the vehicle mileage of the city is run by taxicabs, which constitute only 2.6 per cent of the registered vehicles. Hence they are a major factor in traffic, far exceeding their numerical importance. Statistics indicate that the taxicab driver is a safer driver than the average operator of a private automobile. Even so, the total number of accidents in which taxicabs are involved is very large.

The report recommends a number of ways of making taxicab operation safer. A standard system of recording and analyzing accident statistics was proposed for adoption throughout the industry. More careful selection and training of drivers were urged in order to eliminate incompetent and physically unfit men, and to raise the qualifications for employment. Educational activities, such as safety advertising, safety committees, group meetings, bonuses and contests were put forward as means of stimulating interest in safe driving. Studies of individual cases of accident-prone men were proposed in order that remedial steps may be taken rather than the discharge of the individual. It also was held important that only safely constructed and safely maintained vehicles be operated. Preference was expressed for cabs designed for the purpose rather than converted pleasure cars.

The program outlined is similar to that which local transportation has been following in connection with electric railway and bus operation. Adoption of these methods surely will make an improvement in the number and severity of taxicab accidents. Safety effort among taxicab operators organized along these lines furnishes another illustration of the essential similarity of the problems of all forms of community transportation.

A Pioneer Passes On

THOMAS A. EDISON is dead. With his passing there has gone another of that group of pioneers whose work was instrumental in the development of our present mechanized civilization. Edison's popular fame is connected largely with the invention of the electric light. But it must not be forgotten that he played a prominent part in the development of the electric railway. His efforts, begun in 1879 and lasting through the next decade, had a marked influence on the progress of the art. Motors, generators and locomotives designed and built by Edison and his collaborators were among the first in this country. It was only when others had come to take over a large part of the development that he turned his effort to different fields. Thus the electric railway industry has always felt particularly close to this man who did so much toward the development of electricity. While we mourn, we see his spirit living on in the work he has done for mankind.

Misplaced Emphasis in City Planning

CIVIC beautification rightfully receives a substantial share of the attention of city planners. No one can deny that there is much room for improvement in the appearance of the average American city. Every reasonable effort in this direction deserves whole-hearted support. But, when all is said and done, beautification is only the icing on the cake, and should not engage the cook's attention to the neglect of the preparation of the ingredients essential to the cake itself.

Unfortunately, many city planners are inclined to make the mistake of concentration on esthetic problems while certain practical problems of vital importance in civic development receive scant consideration. Take, for example, a bulletin recently issued by the School of City Planning of a large Eastern university, listing a total of 24 courses of study. Two important courses deal with horticulture and plants. Their purpose, according to the bulletin, is to give the student information on soil, fertilizers, the most common and troublesome plant diseases, and to instruct him in the best methods of gardening public and semi-public areas. Another course embraces the history of Mediæval, Renaissance and modern art. But there is no course dealing with the problems of public transportation. Nowhere is any consideration given to the relationship between transportation facilities and civic development. It is true that one course contemplates the design of an ideal town, including the layout of a transportation system. This layout is merely incidental, however, the principal emphasis being placed on other features of the problem. No previous instruction having been given on the subject of transportation, the student apparently is expected to sketch in a few routes at random and call the result a community transit system.

Indifference to the transportation problem is partic-

ularly to be deplored at this time because the progress made toward its solution has been relatively less than in many other lines of civic development. Moreover, it is a problem that cannot be solved by the transportation men alone. Co-operation of all elements is needed. The comparatively minor problems of landscape gardening should not be allowed to obscure a subject of vital importance to the welfare of the entire community.

Electrification Should Proceed on Its Merits

INAUGURATION of construction projects involving immense expenditures has been proposed again and again as a means of relieving unemployment and stimulating business recovery. One of the favorite suggestions of those desiring to create jobs for the unemployed is to electrify all or a large part of the steam railroads. This is urged, not from the standpoint of the intrinsic merits of electrification, but simply as a means of putting men to work. Real friends of railroad electrification can only look askance at projects of this kind put forward without consideration of the economic side of the question.

A recent suggestion for the electrification of 50,000 miles of main line railroad is a case in point. This is roughly equivalent to 100,000 miles of track, or close to half the active mileage in the country. It is estimated that the cost would be upward of \$3,000,000,000. Even if this could be obtained in the form of a low-interest loan from the Government as proposed, the carrying charges would be staggering. No economic justification exists for undertaking such a project. Past experience shows that the greatest advantage of electrification is in the increase of capacity of crowded lines. There it can and does remove the limits imposed by the steam locomotive, and permits more intensive use of the existing plant. But with reduced traffic density all over the country, the need for greater capacity is not pressing. From the standpoint of operating cost the straight substitution of electricity for steam does not now show as much saving as it once did. Radical improvements have been made in steam locomotives with consequently reduced coal consumption and decreased maintenance costs. Today there are relatively few instances where a direct profit can be calculated on a straight substitution of electric in place of steam operation.

With labor and materials at the lowest prices in a generation, however, there are undoubtedly special locations where electrification would be advantageous. When it is considered that only some 4,500 miles of railroad track have been electrified in the United States, it is easy to see that there are numerous opportunities for its extension on a reasonable basis. But that is a far cry from any plan to electrify lines wholesale. To make such a move would be the height of folly. If real progress is to be made, electrification must proceed on its own economic merits.

Transportation—

A Fundamental of

Land Values

By

MARK LEVY

President
Chicago Real Estate Board

MASS TRANSPORTATION and real estate are two inseparable phases of a city's being which have outgrown the corporate boundaries of the city itself. From an economic, commercial and residential viewpoint, cities have become metropolitan districts, the areas of which are now more accurately defined by the limits of convenient transportation. Although a certain amount of decentralization has been effected and is still a definite trend, the accessibility to the central business district of a city continues to be a major factor in the establishment or maintenance of land values.

In nearly every large American city, the history of community development is the history of transportation. Natural facilities for communication and travel governed the selection of the original sites for commerce and industry with residences grouped immediately around these districts. Then came the railroads, local transportation systems, and the resultant expansion of urban areas with increased values. Industry spread out along lines of communication, and residential communities moved farther away from the original center. But in nearly every instance, the great general commercial center of the city has remained fixed.

Chicago is a typical example of such expansion. This city naturally grew up near the mouth of the Chicago River and along the branches of the river. It was incorporated as a town in 1834 and as a city in 1837, with a population of 3,297 and a land area of 2.41 square miles. From 1850 to 1860 a new factor affecting the form and character of the city's growth appeared with the building of steam railroads to the port. During this decade ten steam railroads, three from the east and seven radiating toward the west, northwest and southwest, entered the city and located their freight and passenger stations as close as possible to the wharves and general shipping points along the river.

From this time onward, the city not only took on a new importance as a railroad center, but it also underwent a marked change in its territorial development, both the residential and business sections showing a tendency to follow the steam railroad lines away from the original water shipping centers. The influence of the steam railroad and lake traffic has continued to affect the city's growth, both having the common characteristics

Accessibility is the keynote. Time has become a greater factor than distance. More arterial rapid transit lines with co-ordinated feeder service will maintain land values over broader areas and insure the stability of the transportation business

of concentrating freight and passenger delivery in what is now the heart of Chicago, the central business district—the Loop.

As a result of the condition just mentioned, Chicago has developed radially from this center. Stores, commercial houses and factories, originally concentrated here, have lately become somewhat more widely distributed, but the commercial center of the city has remained fixed. However, the growth of the central business district, including the surrounding factory zone, has tended to spread the residential district constantly outward from this center. The construction of surface and elevated lines, which have constantly reached out into new territory, as well as the major railroad improvements, such as that made by the Illinois Central Railroad, and the services of the three interurban electric lines originating in Chicago, have definitely stimulated this outward movement of population.

Despite the constant improvement in transportation, the daily rush-hour traffic, converging from the residential districts to this common center, has become more and more difficult to handle. In comparatively recent years business subcenters have grown up in outlying districts and have assumed real importance. The history of Chicago indicates that the present concentration in its central business district has been the result of a long period of development, which now appears to have reached the stage of transition where well-considered changes for co-ordination in the transportation systems will undoubtedly effect a very desirable distribution and readjustment of the residential and occupational districts.

Decentralization has been the major trend in all city development for the past several decades, and is still a major factor in the expansion, not only of transportation

and real estate activities, but of stores, theater enterprises, etc. Chain stores have had and are having an important effect upon business development, both in the central business districts and in outlying centers. Their location may be taken as something of a measure of land values and consequently of the effects of transportation service, since chain stores have of necessity adopted the general policy of locating only in the most convenient and accessible locations.

Many factors enter into the success or failure of outlying business centers. One important factor is the distance of the subcenter from the city's central business district; another, the factor of time in transportation to the central districts. From the standpoint of distance, points at which business has successfully developed in subcenters have been gradually extended. Distances of 8, 10 or 12 miles from the city's center seem to be appropriate now in the case of cities the size of Chicago. If the areas are closer to the central business district, they come into too much competition with downtown agencies. There is also a decided limit as to how far people are willing to live outside of the central part of the city, and that limit is not one of miles but of time. In the writer's opinion, the limit is that area not exceeding 45 minutes travel to the central business district.

Again, outlying business sections develop only with the development of the surrounding district as a residential section and trade area. As a matter of fact, subcenter business depends not only upon the immediate residential district but also areas lying far beyond what might be termed the subcenter development itself. An excellent example of a successful metropolitan subcenter is found in the city of Evanston, just north of Chicago. The city itself has a population of 67,000, but the trade population of the Evanston merchants is 250,000 people. The city draws from a trading area of 194 square miles. Evanston is a successful subcenter because of this outlying trade area and in spite of its accessibility to central Chicago by means of steam railroads, rapid transit lines, surface lines and motor buses.

Another type of subcenter development, with different results, is that similar to the areas surrounding 63rd Street and Cottage Grove Avenue on the south side, or Wilson Avenue and Broadway on the north side of Chicago itself. These developments are too close to the downtown district of Chicago and transportation is too good. Although a certain amount of commercial activity is centered there, the communities are not first-rate subcenters with the larger type of business institutions. The people living in these areas are of the "white collar" class who work in the offices of the central district, and who naturally do a large amount of purchasing downtown.

Many other examples showing the relationship between transportation and land values, whether for commercial or residential development, could be quoted. Two of these—in Philadelphia and New York—are illustrative. In Philadelphia, the construction and operation of the Market Street elevated and subway system not only made possible the exceptional subcenter at 69th and Market Streets and a large residential area surrounding that point, but increased land values through West Philadelphia to that point and maintained land values in the heart of downtown Philadelphia which were on the verge of collapse. In New York City, it is reported that the total value of land, assessed at a few million dollars prior to the development of the subway systems, increased subsequently to several billions.



MR. LEVY, president of the Chicago Real Estate Board, has been engaged in the general real estate business in Chicago for more than a quarter of a century. His activities have included selling, leasing, loaning, managing, chain store renting, developing and appraising of real estate investments, as well as acting in an advisory capacity for the acquirement of various classes of property. His qualification to discuss the relationship between transportation and land values is scarcely equaled in this country today. In 1916 Mr. Levy appraised the land of the Chicago Elevated Railroad for the Chicago Traction and Subway Commission. In 1919 he appraised all of the land previously valued and additional properties for the then Chicago Elevated Railway. In 1928 and 1929 he appraised the property of the Chicago Rapid Transit Company in Chicago and Cook County, Illinois, comprising the Elevated Railroad System, and also valued part of the rights-of-way of the Chicago Junction Railroad, New York Central Lines, the Chicago, Aurora & Elgin Railroad and the Chicago, Milwaukee & St. Paul Railroad. Mr. Levy represented the city of Chicago through the Board of Local Improvements on several street widening and public improvement cases, in an advisory and expert capacity. In 1923 and 1924 he represented the Board of Local Improvements of the city of Chicago in the \$22,000,000 South Water Street improvement case in an advisory and expert capacity, embracing the valuation of all lands in the South Water Street assessed district in an amount in excess of \$1,000,000,000. Mr. Levy is a past-president of the Cook County Real Estate Board, and is the treasurer-elect of the National Association of Real Estate Boards.

After all, land is valuable only to the extent to which it can be used and is accessible. Real estate operators study transportation and its trends as the most important factor of values, and to aid them in forecasting future activities. Land values in which realtors and real

estate owners are interested depend in a large measure on the character of service which transportation agencies provide or will provide for the public. Good transportation and good service influence a purchaser. There is no limit to the increase in land values which good transportation service brings.

The effect of transportation on land values and on the growth and progress of industrial centers is greater than it is on residential land. How the factor of transportation enters into land values of all types can readily be seen by picking up any Sunday newspaper and glancing over the advertisements of the realtors. Transportation is always emphasized.

As has been stated, the history of city growth is closely aligned with the history of transportation. But what of the future? In the writer's opinion, transportation must keep one step ahead of city development. It must remain the backbone on which natural expansion depends. Metropolitan districts are surely becoming better places in which to live and carry on the pursuits of life and happiness. Trade areas are broadening; residential sections are being improved, whether they be districts for homes

or apartment houses; commercial activities, while retaining their central district advantages, are taking their products and services to the people by establishing outlying branches; census returns are showing a larger growth in suburban areas than in the central regions.

Transportation must be modernized along with all the other factors of city development. With the trend of decentralization in mind, transportation agencies must recognize that a psychological element as well as a practical necessity enters into the desire of people to be within easy access of the downtown area. People want to come downtown occasionally, and above all they want to feel that they can do so quickly and comfortably. More rapid transit is unquestionably the solution. More rapid transit plus a well co-ordinated feeder service with modernized equipment and operating conditions, which will move people about a city with the least possible trouble to themselves, will not only be profitable to the transportation system but will directly benefit the landowner. The efforts for security of the two factors will be one. Transportation and real estate will continue to be inseparable partners in community development.

Auto-transformers Feed Reading Electrified System

BY A. I. TOTTEN

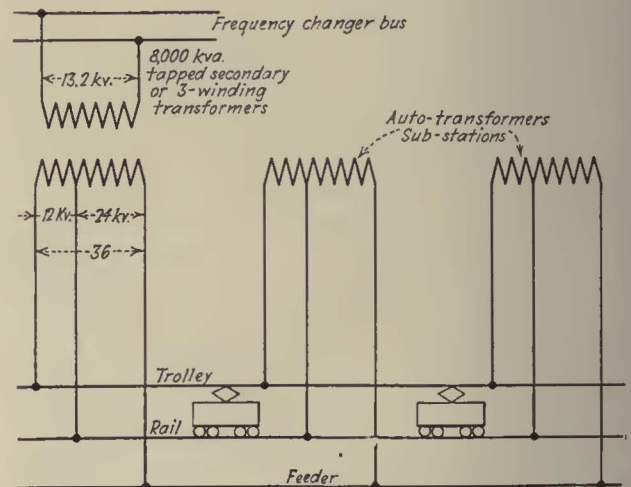
Transportation Engineering Department
General Electric Company

WHEN the Reading Company laid out the power distribution for its Philadelphia suburban zone electrification, because of the somewhat limited range it was decided to adopt a three-wire distribution system fed from a single point, Wayne Junction, where frequency-changer sets would be installed by the Philadelphia Electric Company for converting from three-phase, 60-cycle current to single-phase, 25-cycle current for railway use. This arrangement permitted the adoption of balancing or auto-transformers instead of two-winding transformers at the outlying distribution points, spaced 5 to 7 miles apart. Besides the lower investment and possibly higher distribution-system efficiency, there also is the possibility of balancing currents which will, in greater or less degree, minimize inductive effects.

Before determining the capacity of the individual windings and the aggregate rating of each unit, an elaborate study of the system was made to ascertain the proper relation of reactances to give the desired current distribution under normal and short-circuit conditions.

The three single-phase, 25-cycle transformers as finally specified and built by the General Electric Company are rated 8,000 kva. at 13,200 volts on the primary. The feeder-to-rail secondary is rated 3,333 kva. at 24,000 volts, and the trolley-to-rail secondary is rated 5,333 kva. at 12,000 volts. These are normal continuous ratings with 40 deg. C. temperature rise. Following this load, the transformers will carry 150 per cent load for two hours with not over 60 deg. rise, after which 300 per cent load can be carried for five minutes with not more than 75 deg. rise.

The specified reactance values on an 8,000-kva. base were: Primary to feeder-rail winding, 8.6 per cent; primary to trolley-rail winding, 6 per cent; primary to trolley-feeder winding, 4.6 per cent, and trolley-rail to feeder-rail winding, 14 per cent.



Method of connecting Reading transformers to frequency changer bus and distribution system

Because high insulation values were needed for the trolley and feeder system, primarily because of smoke and dirt incident to steam locomotives, it was likewise deemed essential to provide superior transformer bushing insulation. The specifications required the following dry and wet arc-over values for the bushings: Primary terminals and trolley terminal, 150 kv. dry, 110 kv. wet; feeder terminal, 195 kv. dry, 155 kv. wet; rail terminal, 70 kv. dry, 45 kv. wet.

The transformers as supplied are fully self-protective under any practical condition of short circuit, without considering the external reactance of any part of the system. Special incorporated and auxiliary features include ratio adjusters, flanged wheels, Bristol indicating thermometer and mercoid temperature controller.

HIGHER MAINTENANCE STANDARDS and LOWER COSTS

Are Objectives at Atlanta



Reliability of service, an important factor in winning the favor of patrons in Atlanta, is made possible by the high maintenance standards

PROFICIENCY shown in all branches of maintenance work by the Georgia Power Company, Atlanta division, resulted in the award of the 1931 *ELECTRIC RAILWAY JOURNAL* Maintenance Contest to that company. With the purpose of broadening the scope of the contest this year, the plan was adopted of basing the company award upon data showing the general character, quality and cost of the maintenance work done by the various contestants during that calendar year 1930. A total of 42 companies submitted their records in the competition. Presentation of the prize, a handsome silver plaque, was made at the general session of the Engineering Association at the recent Atlantic City convention, by W. W. Wysor, chairman of the committee.

In winning this award, the Georgia company made an enviable record. Although its standards of maintenance have been raised and the cost lowered over a number of years, an even greater effort was made in 1930 to achieve better results. This effort is reflected in decreased unit costs of car, bus, track and overhead line maintenance. The average car mileage and bus mileage per pull-in have been con-

siderably increased, and trolley wire breaks greatly reduced. Regular inspections, painting and general cleaning were carried out on the usual schedules, and a substantial proportion of the entire rolling stock was completely overhauled. Track maintenance was held to a high standard in the face of a decreased budget, and a substantial mileage was thoroughly reconditioned during the year.

Other important maintenance activities of the company include frequent grinding of wheels to eliminate thin flanges and flats, salvaging worn parts by welding and other methods, rebuilding buses to make them more serviceable, conversion of equipment for one-man operation, keeping accurate records of all phases of work, decreasing the inventory of stocks by more careful planning, installing new machinery to effect savings in overhaul and repair work, reducing lost-time accidents among all shop, garage, roadway and line employees, and fostering a spirit of co-operation among the employees in all departments.

While endeavoring in every way to reduce expenses, the management has adopted the policy that absolutely no maintenance shall be deferred. That this policy was followed rigidly is indicated by better pull-in records for cars and buses, and by the present excellent condition of all track and overhead. By thus keeping its physical plant in first-class condition, the company has been able to render high-grade service to its patrons.

Use of the budget system for all departments has aided the management in trimming its expenses. In September and October of each year an estimate of revenue and expenses for every month of the coming year is prepared. In making this estimate, the company carefully apportions the operating expenses, taking into consideration all factors such

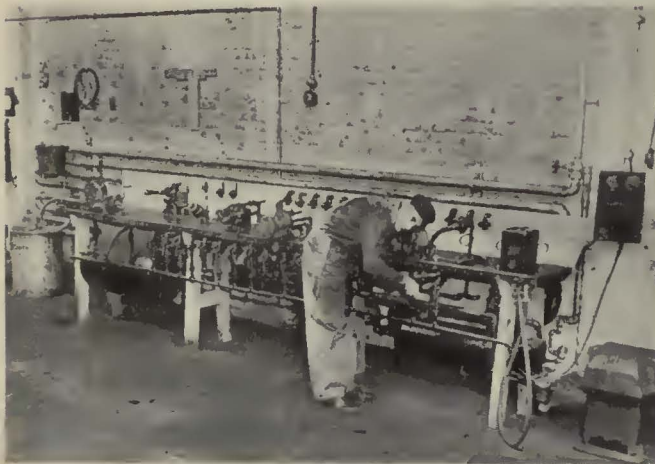


Plaque awarded to the Georgia Power Company, Atlanta division, winner of *Electric Railway Journal* Maintenance Contest

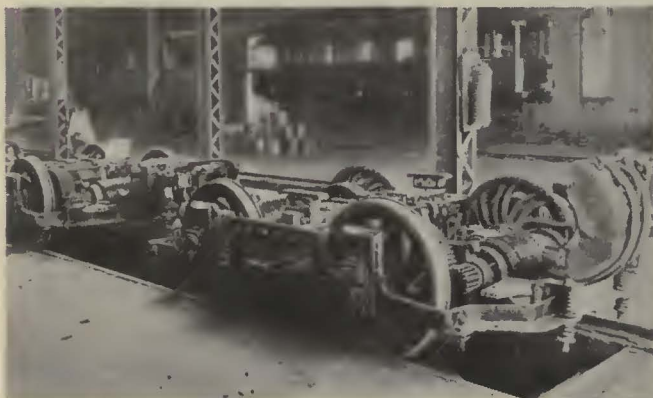
For outstanding accomplishments in all departments, the Georgia Power Company won the *Electric Railway Journal* Maintenance Contest Award in competition with 41 other electric railways



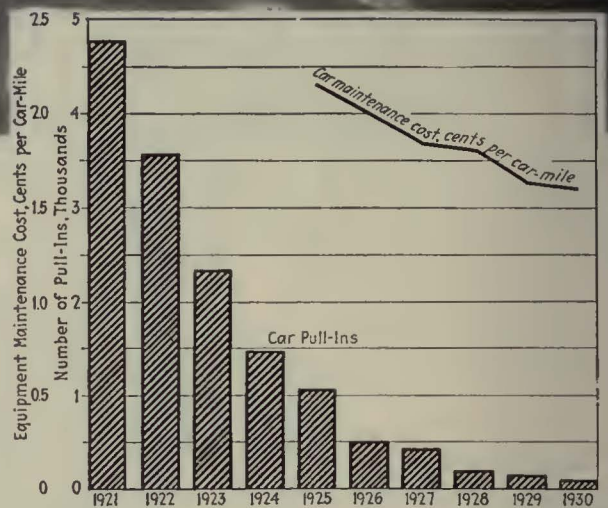
Car overhauling is facilitated at the Fulton County plant by using modern machinery



All types of air equipment are tested on this specially constructed bench before being placed back on the cars



Trucks being reassembled after thorough overhauling



While pull-ins have been reduced from 4,765 in 1921 to 90 in 1930, the cost per car-mile for maintenance has been steadily decreased

as number of cars and buses to be overhauled, amount of track that must be reconditioned and the possible saving in operating expenses through an increase in one-man service. As each month approaches, the figures are subject to revision, depending upon the trend revealed in the more recent months. If a downward revision is necessary, the cut is distributed over all departments. Not only do the departments endeavor to keep within the budget, but all try to go under the budgeted figure as far as possible. During 1930, the actual operating expenses were considerably under the budget. From this it will be seen that the use of the budget has been a great aid in lowering maintenance and other expenses.

Co-operation among all divisions of the company is another factor which has contributed to its excellent maintenance record. The need for paying more attention to details and co-ordinating the efforts of all groups has led to a better understanding on the part of every employee of the responsibility of the other. The proper operation of the cars by the trainmen, the reduction of flat wheels, accidents and collisions, and the saving in power have all been of material aid in reducing maintenance costs. In promoting this attitude, the management itself has co-operated in every way possible.

In the following pages the particular accomplishments of the rolling stock and shops, way and structures, overhead lines, and bus departments will be outlined. Each has contributed its part in winning the award, and each has a record of numerous new methods, devices, and general improvements adopted.

Equipment Department Has Notable Record of Accomplishment

OUTSTANDING records have been made by the Georgia Power Company during the past several years in the maintenance of equipment. The purchase of new cars, the rehabilitation of older cars, the exchange of records with other railways, the rigid inspection and the frequent overhaul have been largely responsible for the good accomplishments.

Reductions in maintenance cost have been accompanied by substantial decreases in car failures. Pull-ins have been reduced from an average of thirteen per day in 1921 to one every four days in 1930. The cost of maintenance of equipment and the number of miles operated per pull-in since 1925 are shown in the tabulation below:

Comparison of Maintenance Costs and Performance

Year	Total Equipment Maintenance Cost	Equipment Maintenance Cost per Car-Mile, Cents	Miles per Pull-In
1925.....	\$285,486.04	2.17	12,226
1926.....	265,379.14	2.00	26,041
1927.....	248,583.02	1.85	29,685
1928.....	235,236.01	1.79	77,664
1929.....	212,528.02	1.62	83,861
1930.....	205,280.70	1.60	142,877

The best evidence of the high standards set in overhauling and repairing the cars is found in the record of pull-ins. Using the Southern Equipment Men's Association definition of a pull-in as "a car which has to be removed from service prior to completion of its regular prescribed run for any mechanical, electrical or man failure, or accident will be termed a pull-in," the company has kept a record of all failures for a long period of years. The following table shows the total for the years 1921-1930, and the average per month and per day.

Ten-Year Record of Pull-ins

Year	Total for Year	Average per Month	Average per Day	Average Miles per Pull-In
1921.....	4,765	397	13.2	3,002
1922.....	3,577	298	9.9	3,820
1923.....	2,342	195	6.5	5,859
1924.....	1,479	123	4.04	9,341
1925.....	1,070	89	2.95	12,226
1926.....	508	42	1.39	26,041
1927.....	458	38	1.22	29,685
1928.....	169	14	0.463	77,664
1929.....	156	13	0.42	83,861
1930.....	90	7.5	0.24	142,678

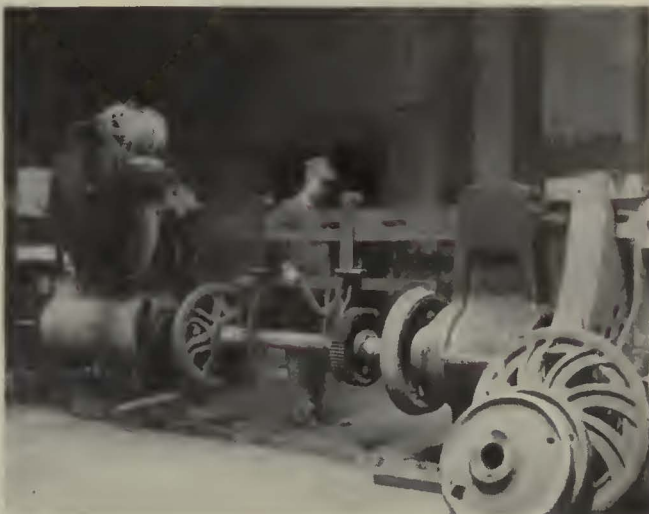
Of the 90 pull-ins during 1930, 42 were not chargeable to the mechanical department. The remaining 48 "chargeable" pull-ins are equivalent to an average of 0.13 pull-ins per day, or 267,521 miles per pull-in. For the year 1929 Atlanta topped the list of the member companies of the Electric Railway Association of Equipment Men, Southern Properties, with an average of 83,861 miles per pull-in. In 1930 the company held second place in the rating.

Comparative maintenance costs of 26 cities in the Southern Equipment Men's Association show that during the year 1930 Atlanta was next to the lowest. Costs for these cities ranged from 15.2 to 32.89 cents per car-mile, and averaged 21.18, Atlanta's figure being 16.21 cents, or 4.97 cents below the average.



Door engines are removed from the car at the time of overhaul and dismantled for checking

Since the report of the Georgia Power Company for the competition included the rail operations of the city lines in Atlanta, the Stone Mountain interurban line and the Atlanta Northern Railway line to Marietta and Smyrna, the records are for the maintenance of 356



Wheels are ground in a lathe during the regular overhaul



Wheels that show signs of wear on the flanges are ground while under the car

active cars. This number includes 326 city motor cars, nine city trailers, fifteen inter-urban motor cars and six interurban trailers. All of these cars are double-truck, and most of them are equipped for one-man operation. All major repairs, overhauling and painting are taken care of at the so-called

Fulton County plant. The cars are operated from three carhouses, known as Butler, Edgewood and Ashby.

During the year 1930 a total of 192 cars, or 54 per cent of all active cars on the system were overhauled.

How the savings in maintenance expense were distributed is shown in the following table, listing the amounts for each account for the years 1928, 1929 and 1930. From this it will be seen that the principal reduction has been made in the car account.

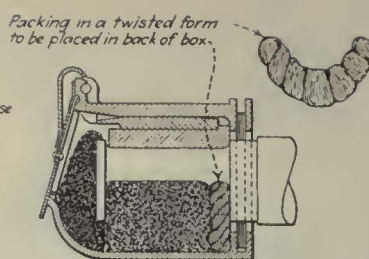
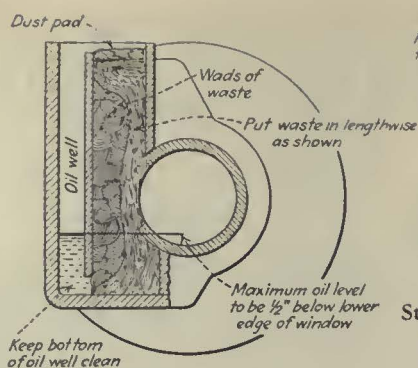
Distribution of Maintenance Expense

Account Number	Maintenance Account	1928	1929	1930
329	Superintendence.....	\$8,866.01	\$14,570.99	\$13,689.62
332	Car.....	140,884.83	119,979.62	115,717.48
333	Electrical equipment of cars...	62,256.68	57,168.28	64,056.73
337-1	Shop expense.....	22,530.29	21,293.56	21,160.65
337-2	Shop equipment.....	656.80	458.94	611.30
339	Miscellaneous equipment.....	41.40	56.63	44.92
	Total.....	\$235,236.01	\$212,528.02	\$205,280.70
370	Carhouse expense.....	\$135,196.56	\$126,743.43	\$116,032.72

The decrease in maintenance costs has been accompanied by an increase in average wages, from 66 cents per hour in 1926 to 72 cents in 1930 for overhaul shop employees (white), and from 56 cents to 65 cents over the same period for carhouse attendants. More efficient operation of the shops, with newer cars, improved methods and labor-saving shop equipment, have enabled the company to reduce its mechanical department force from 216 to 154 in the last four years. Thus, even while wages were increased, the total payroll showed a decrease from \$305,966.43 in 1927 to \$239,471.93 in 1930.

During the entire year of 1930 there were only two lost-time accidents in the entire mechanical department. One of these was caused by negligence on the part of the affected employee. This record compares with nineteen lost-time accidents in 1926 and fifteen in 1927.

Aside from the work of overhauling, inspecting, repainting and cleaning, the mechanical division did a number of special jobs which were not part of the regular routine. Of these, the most important was equipping 85 cars with steel wheels. In March, 1930, the company began by equipping 50 one-man city cars, removing the cast-iron wheels. That work was completed in September



Standard method of packing and lubricating armature bearings (left) and for packing journal boxes (right)

derailments, caused by broken flanges.

During the year the mechanical department also installed grab handles on 50 cars, changed register stanchions in 90 cars, changed foot rests on 75 cars, installed a metal shelf for the operator in 50 cars, changed ventilation on 50 cars, changed drawhead couplings on twelve cars and moved the gong valve to the inside of 40 cars. The department also rebuilt one flat car, installed a new floor and sheet-iron covering on another work car, made sign changes necessitated by route changes between the three carhouses, and replaced 30 old compressors with a new type.

A record of work done at the Fulton County plant in 1930 shows that 190 cars were overhauled and 810 were repaired in the truck and motor shop, of which 206 were gone over in the carpenter shop and 185 were painted.

The mechanical department made a number of improvements in its shop equipment during 1930. Among these were the installation of an electric hoist in the truck shop; use of separate wires to electric welders, saving time and causing less welder troubles; installation of a bench for testing all air devices, this being so equipped that all parts get a service test before being put back on the cars; improvement of the test rack for checking door-engine magnet valve coils, a device which has proved valuable in reducing valve troubles; installation of a test bracket for checking PC control valves and relays; improvement of the field tester, enabling electricians to find defective fields that previously were not being detected; change of the armature ground tester, useful for finding defective armatures before going into service; improvement of an air gage tester, making it possible to set all gages the same; and adoption of a better method of banding armatures, which reduces open circuited armatures. Carhouse equipment installed included a machinist vise, a hydraulic jack, a 10-ton hydraulic hand pump and hoist, and a rack for trolley poles.

In car overhaul work a definite procedure, accompanied by special tests and methods, is followed. Much of the success in reducing pull-ins is due to the thoroughness of this overhaul. All parts, though some may appear to be in good condition, are checked carefully before being reinstalled on the car. If any equipment shows wear or proves



Cars are kept attractive by painting them every 22 months

defective under test, it is repaired, rebuilt or replaced. The rigid policy is that all equipment must be in condition to operate satisfactorily until the next overhaul. Mileage records are kept for each car, and at the end of every month the mileage is checked. As soon as a car approaches the 80,000-mile mark, it is withdrawn for overhaul.

When the car enters the shop, the body is raised and the trucks moved ahead on the track. All equipment, including the air compressors, door engines and controllers, is removed from the car and the body repaired. The trucks are completely dismantled, the motors going to the electrical shop and the brake rigging, wheels and bearings to other sections of the shop. When all parts have been brought up to standard, they are again assembled. The car then proceeds to the paint shop, if it is in need of painting, or to its regular carhouse.

In the motor repair shop the armatures are removed, checked, and rewound, banded, dipped and baked. Particular attention is given in this shop to inspecting armature bandings, as it is thought that the life of the armature depends to a great extent on how well it is banded. Armatures are tapped lightly with a hammer, and if any vibration is noted the bands are removed. Other electrical devices, including the line breakers, lightning arresters and energy consumption meters are thoroughly tested and overhauled. A special installation of meters and necessary auxiliary equipment permits the testing of all electrical equipment on the car. In overhauling the watt-hour meters, double-distilled mercury is used. This mercury is clean enough to last until the next regular overhaul and gives an increased life to the meters.

Compressors and door engines are taken to the air department, where new gaskets are substituted and worn parts replaced. A bench has been constructed in the shop which permits testing of all air devices used on a car. Worn air compressor cylinders are rebushed on a special machine designed for this purpose. This same machine is used also for axle bearing fits on motors. In going over the operators' equipment, the brake valves are completely dismantled, inspected and reassembled.

Whenever necessary, brakeshoe heads are built up by electric welding. Bolster guides also are built up by welding, and then turned down to shape with a special lathe tool in a radial drill. The original bushing is then put on the guide and welded. The same procedure is followed for brake hangers, or other apparatus using a half-ball bearing. Pins, hangers and other parts of the brake rigging are renewed.

Regular inspections of the cars are made at the three carhouses on a 1,400-mile basis. This inspection is very comprehensive, including trucks, motor leads, brushes, brakes, controllers, line breakers, compressors and other parts. The accompanying repair work consists primarily of replacing, lubricating and adjusting worn parts.

An important part of all work in the mechanical department, particularly that of the inspectors and those in charge of overhaul, is the personal responsibility involved. Any troubles that result are traced to the inspector who failed to report properly or to the mechanic who repaired the defective part. This system has aided greatly in obtaining a thorough reconditioning of the equipment.

Much attention has been given to the lubrication of wearing parts. The company has adopted a set of standard practices which are followed rigidly. In the pro-

cedure for packing armature and axle bearings, the packing next to the shaft or axle is made in the form of a wick. The wicks for bearings are made into skeins long enough to reach from the bottom of the waste chamber up to about 6 in. above the seat of the chamber cover. The skein is then twisted about one complete turn in order to hold all of the strands in place, and to produce a more springy wick. After the wick is formed in the chamber it is pressed against the shaft with a packing iron and then the necessary additional waste is forced behind it. A little oil is added when packing, if the waste is not sufficiently saturated. The loose upper end of the wick is then folded over the other waste and tamped down tightly. Care is taken that enough waste is placed back of the wick so that the loose end is above the opening of the bearings after being tamped. A pad of saturated waste large enough to fill the remainder of the chamber is then placed on top of the wick to catch and hold dirt which might fall in when the bearing housing cover is open. Armature and axle bearings are repacked every six months on all cars. Waste is teased every three months on the improved type housings, and every 30 days on all other cars.

Armature and axle bearings are oiled every 1,400 miles, at the time of the regular inspection. Oil is put in the well and not on the waste. If the waste is found to be dry and not feeding properly, all the waste is pulled out and observations made as to whether the opening between the waste chamber and the oil well at the bottom is free from dirt. Oil in the loose well is measured with a rod marked for the different oil heights, and checked with a table of depths specified for the various types of motors.

Truck journals are repacked every six months, in the spring and fall. The first waste inserted is in the form of a roll, and is packed tightly in the rear end of the box. Sufficient waste is then added and packed firmly enough to form a good wiping contact with the journal. Waste placed at the side of the journal is never above the journal center and lies rather loosely. The dust pad is then replaced, all surplus oil and waste threads are removed from the mouth and edges of the box and the lid is closed tightly. Center and side bearings are oiled with a bearing grease every three months.

For gears and pinions it has been found that the best results are obtained by frequent addition of small quantities of grease. About $\frac{1}{2}$ lb. of grease is applied at each inspection period, and spread on the gears and pinions as far as the hand can reach through the handhole plate. Air compressors are examined on inspection days, and enough oil added to bring the level within $\frac{1}{4}$ in. of the top of the filling plug.

Special attention has been given in Atlanta to the grinding of wheels. By grinding whenever necessary and making certain that the two wheels on a single axle are of precisely the same diameter, the company has greatly increased the life of wheels, has eliminated thin flanges, and has improved the smoothness of operation. Cars are inspected frequently, and, if a thin flange on a wheel is discovered, the car is immediately sent to the Butler carhouse where the grinding equipment is installed. The wheels are not taken off, but the car is raised slightly so that they can turn freely. A motor-driven emery wheel is then placed in position under the car and the wheels ground to correct size. Through proper grinding, the life of steel wheels has been increased from 83,000 miles to about 145,000 miles.

Track Construction and Maintenance on Economical Basis

WHILE maintaining track at a high standard, the Georgia Power Company has greatly reduced the cost. This has been accomplished in part by developing efficient methods and economical types of track construction. Careful supervision; modern equipment, including a rail grinding car, a pneumatic sand car and a welding truck; good construction in the past and the application of up-to-date methods are other factors which have contributed to the company's excellent record.

A clear picture of what the roadway department has accomplished in reducing costs may be obtained from the following table:

Track Maintenance Costs, 1923-1930

Year	Cost of Maintenance	Per Cent of Revenue	Cost per Track-Mile	Cost per Car-Hour	Cost per Car-Mile
1923	\$223,776	4.27	\$1029	\$0.1492	\$0.0163
1924	214,491	4.25	982	0.1473	0.0156
1925	176,541	3.44	803	0.1311	0.0135
1926	174,600	3.32	794	0.1290	0.0132
1927	176,477	3.44	784	0.1280	0.0131
1928	149,130	2.78	661	0.1089	0.0114
1929	148,194	2.83	659	0.1100	0.0113
1930	136,216	2.85	606	0.1040	0.0106

"Cost of Maintenance" for this table includes accounts 1 to 11, inclusive.



International steel twin ties were installed when this double track was rebuilt

and 80-lb. rail. Formerly rail traffic was held off of this type of track for 21 days after concrete was poured. By using calcium chloride the time was reduced to seven days. At present, an International concrete pulsator is used which permits the track to be built while in service. Variations from this type of construction include the use of a 1-in. layer of asphalt for the paving surface in place of all concrete, the use of International steel twin ties, either with a concrete or asphalt surface, and the use of Dayton mechanical ties. Two other types used are the 122-lb. rail beam construction and the solid tie, ballasted and grouted. Thermit joints are standard for all new track and track being rebuilt. When wood ties are used, spikes are driven without boring holes in the ties.

In recent years a total of 49.14 miles of track has been built, five major types of construction being used. A tabulation of these types follows:

Recent Track Construction in Atlanta

Type of Construction	Miles
International steel twin tie.....	6.42
Dayton mechanical tie.....	0.80
Beam construction, 80-lb. A.S.C.E. rail.....	25.49
Beam construction, 7-in., 122-lb. rail.....	4.65
Solid tie construction, 7-in., 122-lb. rail.....	11.78

By solid tie construction is meant track built with the ties spaced approximately 2 ft.



Through use of International concrete pulsator track now can be built under service

Much of the success in reducing the costs of the roadway department is due to the detailed budget, the careful checks of expenses and revenue each month and the efforts made to keep within the allowed amounts. For the past year \$180,000 was appropriated for roadway maintenance. The actual amount spent was \$162,328, a decrease of \$17,672, or 9.82 per cent under budget. It also represents a decrease of \$14,324, or 8.11 per cent, from 1929. In arriving at these figures, accounts 301 to 306, 308 to 312, 315 to 317, 322 and 324 are included.

In the record of unit costs of total maintenance, the cost per mile of active track decreased from \$596 in 1929 to \$553 in 1930, or 7.3 per cent. The cost per car-mile was lowered from \$0.0100 to \$0.0094, or 6 per cent, and the cost per car-hour declined from \$0.0970 to \$0.0925, or 4.64 per cent. These figures are based on charges to accounts 301 to 310, inclusive, 315 to 317, inclusive, 319 and 322.

At the close of 1930, the system included 229.176 miles of active track. This total is made up of 86.774 miles of double track and 55.628 miles of single track. Several types of track construction are used in Atlanta. The type considered the most economical and the one most used recently is the concrete beam construction, using wood ties

During the year, a short stretch of track of unusual type was built. Trough channels, joined by steel angle bars and embedded in concrete, were installed for holding the individual rails and the surrounding asphaltic concrete. The aim of this design was to obtain a track with rigid foundation suitable for asphalt pavement, allowing the use of a light section T-rail and permitting sufficient flexibility immediately around the rail to deaden noise and assist in preventing corrugation.

In constructing this track an excavation was made, 6 ft. 5 in. wide and 6 in. deep. This was rolled and then a longitudinal trench was excavated about 18 in. in width and 16 in. in depth for the troughs. Second-hand cross ties were laid across this excavation, 80-lb. A.S.C.E. rails were laid on them, the rails were shimmed up to suitable line and grade and thermit weld joints poured. The trough channels were placed under the rails and cross angle members and holding clips bolted to trough and base of rails. The temporary cross ties were removed and the track blocked and shimmed to proper line and grade. Before the track was lowered in place trenches were dug for the cross-channel members. Concrete was then poured to the top of the vertical leg of the channels while the track was being vibrated.

After the concrete had cured sufficiently, asphaltic concrete was tamped as hard as possible around the rail to the proper elevation. A concrete groove was then formed with Incor cement, which obtains a workable strength in 24 hours, after which a paving asphaltic surface was laid. On the vertical leg of the trough angle cuts were made in the top of the angle on the gage side about 1 in. apart and $\frac{7}{8}$ in. deep. Steel between these cuts was hammered over toward the rail to form an anchorage for the groove concrete. These anchorages were spaced approximately 1 ft. apart. This work was done in the shop and the cuts were made by an oxyacetylene flame.

Under heavy traffic conditions it is expected that the trough channels and foundation will outlast several sets of rails. It will be an easy matter to excavate the asphalt from around the rail, remove the nuts and clips and install new rail. No concrete comes in contact with the rail except the small amount used on the gage side to form a groove for wheel flanges. If the asphalt were brought up to proper level for groove it would soon become gouged out of surface by the action of flanges.

During 1930, a total of 9.881 miles of trackwork was done. This included 0.336 miles of new track built, 6.450 miles of track rebuilt, 2.941 miles of track resurfaced and 0.154 mile of track repaired by cutting in short pieces of rail. In the past year there were 158 active construction orders, the total estimated cost of which amounted to \$433,236. The actual cost of this work was \$399,610, a saving of \$33,625. New special work was installed at five locations, old special work was abandoned or replaced by new design at seven points, and old special work was replaced by new of the same layout at eighteen locations.

For the past several years, track activity has been maintained at an almost even pace. Extensions have not been numerous but track rebuilt has remained about the same. The following table gives the mileage of track built and rebuilt for the past seven years:

Summary of Trackwork, 1924-1930

Year	Built	Rebuilt	Total
1924	2.999	6.995	9.994
1925	3.106	6.670	9.776
1926	1.345	6.883	8.228
1927	3.308	6.266	9.574
1928	0.689	7.338	8.027
1929	1.127	6.036	7.163
1930	0.336	6.450	6.786

To insure smooth track throughout the system, all rail, including joints, is ground by a reciprocating grinder when installed and when any part of the track shows signs of corrugation. This work is done with a separate car equipped with a grinder and other necessary equipment. During the year 72.1 miles



Pneumatic paving breakers and other modern machines help the roadway department to lower costs

of old rail was ground for corrugation at a total cost of \$19,230, or \$0.05051 per foot. An average of 813 ft. of old rail was ground per nine-hour day. New rail ground during the year totaled 16.95 miles. This was done at a cost of \$3,464, or \$0.03871 per foot. Grinding bricks averaged 150 ft. for old rail and 163 ft. for new rail.

An important part of the roadway maintenance is the keeping of records to show at all times the progress on individual jobs and what the various crews have completed.

Forms used show the date when the work was started and finished on certain streets, when lanterns were placed at exposed work, information regarding employees, use made of air compressors, number of thermit welds made, trouble reports of signal and switch maintainers, call reports of the emergency truck, retirements and reports on improvement authorities, giving location of work, estimated cost, distribution of money spent, total of track and paving, and unit costs. Reports from the foremen are submitted to the superintendent's office where they are consolidated.

In the past year a total of 9,936 ties were installed, 1,718 for maintenance and 8,218 for construction. Of these 9,488 were creosoted pine ties, 40 were plain oak ties, 62 were International steel twin ties, 60 were channel steel and 286 were Dayton mechanical ties.

All creosoting is done in the company's own plant. Ties, poles and all structural timber subject to decay are treated with a preservative in this plant before installing. During the year the company creosoted by the empty cell process 37,839 cu. ft. of ties and bridge timber. A total of 28,822 gal., or 253,193 lb., of creosote was used for this work. The unit cost per cubic foot of timber for creosoting was \$0.1674.

A number of work cars and trucks, under the supervision of the roadway department, are used on the system. Included in this fleet are an emergency truck, equipped with winches, ropes, jacks and other tools, for taking care of any emergency which would block a line; three $2\frac{1}{2}$ -ton trucks, on each of which is carried a welder and an oxy-acetylene cutting outfit; a car for weed killing; a work car with an electric crane for handling rails; two other work cars for substitute service; a Differential dump car for hauling crushed stone; two $3\frac{1}{2}$ -ton trucks for general use; a 5-ton Differential truck with a three-way dumping body, for use in handling track materials; a tower truck for signal maintenance; a light truck for the switch tongue crew; another truck for servicing electric throw



Section of track being rebuilt with Dayton mechanical ties

devices; a sand truck, and a sand car.

The sand car is filled at the drying plant by forcing the sand through a pipe with air. The overhead tanks in the carhouses also are filled, in turn, by forcing the sand from the tank in the car. This system has proved a real time-saver and has caused no trouble whatsoever.

In the organization of the roadway department the superintendent has directly under him a chief clerk, a supervisor of switch and signal maintenance, an engineer and a roadmaster. Under the supervisor of switch and signal maintenance are those in charge of signals, special work, electric switches and the emergency truck. Under the roadmaster are the track foremen, operators of work cars, welders and grinders.

With the addition of modern machinery and the adoption of advanced methods, it has been possible to reduce the roadway force considerably. Four years ago 263 employees were in this division; now there are 155. As a result, the payroll has decreased from \$299,162 in 1927 to \$231,453 in 1930. The present weekly wage for foremen is \$43, for sub-foremen, \$37, and for work car motormen, \$40. Laborers are paid 30 cents an hour.

When it was found necessary to reduce the payroll of this department, it was decided that rather than discharge



Thermit welded joints are used on all track construction at Atlanta

employees it would be better to shorten the week. Accordingly, the five days of nine hours and five hours on Saturday, totaling 50 hours, was reduced to five days of 7½ hours and 4½ hours on Saturday, totaling 42 hours.

Safety at all times is stressed among the employees of the roadway division. During the year a meeting was held each month to discuss ways and means of eliminating hazards and preventing accidents not only to the company's own workers, but also to the general public. Committees were

formed among the workmen covering each phase of the work, and these committees were required to report at the meetings any hazards they may have noticed or had called to their attention during the month, or any item of improvement that could be made in the service.

All foremen have special compartments in their tool boxes for first-aid kits and during the year 69 minor accidents were treated on the job. These kits are all kept well stocked and goggles are furnished the men whenever necessary. There were no eye accidents during the year. In the last twelve-month period only six lost-time accidents occurred, four of which were due to the injured person's own carelessness. This figure compares with 32 in 1926 and 21 in 1927.

Automatic electric switches are installed at 122 loca-



In reconstructing this track the old wood ties were left in place and steel ties placed between them



New type "quiet" track, using concrete-embedded channels in which an asphaltic concrete is tamped around the rail



Cars operating over newly laid track, built under service with the aid of a concrete pulsator

tions on the system. There were 13,038,067 operations in 1930 and 159 failures, or 82,000 operations per failure. The cost of maintaining these switches was \$7,692.

The signal system of the company, also maintained by the roadway department, consists of 82 blocks. There were 8,671,250 operations in 1930 and 163 failures, or 53,198 operations per failure. The cost of maintaining the 135 signal units was \$8,086.

Systematic Maintenance Has Reduced Wire Breaks

ATENTION is directed primarily to constant inspection in the maintenance of the overhead. Line crews watch at all times for defects and pay particular attention to such danger points as intersections, curves, hills and locations in front of carhouses. Contributing to the excellent record of this division is a thorough general inspection of the entire system each year. At this time all wire is measured and every joint examined. Any wire

year from 1923, when 26 breaks occurred, and a sharp decrease from the period around 1918 when, it is reported, there was an average of six breaks per day. While improving the overhead, maintenance costs have been steadily lowered until the cost per car-mile in 1930 was \$0.0039915.

In the past eight years 170 miles of new wire has been installed. This total includes the rehabilitation of the Marietta and Stone Mountain interurban lines in 1925 and 1926.

All overhead line clearances are measured to meet the requirements, not estimated, and all lines are fully insulated. The overhead fixtures have been greatly improved in the past several years. All frogs and crossings are fitted properly and have the correct angle. Instead of using open-pan frogs the type now installed permits the trolley wheels to travel from end to end of the fixture on the groove instead of the flanges.

Equipment for maintaining the system also has been improved. The company now has a trolley stringing



The overhead structure at "Five Points" and other intersections is checked frequently to note defects

that measures 50 per cent or less of its original diameter is marked for replacement. Other factors are keeping trolley wire aligned, observing clearances, making improvements in overhead special work and fixtures, installing wheel guards on the trolley poles, using a regular order of work for the crews, and employing precision methods to build and check the overhead.

Statistics of the line department show the results of carrying out the preventive maintenance policy and building to high standards. In 1929 the company was placed second out of 28 companies reporting to the A.E.R.E.A., with a record of eleven trolley breaks for a total of 13,726,601 car-miles run. Of these breaks two were due to wire and fittings and nine were due to burn downs, pull downs and other causes beyond the control of the maintenance force. In 1930 there were only seven trolley breaks for 13,518,839 car-miles. This record of 1,931,-263 car-miles per break in 1930 compares with 1,247,-373 car-miles in the previous year. The seven trolley breaks for last year represent a steady decrease each

truck which is self-contained. The reel fits on the truck and the wire passes back over the tower. When the truck gets to the end of the new wire the crew merely sets up the blocks and pulls up to the splicing ears. With this arrangement only one truck and five men are needed for stringing trolley in Atlanta.

Establishing a regular order of work has aided greatly in getting the most accomplished. First emergencies are taken care of. Then comes the regular work, and lastly there is the patrol work. The general foreman makes frequent inspections of all lines, checking their general condition. In addition, the gangs carry on a regular schedule of inspections, checking poles, span wires, trolley wires, insulators and fixtures, making repairs and replacements of the overhead when necessary. Parts that need immediate attention are repaired on the spot. If the span wires, trolley wires and fixtures have a good margin of safety they are left until they need to be replaced. It is the watchword to catch a defect before a break actually happens, to save time, money and delay of cars.

Summer is the regular repair season, and during it all regular replacements are made. The wire is inspected, of course, throughout the year, but in the summer the crew makes a most thorough check of each line. By this means it is possible to catch anything that might become unsatisfactory in the next twelve months. Because of this additional work a second crew of the same size as the regular one, five men, is added during the warm months.

Trouble crews work on three shifts. Two men and a driver are on each shift, except two men are on the evening shift. When not doing emergency work the trouble crews assist the regular crew. They are required to telephone the office to give information as to their whereabouts.

Guesswork is not tolerated. Level boards, micrometers, plumb bobs and tape lines are used so the entire system can be checked accurately. Particular effort is made to obtain correct alignment of the overhead with respect to the track. This precaution has been found very important in reducing troubles at curves and junctions.

New wire is strung with a tension of 3,000 lb. By

Each day the crew foremen report to the general foreman and receive orders for the next day. If it is necessary to repair overhead which gave trouble during the night the plans are altered. To facilitate the work of the crews all material is loaded on the trucks the night before.

Unit Replacement System Keeps Buses in Service

IN REDUCING road failures and in making the vehicles cleaner, more comfortable and more serviceable, the bus maintenance division of the Georgia Power Company has made an excellent record. Rigid inspection of the buses, complete overhaul, prompt repair of vehicles that have failed in service, an orderly procedure for all maintenance work, the use of modern labor-saving machines and tools, and a complete system of records are responsible for this showing.

During 1930 the Atlanta Coach Company operated 572,607 bus-miles. Vehicle-miles per pull-in averaged 2,883, but this includes failures not attributable to the maintenance department. The cost of maintenance per



Precision methods are used to align the overhead properly with the track at carhouses, curves and intersections

keeping the suspension flexible, it approaches the catenary principle. As the wire gets older and the section is less, this tension is slightly reduced.

A distribution line crew is not allowed to leave a patched-up span wire job. As soon as the distribution crew has transferred a section of poles the regular trolley crew follows to restore the trolley work to first-class condition.

The system of individual responsibility, used in the car shop, also is in effect in the overhead division. All troubles are traced back and the crew which last inspected or repaired a defective wire is asked to account for the failure. To assist in this, reports of troubles and repairs must be turned in by the crews. From these records the causes of all breaks are analyzed and an effort made to avoid a recurrence.

As for the other departments, a budget is prepared for the overhead division. Allotments of certain amounts for all operating divisions permit a careful planning of work for each month and for the entire year.

bus-mile, \$0.0721, is a little high in part because of the large number of other vehicles maintained in the garage and which increase the charges to the bus division. In carrying 1,142,914 passengers during the year, the revenue per bus-mile was 20.44 cents.

The 33 buses operated by the Atlanta Coach Company include fourteen double-deck, 54-passenger, gas-electric Fageols, three Model 65, 23-passenger Whites, ten Type X Yellows and six Type W Yellows. These are maintained at the Gilmer Street garage, located centrally in the city. In addition to these buses approximately 200 private automobiles of the Georgia Power Company, all air compressors, manhole pumps and service trucks are maintained at this garage.

During the year half of this entire fleet was completely overhauled. In six of the double-deckers new posts were installed and all side sheathing replaced with steel of heavier gage. Cross-braces of heavier metal were placed over the letterboards and the chassis were reinforced. New posts and metal sheathing also were installed on



Road failures of buses have been reduced greatly by rigid inspection and complete overhaul

seven of the Type X Yellows. These buses were equipped at the same time with new Buick engines. The three White buses, formerly used in Rome, were transferred to Atlanta and underwent a complete overhaul before going into service.

Buses are overhauled on a 50,000-mile basis. Individual records are kept for each bus and the day-by-day mileage posted. When a vehicle approaches the 50,000-mile mark it is removed from service. In overhauling the vehicles, every single part is checked and repaired or replaced. Bodies are gone over for defects and reinforced where necessary. Engines are completely dismantled and various parts are examined. In putting the engines in condition to operate another 50,000 miles, cylinders are rebored, pistons turned and valves ground, if necessary. The ignition system is checked very care-

fully, as are the fuel system, differential, transmission and all parts of the chassis.

To lessen the time of holding a bus out of service for repairs, an extra motor for each type of bus, except the White, is overhauled and kept in the shop ready for placing in the bus when the other engine is removed. Extra lighting generators and other equipment are kept on hand to allow unit replacement to a certain extent.

Shop facilities are adequate in every respect. In addition to the regular machinery this garage has a few special machines to facilitate the work. One is a piston turning and grinding machine, which is used for about 250 pistons each year. It is claimed that this device makes possible enormous savings. Another valuable machine in the shop is a cylinder grinder. Because of the large number of private automobiles and trucks maintained



All buses in Atlanta are maintained at this centrally located garage



Interior of the spacious garage, showing some of the double-deck buses

in addition to the regular buses, this machine is proving a real investment. In grinding from 35 to 60 engine blocks per year, there is a saving of \$8 each, or a total saving of from \$280 to \$480 per year on this \$2,500 machine. To see that all machines are kept in good condition and that all tools are in their proper place, a man is assigned to inspect the shops in detail every day and to watch at all times for misplaced articles.

Numerous pits are available in the garage to aid in inspecting and repairing the buses. In one part of the garage three longitudinal pits terminate in a cross-pit with a work bench along its full length.

Buses are painted once a year in a room which is closed off from the remainder of the garage. A heat-diffusing unit is used to maintain the proper temperature.

Every 10,000 miles buses receive a thorough inspection. At this time all parts are checked and repaired if necessary, and lubrication is done according to a regular schedule.

Brakes are tested daily to see if they are in proper working order and whether they are equalized. This practice has aided in reducing accidents and in lessening tire and brake lining wear.

Tires for the entire fleet are secured on a contract basis from one company. Daily and monthly records, individual and consolidated, show the mileage and any troubles encountered.

An emergency truck is stationed at the garage, for taking care of any trouble calls that may come in from the drivers. An individual record is kept of each bus failure, giving the exact location of the breakdown, the time, the trouble reported, the man who last serviced the bus, and other details. Composite records of these trouble calls are made, listing the calls by buses and months. These records show that fewer calls were received in 1930 than in 1929.

Much emphasis is placed on keeping the buses clean. Every night they are washed down on the exterior and swept and washed thoroughly on the interior.

In servicing the buses a complete record is kept of all gasoline and oil delivered to the vehicle. A composite record of gasoline and oil consumption for each bus is kept by months. If any vehicle shows a consumption higher than is expected an investigation is made to determine the cause. An Aqua hydraulic system is used to feed the fuel pump. Ethyl gasoline is used for all the company's vehicles. It is claimed that greater mileage, better performance in service and less maintenance result.

In all garage work safety has been stressed. To impress this upon the employees safety meetings are held twice a month. At these meetings employees are free to suggest ways and means of making the work safer and to bring up any ideas that they may have in regard to improving the methods and standards.



This arrangement of pits in the garage facilitates bus repairs



Special and regular machines in the garage shop effect savings in the repair work

CAR

RESEARCH

Progressing

An extensive series of tests is now under way in the field laboratory of the Electric Railway Presidents' Conference Committee at Brooklyn

EXPERIMENTS under the auspices of the Electric Railway Presidents' Conference Committee are now well under way in the field laboratory established in Brooklyn. Prof. C. F. Hirshfeld, the committee's chief engineer, is in charge of the work, with a considerable force of research engineers and mechanics to assist him. The facilities of the field laboratory include an outdoor test track, 1,550 ft. long, and an adjacent four-track car shop for indoor tests, both being loaned to the committee by the Brooklyn & Queens Transit Corporation. A number of the most recently-built cars of electric railways in various parts of the country have been shipped to Brooklyn for purposes of



Simplified model to show spring action at various speeds. The wheel at the top corresponds to the car wheel. From it, a series of weights corresponding to the various elements of the car are suspended by springs corresponding to the car springs. When the wheel is rotated, the elements vibrate with the same characteristics as the elements of the car vibrate at various operating speeds
Photos by William J. Ganz Company, New York Producers and distributors of talking pictures.

experiment. The general program involves the determination of facts from existing records, by analysis and by test and experiment. Investigations now under way at Brooklyn cover the third phase of this program.

DETERMINATION OF FACTS BY TEST AND EXPERIMENT

While a large amount of information was already available concerning the performance of existing equipment, the committee believed that further tests should be made. Those that have been made on various properties in times past have generally been limited in scope. More-



At left—Investigating time-distance characteristics of car performance. An extra rail with vertical slots at intervals through one side of the head has been installed between the running rails. The carriage is equipped with a light under the head of the extra rail, and a photo-electric cell above the rail to record the light impulses projected upward through the slots. At right—Test carriage attached at rear of a car, ready to record its acceleration and operation over the test track

over, they have been made under conditions which are not strictly comparable. The committee has decided, therefore, to undertake a thorough investigation to determine the operating characteristics of the modern electric rail car. The principal items being studied are: (1)



Testing the effect of acceleration on the passenger. This cage is accelerated at a known rate, while a slow motion picture records the action of the passenger from the time acceleration begins until it is sufficiently great to cause loss of balance.



Determining the strength of car bodies. A hydraulic ram is here shown pressing against the side of the car, while observers on the opposite side record the deflection



Observer on catwalk above car roof measuring deflection under various conditions of loading

structural strength of car bodies, (2) resistance during starting period, (3) starting characteristics, (4) balancing speed characteristics, (5) stopping characteristics, (6) riding qualities, (7) noise characteristics, (8) illumination, (9) heating and ventilation, (10) safety provisions, (11) passenger interchange provisions, (12) power requirements.

The tests being made in the field laboratory have not yet advanced far enough to permit the compilation, analysis and publication of results. Before the engineering investigations could be undertaken, it was necessary to do a large amount of preliminary work in the development of measuring and recording instruments, as none was in existence suitable for the measurement of some of the things in which the committee was particularly interested. The necessary new instruments have now been developed, and comprehensive tests are under way to determine the facts concerning various phases of car design and performance. A motion picture film has been prepared for the committee by the William J. Ganz Company, New York, showing how some of the tests are being made. This film was shown at the Wednesday session of the American Association at the recent A.E.R.A. convention, at which time Professor Hirshfeld outlined the progress of the work. The illustrations accompanying this article are prints made from the film.

TIME-DISTANCE CHARACTERISTICS OF CAR PERFORMANCE

Tests are being conducted concurrently along a number of lines. One of the most interesting of these is the study of time-distance characteristics of car performance. Special apparatus has been developed for measuring the rate of car acceleration. The first step in this experiment involved the laying of an additional rail between the two running rails of the test track. Vertical slots were then cut through the head of the extra rail at measured intervals. A small carriage was designed to operate with two wheels on the extra rail and two wheels on the adjacent running rail. This carriage was equipped with a light so placed as to shine upward through the slot in the rail head, and a photo-electric cell held above the rail to record the light impulse projected upward from the lamp. The carriage is attached to the rear of the car under test. As it moves along the track, a succession of light impulses are recorded as it passes the slots. This has proved to be a convenient and effective means of measuring the rate of acceleration and operation over the test track. Accompanying illustrations show how the carriage is used.

In conjunction with the acceleration tests being made in the field laboratory at Brooklyn, certain other studies are being made at the University of Michigan covering the effect on the passenger. In these tests the passenger assumes a standing position on a small flat car which is accelerated at a definite rate, while a slow motion picture camera records his actions from the time the acceleration begins, until it is sufficiently great to cause loss of balance. By this means, the committee hopes to discover the maximum rate of acceleration to which a standing passenger can accommodate himself. An interesting fact developed by the experiment is that women, if facing forward, are able to retain their balance at higher rates of acceleration than are men. This is believed to be due to their use of high-heeled shoes which tend to move the center of gravity of the body forward with consequently greater resistance to falling over backwards.

Structural strength of car bodies is another important subject of study. For this purpose the car body is treated as a box girder and subjected to loads which simulate those experienced in actual service. A special framework has been constructed in which the car is placed for testing. Sand bags are then placed inside the body to simulate any desired passenger loading. Deflections under load are carefully measured by means of an inside micrometer caliper. A hydraulic ram is used to test the structural strength of the car under side-stress. This pushes the body against two supports near the ends on the opposite side, as shown in an accompanying illustration.

An ingenious device has been developed for use in connection with studies of riding qualities. This is a model consisting of elements corresponding to certain elements in an actual car arranged to show spring action at various speeds. A simplified model constructed for demonstration purposes at the A.E.R.A. convention is shown in an accompanying illustration. The arrangement of the elements in the model is inverted from that of the actual car, the wheel being at the top. From it are suspended weights representing the wheels, axles, truck frames and car body. Between the weights are springs representing the journal springs, the bolster main spring and the bolster auxiliary spring. When the disk at the top is rotated, the various elements of the model vibrate as do the corresponding elements in a moving car.

Operation of the model shows conclusively that the amplitude of vibration varies greatly with changes in speed. It does not, however, increase directly with the speed but increases to a maximum point, and then decreases again as the speed gets higher.

NOISE, ILLUMINATION AND VENTILATION TESTS

Noise characteristics are being carefully investigated. Tests are being made not only of the intensity of noise, but its quality. Some noises of comparatively small volume have been found to be particularly objectionable on account of the pitch. Measurements are being taken both inside the car, with and without passengers, and also on the street. The apparatus includes a so-called filter to differentiate various frequencies. The volume of noise at each frequency is measured and recorded. When a frequency is discovered which seems to be responsible for a large volume of noise, a careful investigation is made to trace it to its source.

Extensive tests are being made of car interior illumination. In this work, all windows are carefully covered with lamp black to exclude any outside light. Steady voltage for the interior car lights is assured by the use of a small motor-generator set with voltage control. The intensity of illumination at various heights is then carefully measured at selected points. From this it has been discovered that the intensity of illumination varies greatly in different parts of the car.

Investigation is being made also of heating and ventilation. The ventilating experiments are being made on the outdoor test track. The car interior is filled with a very rich mixture of carbon dioxide and air. Samples are then taken at frequent intervals to discover the length of time that is required to completely change the air in the car.

Up to the present time, the experiments have been confined largely to tests of equipment now available. As the program proceeds, however, it is planned to utilize

the results of these tests to develop new equipment designs which will in their turn be subjected to similar tests. Following the experiments in the field laboratory, it is planned to make further tests of equipment in actual service.



Measuring deflection of car underframe with inside micrometer caliper as the load within the car is varied



Investigator measuring the intensity of illumination on a white disk placed in a position corresponding to that of a newspaper held by a standing passenger



Extensive studies are being made of noise. Observers on the street are measuring with this apparatus the volume and character of noise emanating from passing cars



Queen Mary Road substation is built in a style commensurate with its residential surroundings

Montreal Tramways

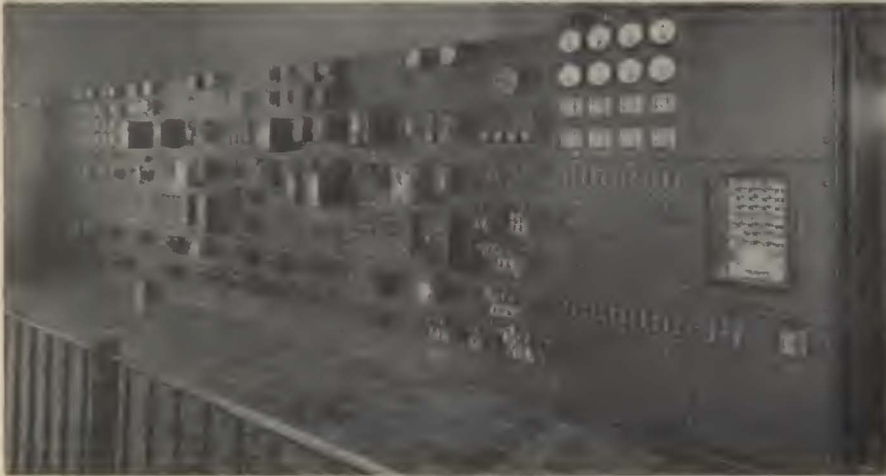
Extends Use of

The location is in a high-grade residential community and it was essential that the building should have an attractive exterior in harmony with the general surroundings. For this reason it was decided to follow the old French Canadian architectural style, as shown in one of the illustrations. While the architects employed the traditional wall masonry with wide lime mortar joints and trimmed with local cut stone, steel is used for windows and trimmings. This was so

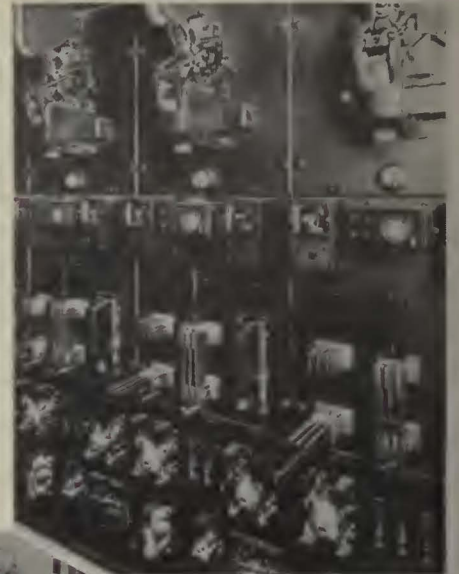
CONTINUED growth of the residential district in the northwest end of Montreal has necessitated the extension of the car routes serving it, and shorter headways between cars, particularly during rush hours. Obviously, this has called for more power and for a redesign of the direct-current positive and negative feeders to secure better voltage regulation with lower distribution losses. The load center had shifted so that

handled as to avoid giving the building a factory-like appearance. An attractive roof was obtained by using asbestos shingles irregularly laid. The interior offers a pleasing color scheme. Quarry tiles of Welsh heather-brown are used for the floor of the main room, and the walls are painted greyish-green. Railings and protective wire screens are painted black, as

Direct-current circuits are handled from a board in the basement

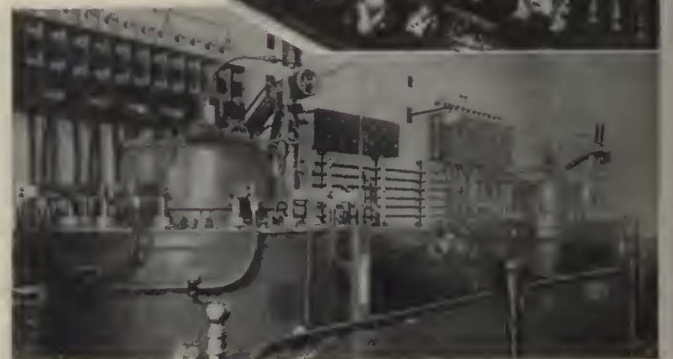


All alternating-current circuits are centered in the switchboard on the main floor near the entrance



the station which previously fed these lines was no longer properly situated. Its equipment, consisting of one 1,000-kw. motor-generator set, had also become inadequate and somewhat inefficient. To meet the new conditions, the management of the Montreal Tramways decided to replace the station by a new one, better located for present and near future requirements, and equipped with up-to-date apparatus.

After careful consideration of the problem and of the continued good operating results obtained with mercury-arc power rectifiers in previous installations, it was decided that the new Queen Mary Road substation would be equipped with two such units.



Two rectifiers each of 1,500 kw. rating form the main equipment of the station

Mercury Rectifiers

By
M. L. De ANGELIS
 Assistant Electrical Engineer
 Montreal Tramways

was a stenciled border running round the top of a painted dado.

In the main, the building is very similar to that of the Viau substation which formed the subject of an article in *ELECTRIC RAILWAY JOURNAL* of September, 1930. Its approximate over-all dimensions are 60 ft. 6 in. by 47 ft. by 40 ft. 11 in. high.

The basement is carefully waterproofed. The roof is of precast "Aerocrete" slabs covered with double-dipped asbestos shingles. The high-tension oil circuit breaker and bus-bar cells are of concrete, and are located along one side of the main room. The rectifiers are on the opposite side, on the same floor as the main control switchboard.

However, in order to reduce to a minimum the transmission of noise due to the transformers, and to keep the appearance of the building as attractive as possible, even on the sides, the two main transformers were installed in separate cells opening on a longitudinal passage with a door at the rear of the station. A hook has been cemented in the roof above each transformer for lifting the core and winding when necessary.

The electrical equipment, supplied entirely by the Canadian General Electric Company, includes:

Two 1,500-kw., 12-phase, 600-volt, non-compound steel tank mercury arc rectifiers with a.c. ignition and capable of 50 per cent overload for two hours.

Two 1,590-kva. 1,300/935-volt, 60-cycle, delta-quadruple zig-zag 3/12-phase, self-cooled transformers for the rectifiers, capable of equal overloads.

One 5,000-amp. series reactor rated to stand 150 per cent load for two hours.

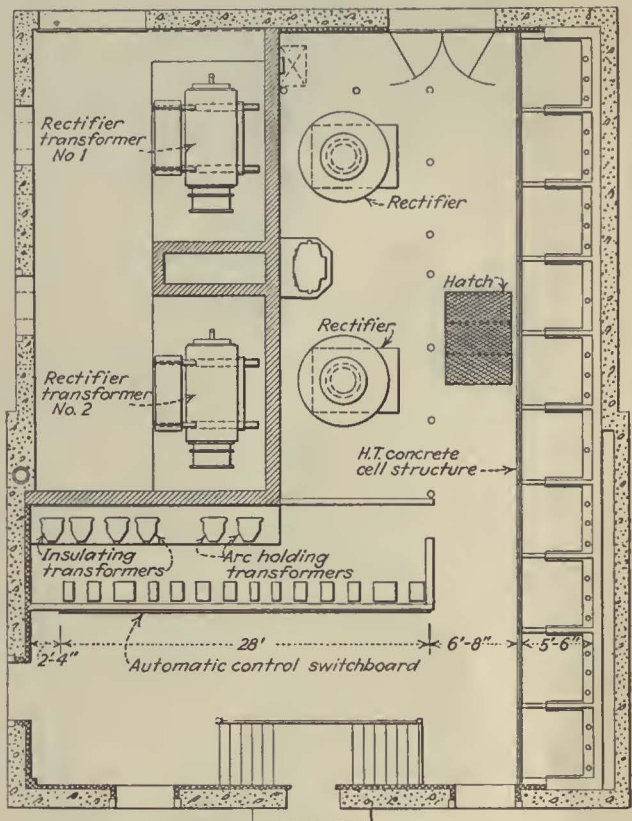
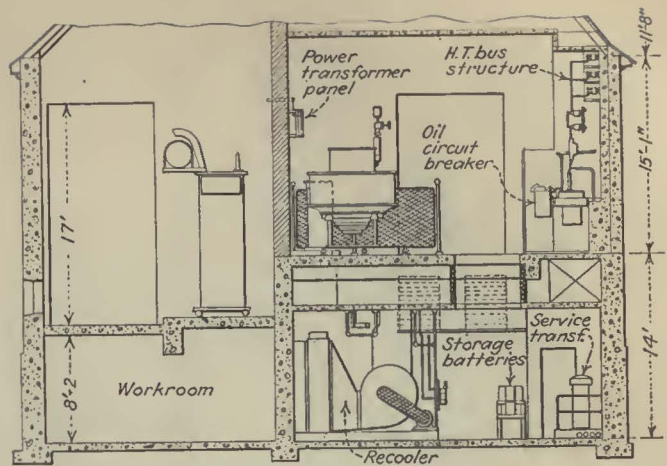
One bake-out transformer with necessary resistors.

Two self-cooling systems for the circulating water.

One bank of three single-phase 13,000/220/110-volt, 20-kva. transformers for the station service and control circuits.

One complete automatic switching equipment designed for the control of following circuits: Two incoming high-tension lines; two outgoing high-tension lines (not yet in service); two 1,500-kw. mercury-arc rectifier units; one 60-kva. station service bank; eight 2,000-amp. d.c. automatic reclosing feeders; one synchronous selector supervisory control equipment in substation and load dispatcher's office, with necessary storage batteries.

All the above apparatus is identical to that installed in the Viau substation. As in the latter station, the load responsive control can be cut out and the equipment operated by manual load control from the main switchboard in the substation. This is obtained by a suitable multi-pole, throw-over switch, mounted on the switchboard and operated, when necessary, by the inspector.



Compactness is a feature of the new Queen Mary Road substation of the Montreal Tramways

However, the alternating-current over-current protection for each unit and the control of the anode and tank heaters is maintained under automatic control. To prevent the load dispatcher from performing faulty switching which might, possibly, introduce a hazard to life or property, the circuits are so interlocked as to render totally inoperative the supervisory control when the throw-over switch is set into the "local control" position; but proper automatic indication is given to the load dispatcher to warn him that the station equipment is under the control of the station inspector.

The supervisory control apparatus is of the synchronous selector type, completely wired for 23 circuits of which, at present, seventeen controls and 22 indications are in use.

Results with the supervisory equipment for the Viau substation, which has now been in continuous service for more than one year, have been so satisfactory it is proposed to extend its use to other stations.



Loading platform in Cincinnati with sidewalk cut back to facilitate passage of vehicular traffic. Illumination is provided by lights suspended from span wires

Public Sentiment Favors Loading Platforms in Cincinnati

CINCINNATI began installing concrete loading platforms protected by substantial steel barricades in 1926, under an arrangement by which the city builds the platform and pays for the lighting equipment and the Cincinnati Street Railway pays for the current consumed in lighting the platforms. Some 280 of these platforms are now in use. They afford ample protection to passengers boarding street cars and alighting from them, and they also permit motor traffic to move past standing cars. Although motorists hit the platforms sometimes and occasional serious accidents occur, public sentiment seems to be generally in favor of their use. Every time a serious accident occurs, however, certain ardent motor enthusiasts question the desirability of the platforms. The following editorial, which appeared in the Cincinnati *Enquirer* on Sept. 28, is a particularly strong argument favorable to the platforms.

Loading Platforms

The question of the desirability of loading platforms, which has been more or less in dispute since the first one was installed, came up again Friday at a safety conference in the office of the City Manager. Motorists who believe in giving the pedestrian a chance will agree with the conference that the platforms are a necessary evil. They do increase somewhat the hazards of driving on the streets, especially the hazards of careless driving. But their value in protecting people afoot who are waiting to board street cars outweighs that disadvantage.

Without the platforms a person who wishes to board a car on any of the wider, heavily traveled streets would do so at the risk of life and limb. In the rush hours he would scarcely be able to get to the car lines at all. The only suitable alternative to the safety platform is to move car lines to the curb and route motor traffic down the center of the main highways. The cost of such a move would be prohibitive.

Another striking editorial on the subject has just appeared in the Cincinnati *Post*, local Scripps-Howard

paper, in its "Cincinnati Column," a human interest editorial feature of the paper, as follows:

Safety

There seems to be a difference of opinion among heads of departments at City Hall over the usefulness of street car loading platforms. Some believe that because motorists frequently hit them they should not be placed in the streets.

Cincinnati leaps to the defense of the loading platforms. He holds that it would be just as logical to remove all electric poles and trees that line the streets. Reckless motorists sometimes hit them, too. No careful driver ever hits a loading platform. The fellow who hits one either is negligent in not having his car under control or he is not looking where he is driving. The only exception is where he is crowded into the platform by another negligent driver.

Loading platforms are more than loading platforms. They are isles of safety for pedestrians crossing streets heavy with traffic. On arterial highways, filled with rush-hour traffic, it is almost impossible to cross the street where there are neither traffic lights nor loading platforms. If loading platforms were taken away traffic lights would have to be installed at every suburban intersection for the safety of pedestrians. How would the hurrying motorists like that?

Clearance Marker Speeds Traffic

IN COMMON with other street railways the San Francisco municipal lines suffer many traffic delays occasioned by motorists who carelessly drive partly on the car tracks and allow themselves to be held up in a traffic line in such a way as to obstruct street car movement. The general use of white street lines as traffic markers gave rise to the idea of painting a yellow line parallel to the car tracks to indicate the clearance necessary for cars.

Such lines have been painted along Market Street by a painting machine attached to the front step of a street car and operated from the air compressor.

Trolley Bus System Will Soon Serve Kenosha

Twenty-two trolley buses will completely replace present street car and gas bus system. New routes provide for a better layout of service throughout the city. Construction of vehicles, overhead and carhouses now in progress

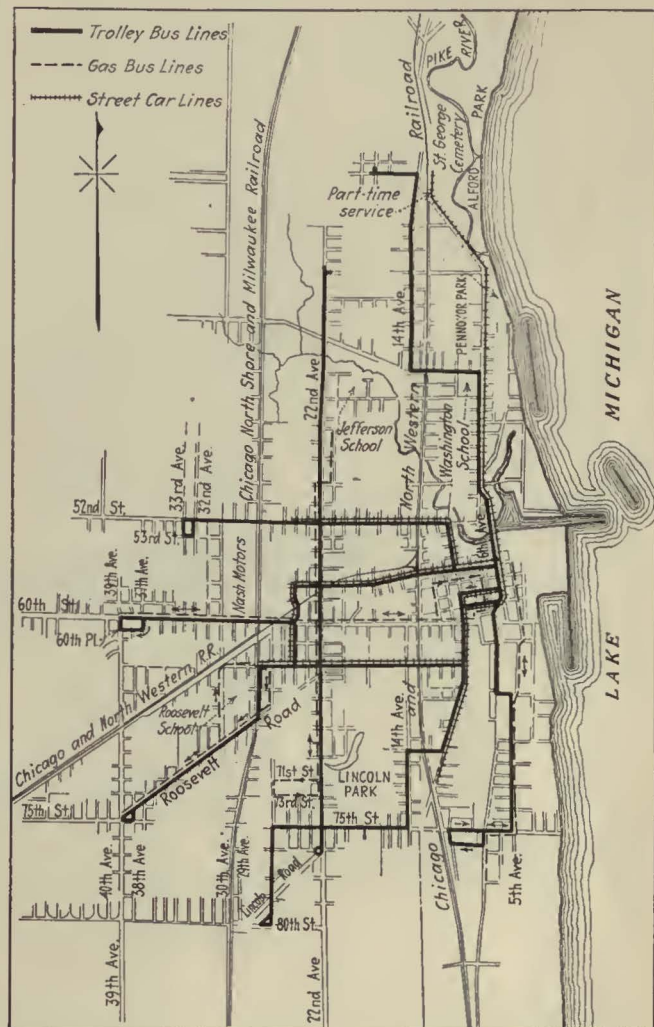
WORK is actively under way for the complete replacement of street car and gas bus services by a trolley bus system in the city of Kenosha, Wis. On Sept. 22, 1931, the Wisconsin Gas & Electric Company placed orders for 22 vehicles, and concurrently began the remodeling of a building to store and maintain the new equipment. Construction of the new double-line overhead system was started on Aug. 20. Ten of the new vehicles are being built by the St. Louis Car Company, St. Louis, Mo., and twelve by the General Motors Truck Company, Pontiac, Mich. The orders call for deliveries to begin in December, and to be completed during January, 1932.

Service will be inaugurated as soon as the vehicles are received and the operators are given a few days' instruction and training. The first line, extending from the northern extremity of the city southward through the central business district, and then westward to the outlying section of the city, will comprise 5.35 route-miles. It will be equipped and service will be started on it as soon as seven trolley buses are received, final overhead adjustments and connections made and the operators trained. A temporary gas bus service will be operated during the transition period, when the railway overhead will be cleared and the new trolley bus wires and overhead put in position. Additional replacements will follow in a similar manner until the system is completed some time in January.

SYSTEM WILL HAVE FOUR ROUTES

When completed, the new trolley bus system will consist of four lines, each of which will be designated by a color name. Appropriate color markers will appear on the trolley buses to identify them. The route described above will be known as the green line. The red line, with 5.70 route-miles, will serve the south and southwest sections of the city. The blue line, 4.10 route-miles, will run from the southeast section, pass through the central business district, and then extend westward. The orange line will be a straight north-and-south route, 2.90 miles long, intersecting all other lines about a mile west of the downtown area, and serving a growing commercial district and adjacent industrial areas.

The new system adds very little to the total route-miles of the combined bus and street railway system, although the new routing does provide a very much better layout for service in Kenosha. The total route distance of the new system is 18.10 miles. This involves the construction of 16.4 miles of double line overhead. Six loops and two wyes will be installed to permit turning at the ends of the four routes. Three lines cross the Chicago, North Shore & Milwaukee Railroad high-speed electric line and there will be five subway crossings of the Chicago & Northwestern Railway. Seven sets of



Four trolley bus routes will replace all street car and bus service in Kenosha, Wis.

electrically operated trolley wire frogs and switches will be used for branch-offs where more than one line is operated over a street.

Double lines of No. 00 round, hard-drawn copper trolley wire will be used throughout the system, with positive and negative feeders over part of the system. The present 600-volt conversion equipment will be used.

The accompanying tabulation gives general specifications of the new vehicles.

Long study resulted in the decision to place a trolley bus system in Kenosha. Failure of the existing street railway to earn enough to warrant extension and its inadequacy even with the supplementary gasoline-powered bus lines to meet the transportation needs of

Specifications for the Kenosha Trolley Buses

Name of railway.....	Wisconsin Gas & Electric Co., Kenosha, Wis.
Number of units.....	22
Type of unit.....	One-man trolley bus
Number of seats.....	42
Builder of body.....	10 units, St. Louis Car Co.; 12 units, General Motors Truck Co.
Date of order.....	Sept. 24, 1931
Date of delivery.....	December-January
Weight total.....	15,500 lb.
Length over bumpers.....	33 ft. 0 in.
Length over body, 10 units.....	31 ft. 9 in.
Length over body, 12 units.....	32 ft. 5 in.
Wheelbase, 10 units.....	193 in.
Wheelbase, 12 units.....	213 in.
Width over all.....	8 ft. 0 in.
Height, road to roof, 10 units.....	112 in.
Height, road to roof, 12 units.....	106½ in.
Window post spacing, 10 units.....	38½ in.
Window post spacing, 12 units.....	35½ in.
Roof.....	Arch
Doors.....	Front end
Air brakes.....	Four-wheel, also electro-dynamic
Armature bearings.....	Ball
Axles.....	Timken, trolley bus type
Car signal system.....	12-volt buzzer
Conduit.....	Flexible metal
Control.....	General Electric Co., special
Couplers.....	Drawbar attachments
Curtains.....	At rear of operator, none on windows
Destination signs.....	Illuminated
Door mechanism.....	Type not settled
Doors.....	Folding
Fare boxes.....	Company's type
Gears and pinions.....	Worm, integral with rear axle assembly
Hand brakes.....	External contracting on axle shaft or on motor drive shaft
Heaters.....	Accelerating-dynamic braking resistors with auxiliary 600-volt circuit
Headlights.....	Trolley bus type, 12-volt
Headlining.....	Builder's standard
Interior trim.....	Metal, enameled in color
Journal bearings.....	Roller
Lamp fixtures.....	10 dome type
Motors.....	Two, 35-hp. General Electric
Painting scheme.....	White and maroon
Roof material.....	Wood, canvas covered
Saab.....	Metal
Seats.....	Semi-bucket type, leather upholstered
Seat spacing.....	10 units, 29½ in.; 12 units, 31 in.
Slack adjusters.....	Integral with air brake mechanism
Steps.....	Stationary
Step treads.....	Insulated
Trolley catchers.....	Two
Trolley base.....	Two, trolley bus type
Ventilators.....	Special, adapted to circulating air system
Wheels, type.....	Heavy duty, 9.75 x 24 in.
Wheelguards and fenders.....	Trolley bus type

the community prompted a study of the various available types of systems as a substitute capable of meeting the requirements of both the community and the utility. Rerouting of lines embodied in the plan finally submitted made it possible to cover the city to much better advantage. The only changes that were made were for the retention of routes over certain streets now used by street railway lines.

A comprehensive city plan with a really fine civic center is being progressively executed by the city. Relocation of the tracks on widened streets would have required a heavy expenditure. Elevation of the main line tracks of the Chicago & Northwestern Railway, which runs north and south about a half a mile west of the downtown business district, called for a considerable additional sum to double track the subways. It was decided that these expenditures were not warranted by the revenues obtained from the street railway. The necessary rebuilding of a considerable amount of track on the system set up requirements for capital expenditures not available in the reserves usually set up to cover replacements of this character.

These major items and the increasing cost of railroad crossing track, overhead and equipment maintenance, and the bus replacements necessary in the next five years, coupled with the inadequacy of the system even after the expenditures for capital account and maintenance,

caused the company management to entertain a proposal from the city to submit a plan for a system to replace the rail and bus services. The result of the negotiations is the trolley bus system now being installed.

Warning Sign Reduces Accidents



Cars of the El Paso Electric Company equipped with the illuminated warning sign have reduced accidents to passengers

ILLUMINATED safety warnings have been developed by the El Paso Electric Company for mounting at the entrance or the exit of cars and buses. The sign is mounted on a suitable support without obstructing the passageway in the vehicles.

The device consists of a rectangular frame, which can be placed vertically or horizontally, with two open sides arranged to hold transparent aluminum slides bearing the stenciled warning signs. Cel-O-Glass is placed behind the stenciled sign. Illumination is obtained from a lamp placed in an open-front metal casing that is part of the device. In the street cars, the lamp is connected to the regular lighting circuit.

These signs can be clamped to the fare box post on the platform so that all passengers will read them as they board or alight from the vehicle. The arrangement permits a clear view of the sign to all passengers seated in the car. This sign can also be used in a step riser beneath the entrance door to the street car or bus. The removable slide of the device permits the use of a variety of safety messages that can be changed as desired. The sign is compactly built and is of an attractive design.

The El Paso Electric Company has been using the new safety sign on cars operated over one of its principal lines for more than a year with excellent results. It has proved to be an important factor in contributing to the increased safety of operation.

Sunday Passes Increase Riding and Revenue in New Bedford

BY HAROLD E. POTTER

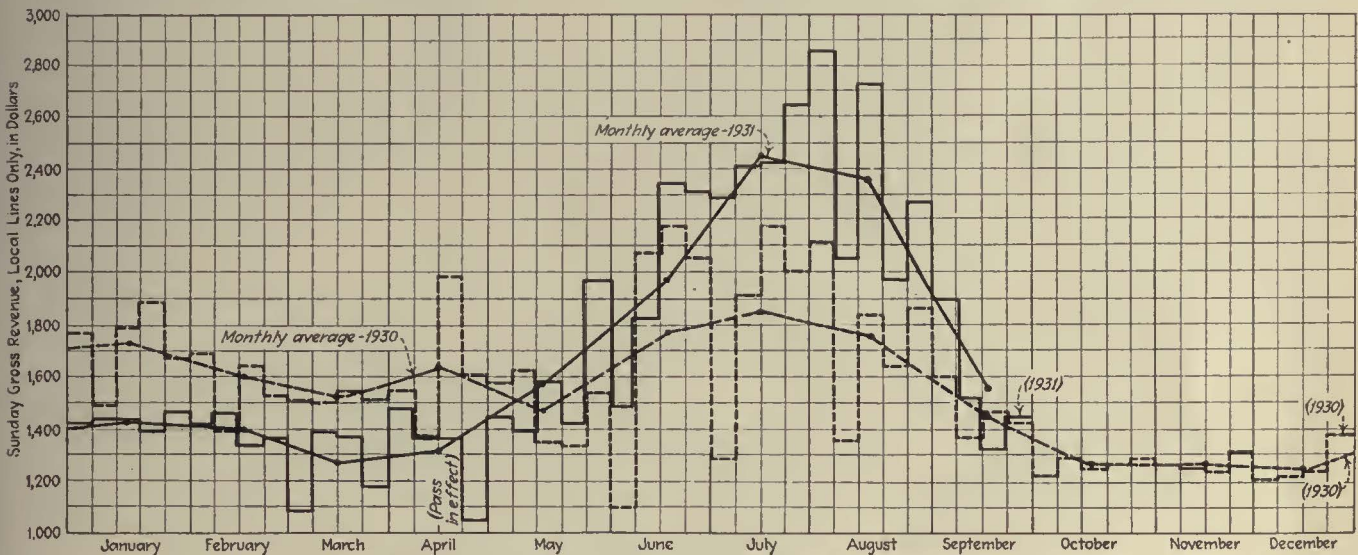
*Assistant Superintendent of Transportation Union Street Railway,
New Bedford, Mass.*

CONFRONTED with a decrease in Sunday revenue of 10 to 20 per cent from 1930, the Union Street Railway, New Bedford, Mass., cast about for a stimulus to business. As a result, on April 19 of this year the sale was begun of a 25-cent Sunday pass which entitles the holder to any number of rides on any of the company's rail or bus lines except those between New Bedford and Fall River. The results of the innovation have been more than satisfactory.

New Bedford has many attractions, among them three large bathing beaches, three amusement parks, and several recreational parks, all reached by frequent trolley service. New Bedford, being an industrial city, has suffered from the depression, particularly in the textile

industry that some kind friend would take them for an automobile ride. Now hundreds of families leave their homes early Sunday mornings to purchase Sunday passes and enjoy an all-day outing at the shore resorts or amusement parks. Many of these places are reached by lines on which open cars are run during the summer, as it is believed that the people who visit such places appreciate the opportunity to "ride in the open." Older people have formed the habit of purchasing a pass and visiting their friends in the city or surrounding towns. It has been years since the company has experienced trolley pleasure riding during the evening hours.

Before the pass was offered to the public, the riding characteristics of the patrons were analyzed carefully.



Sunday revenues on New Bedford local lines have increased as the result of the Sunday pass

industry. The people needed inexpensive recreation, and this the Sunday pass provided. The pass has certainly increased the riding habit in New Bedford and surrounding towns, and has built up distance travel, which had decreased quite markedly on account of the relatively high tariffs. Many people who were inclined to think of trolley riding as a rather inferior mode of transportation have now become enthusiastic boosters for the company. Hundreds of boys and girls save their money all the week so as to purchase a Sunday pass and ride all day for 25 cents. The training of these young people to be trolley-minded is important when one considers how much pressure has been brought to bear to make the younger generation automobile-minded.

The pass also has proved that not all the loss in riding went to the automobile. Many persons could not afford to take their families for an extended trolley or bus ride, and were compelled to remain at home on Sundays, hop-

There were some who thought that people would not be willing to make an investment of 25 cents for one day's transportation. However, as many as 7,232 people bought passes on Aug. 16. It was questioned whether the additional revenue from new patrons would offset the loss of regular patrons already riding through two or three zones. Third zone riding under the regular rate of four tokens for 25 cents was less than 2 per cent of the total, and second-zoning riding varied from 5 to 10 per cent. Therefore, it was felt that enough new riding would be obtained to more than offset the loss on patrons who already paid more than four fares a Sunday. This assumption proved to be correct.

In addition to the regular newspaper items that introduced these Sunday passes to the public, use was made of hand fliers inside the cars, large dashboard signs and a limited amount of front-page newspaper advertising.

It was found that considerably more passengers could

be carried by the regular service, as the empty seats ran quite high. It also was determined that the higher schedule speed on slightly decreased headways in effect on all lines on Sunday mornings need not be altered. In several months the operating costs did not increase at all. During July the cost of the service was increased about \$450 with more than \$3,000 additional revenue.

Immediately following the inauguration of the Sunday pass, an upward trend in revenue and patronage was noted. Before its advent, the Sunday revenues of the New Bedford local lines were off 16.5 per cent from last year. Since its inauguration the receipts show an average increase over 1930 of 18.4 per cent. In August a 20 per cent loss in revenue was changed into an increase of 35.2 per cent. The decrease on one Sunday in September was because the weather was cold and rainy this year. Despite this more money was taken in for the Sundays in that month than during September, 1930, when every Sunday was pleasant.

During the period in which the pass has been in effect, the revenue from it has ranged from 20 per cent to 65 per cent of the total Sunday receipts. Ten weeks after its use began, the pass revenue exceeded that from the regular token-paying passengers, and continued so without exception until the third Sunday in September. No attempt has been made to determine the number of rides taken per pass. Making the very conservative estimate of only four rides per pass, the number of such riders exceeded the total before the pass was offered.

Passes are sold by all car and bus operators. It will be noted that 40 per cent are sold before noon and about 56 per cent between noon and 6 p.m. Considerable rivalry in selling passes exists among the men, and it has done much in stimulating them to be real salesmen of transportation. Cars have been better loaded and every line has increased its earning power.

During the summer months an additional pass was sold for 75 cents that entitled the holder to unlimited trolley rides in New Bedford and Fall River and also between the two cities. This pass increased the revenue of these lines, but it did not prove as popular as the 25-cent city pass.

Concrete Loading Platforms at Pittsburgh

DESIROUS of reducing the hazards for both street car patrons and motorists to a minimum, the city of Pittsburgh is installing a total of 50 loading platforms, embodying several advanced features. The platforms, designed by the Bureau of Traffic Planning, are of concrete, 4 ft. wide and raised 7 in. above the street surface. A chain railing supported on 3-in. pipes along the entire edge of the platform, except for one point of entrance, prevents pedestrians from leaving at any other point. The forward end of the platform is guarded by a heavy concrete bumping block, 32 in. high and tapering to the level of the concrete platform at a point 3 ft. from the forward end of the block.

Visibility of the zone is increased through the use of a flashing electric beacon, mounted at a height of 9 ft., with a light to illuminate the platform and one to light the bumping block. A yellow diamond-shaped sign 18 in. square, marked "safety zone," is mounted at a height of 3 ft. 6 in. on the beacon light supports. The cut out letters of this sign are illuminated by red Neon lights.

The READERS' FORUM

Historical Data Amplified

NEW YORK, N. Y., Oct. 14, 1931.

To the Editor:

After reading with particular interest the contents of your special issue of Sept. 15, 1931, I trust that I may make some amplifying comments, and, in the interest of historical accuracy, a few corrections.

In the list of "Important Dates in the Electric Railway Industry," the invention of series-parallel control is credited to Dr. Hopkinson in 1881. This is correct as far as it goes, but prior to Hopkinson's filing his provisional English patent in that year, the first record date of his invention, this control had been developed by Sprague, at the U. S. Government Torpedo Station, Newport, R. I., and tested for Prof. Moses G. Farmer, then on duty there, in a double-armature new "inverted" type of dynamo, the forerunner of the all modern alternating-current generators. These inventions, therefore, were made thousands of miles apart, independently and almost simultaneously—just as that of the three-wire distribution system was made independently by Messrs. Hopkinson and Edison.

The under-running trolley was invented by Sprague in a universal form, in contemplation of a project for electrifying the Metropolitan District Railway of London, while he was a juror at the Crystal Palace Exhibition in 1882, and in a limited non-reversible form by Van Depoele in the United States in 1883. In a subsequent interference, the testimony as to Sprague's conception was declared not admissible prior to his return to the United States in May, 1883, and, in consequence, Van Depoele was awarded priority in the United States. He did not use a reversible pole trolley until after the equipment of the Richmond road by Sprague in 1887.

The Bentley and Knight separate truck, on which motors could be mounted, was not the first example of this method of construction. It was developed by Sprague in 1885, described by him in a paper read before the Society of Arts of Boston in December of that year, and was for several months demonstrated with a standard truck and dual motor equipment at the Durant Sugar Refinery, N. Y., and on the 34th Street Branch of the Manhattan Elevated System, being fully illustrated and described in *Electrical World* of Sept. 25, 1886.

In the "wheelbarrow" suspension of the early Richmond motors, which were only of 7½-hp. capacity each and of comparatively light weight, the free end was hung from the car body, but the Brill Company soon developed a special truck for street railway cars, to take care of the succeeding larger motors, a model of this truck being now in the Sprague office.

Incidentally, the sectional field winding of that early motor was not abandoned "because of unsatisfactory operation with a weakened field," for these motors were of exceptional efficiency, but because of the frequent breakdowns, with the comparatively high potentials used, on account of the then crude methods of construction.

The first "heavy" electric locomotive seems to have

been that designed by, and built under the direction of, Sprague, Duncan and Hutchinson for Mr. Henry Villard, president of the Northern Pacific Railroad in 1892-3. This was a 60-ton locomotive of 1,000-hp. capacity, intended for direct-current operation at 800 volts. It had four gearless motors, the armatures being carried on the axles and the field magnets on the axle boxes. The main controller was mechanically operated by a follow-up pneumatic attachment under manual control. The framework was built by Baldwin, and the motors by Westinghouse. The locomotive was never put into actual service. A description of this locomotive appeared in the *Railroad Gazette* of Oct. 13, 1893.

The multiple-unit system of control was actually invented in 1895, and for two years vain efforts were made to get the opportunity to demonstrate its advantages on the Manhattan Elevated Railroad. But in 1897 Sprague took a contract, at first personal, for the equipment of 120 cars on the South Side Elevated Railroad, and the first equipments were put into operation on the Berne Bank tracks of the General Electric Company at Schenectady in July, 1897. It, of course, first came into general use on the equipments for elevated and subway railroads, then on interurban roads, and finally on many surface cars, for it quickly demonstrated that for mass movement it had no possible competitor.

That it has become of vital importance in main line electrification is well illustrated in Mr. Withington's article which shows many cars of this type in use throughout the country. Not only are the cars equipped with multiple-unit control, but it is important to note that certainly most, and probably all, of the locomotives are also equipped with it, so that when deemed necessary two or more units may be grouped and controlled from a single point.

It may be further noted that these equipments, both car and locomotive, include direct-current operation from 600 to 3,000 volts, and alternating-current operation of single and multi-phase motors from a single-phase 11,000-volt trolley line; and on mountain divisions regeneration, first demonstrated by Sprague in 1886 on the Manhattan Elevated, is used both for return of power to the line and for braking the train.

Taken altogether, it may be well claimed that the use of electricity for industrial power and traction purposes, vertical and horizontal, transcends in its influence upon human welfare its use for light and heat.

FRANK J. SPRAGUE,
President Sprague Safety & Signal Corporation.

A Trolley Bus in 1882

BERLIN-STEGLITZ, Oct. 7, 1931.

To the Editor:

I have read with great interest the splendid article on "The Trolley Bus," by Clifford A. Faust, in the Convention Number of *ELECTRIC RAILWAY JOURNAL*. You mention a trolley bus of Siemens & Halske of 1899, saying that this bus was the first in the world. This is not quite right. The first trolley bus was built so far back as 1882; the vehicle made trial runs on a high street between Berlin and Spandau.

In this regard, I may draw your attention to my article on trolley buses in the German technical journal *Verkehrstechnik*, No. 17, of April 24, 1931, pages 209-212. Here you will find too that this really first

trolley bus has the peculiar name "Elektromote." The bus was also constructed by Siemens & Halske.

WALTER JACOBSON, DIPL-ING.

[The author of the article in the *JOURNAL* had at hand a report that Siemens & Halske had installed a trolley bus in 1882, but, since no confirmation could be obtained or no descriptive material located, the reference was omitted in the historical review. Two other prior claims were omitted for the same reason.—EDITOR.]

Economical Public Transportation Has Growing Appeal

DALLAS, TEX., Oct. 7, 1931.

To the Editor:

Although the past few years have been indelibly marked in the memories of transportation men as a chaotic period of uncertainty and declining revenues, it is reasonable to predict that the depression will be the major influence in a radical readjustment in standards of living which will react most favorably for that basic industry which has perhaps suffered most acutely.

Since Wall Street's aerial debauchery reached its climax in a tail-spin catastrophe, there has been an inevitable deflation in almost all lines. Mr. Citizen has taken advantage of the occasion to pause and take an inventory, balance his books, and have a heart-to-heart conference with himself on the sublime folly of reveling in luxuries which came on the heels of unearned prosperity.

But he had not been entirely at fault in believing that his holiday would continue indefinitely; he had been influenced by the stalwart leaders of commerce and industry, who, with a wary eye riveted to the eccentric gyrations of the ticker tape, had sanctioned indiscriminate wage increases, bonuses and burdensome obligations as nonchalantly as they had expanded their far-flung activities to care for a staggering volume of sales—sales which frequently proved to be too questionable credit risks.

As the new day dawns, there will follow revised standards of living, equitable standards of values, and such prudent spending that the proverbial Scotchman will blush with shame. The wage-earner, the potential street car rider, has paid dearly for his indulgences, and now he will unconsciously follow the striking example of rigid economy practiced by the electric railway industry during the time when others were reveling in their respite from care and worry.

It will be found, in all probability, that Mr. Citizen's earnings will be less, but he will have a higher regard for his job than ever before. As a consequence, he will give much serious thought to those forgotten virtues—economy and thrift.

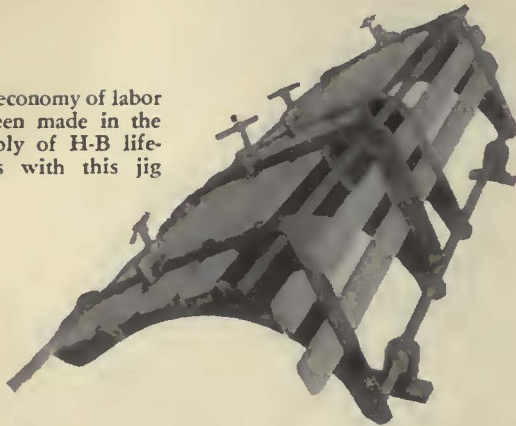
The family motor car, a dependable as well as inexpensive vehicle, is here to stay. But Mr. Citizen, when he fully awakens from his troubled sleep, will rub his blood-shot eyes with an unsteady hand, and, stuffing a sheaf of assorted, unpaid garage bills in his pocket, will stroll down to the old faithful street car line. Then, during a comfortable, restful ride to his work, he will meditate generally upon the fallacy of living beyond his income, and specifically, he will be concerned with the expense and worry of trying to compete with the most economical and safe transportation facility in the United States.

RUFUS C. BURLISON,
Engineer to Supervisor of Public Utilities.

PRACTICAL IDEAS for the

Maintenance Man

Great economy of labor has been made in the assembly of H-B lifeguards with this jig



H-B Lifeguard Assembly*

BY R. WALKER AND H. SMITH
Toronto Transportation Commission

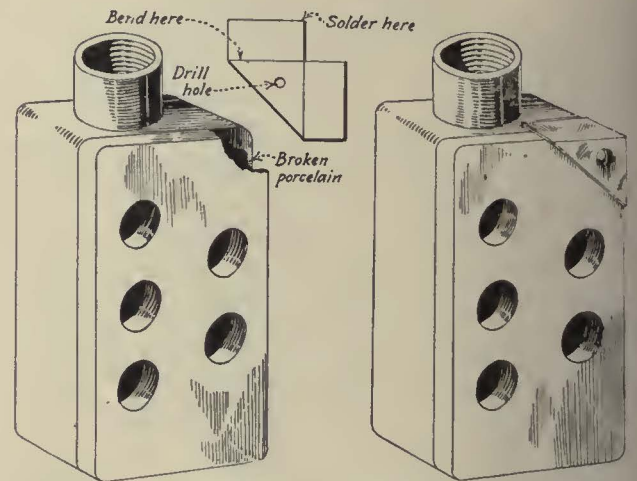
SEVERE winters have played havoc with the H-B lifeguard equipment on the Toronto Transportation Commission cars, and owing to variations in equipment, the assembly of the salvaged and rehabilitated parts gave a lot of trouble. To avoid this in the future, the assembly jig shown in the illustration has been built. It is a metal frame fixed to a shaft that rotates in two bearings. The frame follows the inside contour of the finished carrier, and has slots in which are placed the wood slats and the necessary stops for locating the metal parts, the half oval frame, center stay, carrier lever and carrier bar. The slats are lined up from a stop at one end. Clamps are provided to fasten the metal parts in place, keeping them in close contact with the wood parts of the assembly. The metal parts are uniformly shaped and drilled from jigs. An electric drill is now used to bore the bolt holes in the wood slats. The jig is then turned around on the shaft, and bolts easily inserted. This jig eliminates the former separate operation of boring the slats and trying to mate them with the various metal parts.

It is apparent that this jig will be very useful in the rapid production of carriers in quantity, and with a very considerable labor economy compared with the former method. In addition, all the cradles and parts produced by this method will be interchangeable.

Repairing Porcelains of Junction Boxes*

BY FARRELL TIPTON
Electrician
San Diego Electric Railway

REPAIR of broken junction box porcelains on the San Diego Electric Railway has reduced the expense for new porcelains. Most of the broken porcelains occur on the latest type cars of the San Diego Electric Railway, which are equipped with junction boxes for the motor leads terminating at the car body. Frequently the corners of the junction box are broken by the con-

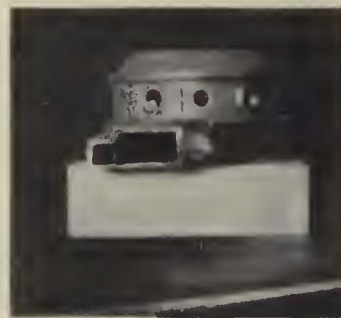


By attaching brackets to the broken corners of junction boxes added service is obtained

stant vibration of the car and the resulting pull of the motor leads. These boxes are repaired in a short time by screwing on a metal bracket at the broken corner. This repair avoids the necessitating of detaching the jack-knife connectors from the motor leads in replacing the broken porcelain with a new one.

Rebuilding Tap Bolt Holes for Motor Housings*

BY J. MONDOUX
Ottawa Electric Railway



Motor housing with a nut welded in for tap bolt hole and one ready for welding

MOTOR housings with threads for the tap bolts worn out have been reclaimed by the Ottawa Electric Railway by boring out the tap bolt holes to a 2-in. diameter, and inserting standard nuts turned down to fit the holes. A beveled edge is turned on each nut to allow space for welding them to the housing. The outside diameter of the housing was

built up by welding and machined, when necessary, to secure a better fit in the motor casing. However, when only nuts are welded in, the welding spelter is below the machined surface of the housing, and machining is unnecessary. When the threads in the nuts are stripped again, it is only necessary to bore out the old nut and insert a new one. This can be done for any casting or forging with holes having stripped threads.

*Submitted in ELECTRIC RAILWAY JOURNAL Prize Contest.

Armature End Play Calipers*

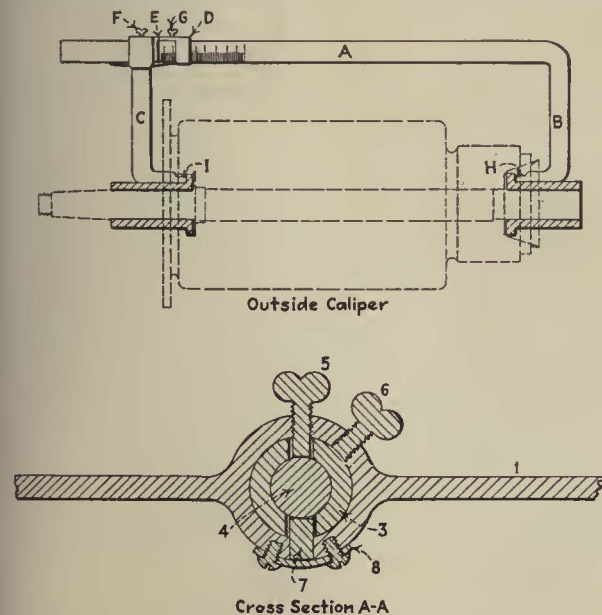
BY H. CORDELL
Master Mechanic
Chicago North Shore & Milwaukee Railroad

ARMATURE end play can be exactly determined before assembly by a calipering device developed on the Chicago North Shore & Milwaukee Railroad. The device is shown in the accompanying illustration.

When assembling motors, the outside caliper consisting of a $\frac{1}{4}$ x2-in. steel bar *A*, graduated in sixteenths of an inch, with integral leg *B*, adjustable leg *C* and stop slide *D*, is placed on the armature after bearings are assembled on the shaft. The fixed leg of the caliper is placed against one bearing collar at *H*. The sliding leg *C* is then placed against the opposite bearing collar at *I*, and locked in place by thumb screw *F*. Slide *D* is then moved to the left against leg *C*, and locked in position by thumb screw *G*. The distance between the bearing collars is then read in inches or fractions of an inch at point *E*. Slide *D* holds the reading after the caliper is removed from the armature.

The inside caliper, consisting of a $\frac{1}{4}$ x2-in. steel bar No. 1, two adjustable $\frac{1}{4}$ x1 $\frac{1}{2}$ -in. legs No. 2-2, sliding sleeve No. 3 with plate No. 9 and sliding rod No. 4 which is graduated in sixteenths of an inch, is placed in the motor shell as shown. Bar No. 1 is held against the bearing housing face on the shell, and No. 4 is forced down against the face of the bearing housing. Thumb screw No. 5 is then tightened, holding bars Nos. 1 and 4 together. This device is now removed, inverted and placed on the other bearing housing as in Fig. 3, which allows sliding sleeve No. 3 with its cross plate No. 9 to slip down and rest against the bearing shoulder on the head. Set screw No. 6 is now tightened. This adjustment subtracts the distance from the bearing shoulder and the face of the head. Upper end of sliding sleeve No. 3 now registers on rod No. 4 the distance between the bearing faces of the shell heads in inches or fractions of an inch that would exist when the motor is assembled. This reading compared with the reading

*Submitted in ELECTRIC RAILWAY JOURNAL Prize Contest.



Armature caliper and housing caliper used by the North Shore Line to indicate accurately armature end play

obtained on the gage, Fig. 1, shows clearance plus or minus.

Plate No. 8 fastened to bar No. 1 acts as a stop for key No. 7, which travels in a slot of sleeve No. 3. This arrangement permits rod No. 4 to be locked to bar No. 1, leaving sleeve No. 3 with cross piece No. 9 free to move without disturbing measurement taken. A slot is also provided on the opposite side of the sleeve to provide clearance for thumb screw No. 5.

This device can be used on any size motor by extending the graduations on rod 4 and bar "A" to fit the motor.

Brake Valve Handle Fastener*

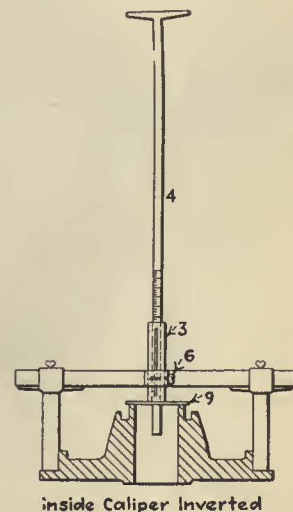
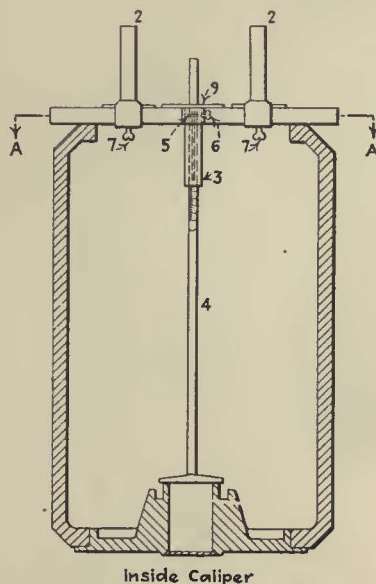
BY A. R. PETRIE
Motorman
Toronto Transportation Commission



Accidental removal of the brake valve handle is prevented by clamping it to the rotary valve key

WHEN wear develops in the upper end of the rotary valve key or the bushing in the handle of the M-20 brake valve, it is possible under conditions with involuntary nerve reaction and excitement, that the brake valve handle in the lap position can be accidentally lifted from the valve. To avoid this possibility on cars of the Toronto Transportation Commission and to compensate for wear the clip illustrated was adopted.

The cap of the brake valve handle was reduced in height just slightly below the height of the rotary valve key, and a brass washer placed on top. An oil screw clamps the washer to the top of the rotary valve key, and effectively prevents the brake valve handle from being removed accidentally.



Tread Guard Placed at Frog Joint*

By E. B. SPENZER
Special Work Engineer Cleveland Railway



Guard placed against outside curved rail to prevent derailments in sharp angle frogs

DERAILMENTS are frequently caused by sharp angle frogs, or involved frogs, the intersections of which are so close together that there is a long gap between the points, or by frogs in which both runs are curved in the same direction, necessitating a level guard due to the tread clearance.

To prevent this trouble, the Cleveland Railway places a rail against the back of the outside curved rail, raised $\frac{3}{4}$ in. above the ball of the rail and spaced far enough away from the running rail gage to give the proper tread clearance. This rail is of sufficient length to guide the wheel before it reaches the gap of the level guard, and carries it past both points. It is beveled at both ends so as to receive the wheel after any gage wear has taken place.

In several instances these rails have been furnished by the manufacturer supplying special track work. Others have been installed by the company.

Jack Handling Truck*

By A. F. POLLARD
Carpenter
Toronto Transportation Commission



Rolling a heavy jack about is much easier than carrying it

TO CARRY a heavy jack around is a needless waste of energy. But as the jack is still a useful appliance in carrying out many of the odd jobs in the shops and carhouses of the Toronto Transportation Commission, the little truck shown in the illustration was developed to facilitate its handling. The U-shaped frame is formed of $\frac{3}{8}$ -in. standard pipe, the axle from $\frac{5}{8}$ -in. square stock, and the wheels are 4 in. in diameter. Two cross members, $\frac{3}{4} \times \frac{1}{8}$ in., and a pan of $\frac{1}{8}$ -in. sheet steel are formed at the bottom to act as a

receptacle for the jack. This is a handy little device, and saves a lot of time and energy in moving this useful manual aid from place to place.

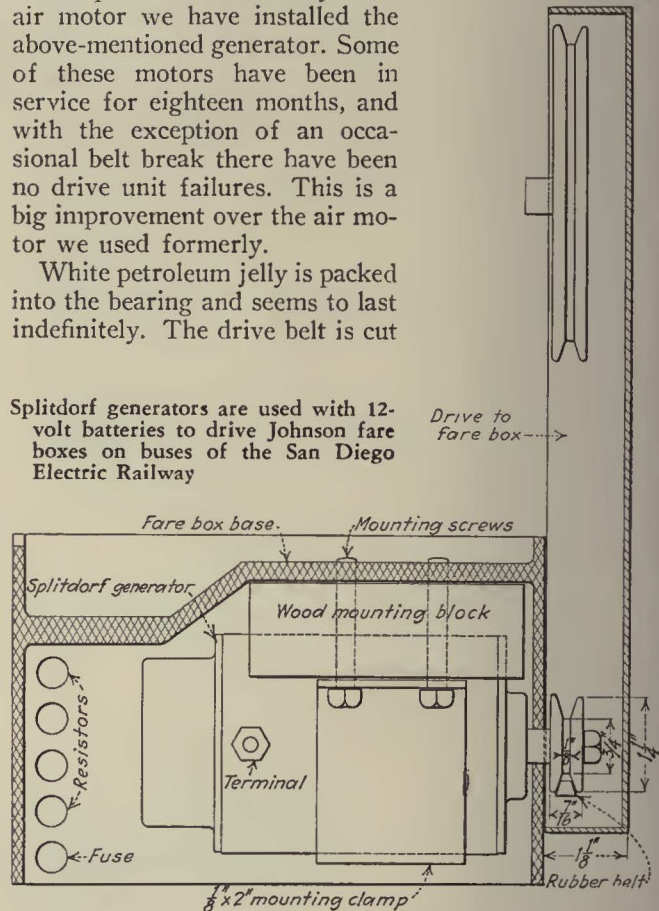
Electrically Driven Fare Box*

By CHARLES HERMS
General Foreman
San Diego Electric Railway

SATISFACTORY results have been obtained by driving Johnson fare boxes on buses with Splittorf generators which have been used for motorcycle lighting at 6 volts. The generators are used as motors. The standard base for a National Pneumatic Company air-driven fare-box motor has been adopted in this arrangement; but in place of the four-cylinder air motor we have installed the above-mentioned generator. Some of these motors have been in service for eighteen months, and with the exception of an occasional belt break there have been no drive unit failures. This is a big improvement over the air motor we used formerly.

White petroleum jelly is packed into the bearing and seems to last indefinitely. The drive belt is cut

Splittorf generators are used with 12-volt batteries to drive Johnson fare boxes on buses of the San Diego Electric Railway

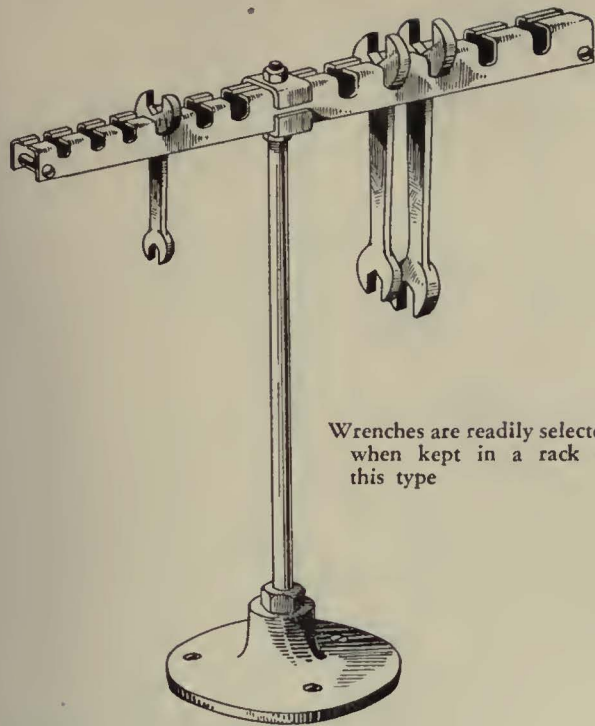


from a 36x6-in. heavy inner tube. The motor is driven by a 12-volt battery, and it is protected with a fuse mounted on the base of the fare box. A resistor is inserted in the battery circuit to reduce the voltage across the motor from 12 to 7.

The unit operates satisfactorily across the motor with a 12-volt battery because the voltage can be maintained above a minimum of 6 volts. The Splittorf generator will operate satisfactorily with a 6-volt battery when it is fully charged. But as soon as the battery is partially discharged and the voltage drops, the motor becomes sluggish. As many of our buses are equipped with 6-volt batteries we are desirous of obtaining a motor that will operate satisfactorily with such batteries even when there is a reasonable drop below 6 volts.

*Submitted in ELECTRIC RAILWAY JOURNAL Prize Contest.

Handy Wrench Rack



Wrenches are readily selected when kept in a rack of this type

EVEN in well-managed shops the useful wrench is an elusive tool, especially when a workman needs it in a hurry. In these times of efficiency experts and time-saving devices, one is overcome with chagrin to see a man walking about the shop in search of a wrench when he should be using it. If the men are trained to place the tool in a suitable rack, conveniently located, waste time and motion will be eliminated. The illustrated rack consists of a stand and two pieces of $\frac{1}{8}$ -in. steel shaped as shown.

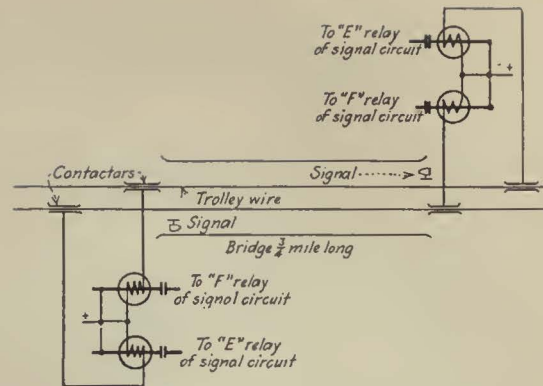
Automatic Block Signals Limit Freight Traffic Across Bridge*

By H. A. BROWN
Return Circuit, Switch and Signal Division
Cleveland Railway

BY AN order of the Board of County Commissioners, the Cleveland Railway is not permitted to operate more than one loaded interurban freight train at a time across any one of several specified county bridges. To control such movements and to eliminate bad traffic hazards Type CD Nachod block signals, operated by Cheatham Type 43 trolley contactors, are used in conjunction with external current relays. The contactor is a standard electric track switch unit for obtaining selective operation, and is used instead of the regular CD signal contactor which would cause the corresponding signal to function every time a car passed under it. No changes are necessary in the standard operating circuits.

Loaded freight trains set and clear the blocks by passing under the trolley contactors at either end of the bridge with power on. Passenger and empty freight cars, not required to operate the signals, pass under the trolley contactors with power off in order to prevent the

*Submitted in ELECTRIC RAILWAY JOURNAL Prize Contest.



Selective trolley contactors set signals automatically when freight cars pass with power on

display of the red or stop indication. These automatic signals eliminate the necessity for trainmen to get off the cars and to walk to the curb, through heavy auto traffic, to set or clear the signals. Unnecessary traffic congestion and loss of time are also prevented by their use, because it is no longer necessary to stop trains in traffic to operate the signals.

Dipping Tank Saves Paint*

By W. R. McRAE
Superintendent of Rolling Stock and Shops
Toronto Transportation Commission



A top layer of $\frac{1}{2}$ -in. of paint will do the job economically and satisfactory

PAINTING of H-B life-guard gates and carriers is done by an economical method in the shops of the Toronto Transportation Commission. A tank, sufficiently large to accommodate the carrier comfortably when suspended, was placed below a rail overhead, on which is hung a trolley and tackle for lifting and lowering the carriers. The tank is practically filled with water, and on the top is floated about $\frac{1}{2}$ in. of black enamel.

To coat the lifestock, it is simply hoisted and dipped in and out of the tank slowly, and then allowed to drain. This method saves much in material and time of drying in comparison with the method of having the tank full of paint.

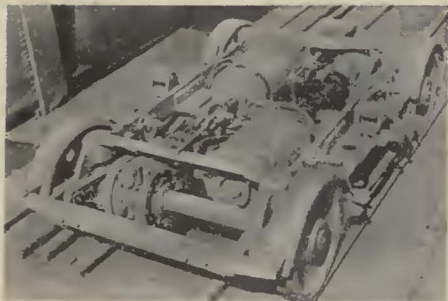
NEW PRODUCTS

for the Railways' Use

Worm Drive Truck Has 63 Per Cent On Springs

SPRING suspension of 63.3 per cent of the total weight, including motors, has been obtained in the 90-E truck for worm drive developed by the J. G. Brill Company. The weight of the truck complete with motors and drive is 7,060 lb., of which 4,470 lb. is spring borne.

Many fundamental features of Brill truck design are retained. These include solid forged side frames, longitudinal leaf springs, half-ball brake hangers with renewable wear caps and wheel tread shoe brakes. The axles are of heat-treated carbon



The Brill 90-E truck has a 6-ft. wheelbase and a top height of 2 ft. 8½ in.

vanadium steel fitted for inside journal bearings and a roller bearing worm drive assembly pressed directly on. The 24-in. diameter wheels are pressed on the ends of the axles. Four silencing blocks are bolted on each wheel.

To reduce the truck width and weight an inside frame was adopted. Journal boxes are of the compensating type with roller bearings. Friction wear is taken on large surfaced bushings and wear plates. This type of box eliminates the pedestals, and by its radial adjustment to load, maintains a constant brakeshoe clearance. The side frames have recessed heads over the boxes, forming journal box spring pockets, and end arms are extended beyond the journal box pivot pin, forming truck end-frame connections. The bolster contour permits necessary clearance for drive shafts and couplings, and for center plate mounting. The ends extend under

the side frame shaped for single roller-type side bearings. Longitudinal semi-elliptic leaf springs are suspended at their outer ends near the journal boxes by friction controlled swing links, permitting controlled side swing of the bolster when taking curves. The entire truck frame and the bolsters, spring suspension, motors and drives, are spring supported.

Power is obtained from two 50-hp. light-weight, high-speed motors, mounted longitudinally between the axles and bolsters. Each armature shaft is connected to the worm drive on the opposite axle through two universal couplings and a propeller shaft which acts only through the small angularity caused by the flexing of the journal box springs. The drive consists of a hardened-steel worm and bronze worm wheel with a 7.4 to 1 reduction, pressed directly on the axle and equipped with a roller-bearing mounted housing of the oil sealed drum type. Bearing adjustments are made through shims easily accessible.

Improved Gear Cases for Railway Motors

GEAR cases now supplied with General Electric GE-265 and GE-702 railway motors weigh three-fourths as much as the standard pressed steel and the light-weight malleable iron cases formerly used. The new cases are of standard sheet and rolled sections, with steel channels



Welded gear case for railway motors

forming the top and bottom. Except for rivets used to assemble the felt grease guards, all parts are either atomic-hydrogen or arc welded. The halves are assembled on jigs to assure interchangeability.

The joint between halves is such that the lubricant cannot leak and water, dirt and foreign substances cannot enter. In a tightness test the case was charged with grease thinned to the consistency of lubricating oil and the gearing was run at high speed in each direction for 33 hours. The case, painted white, showed that leakage, even under such conditions, was negligible.



This light-weight journal jack is available in capacities of 15 tons and 25 tons

Aluminum Journal Jack

USE of a heat-treated cast aluminum alloy housing has made possible a substantial reduction in weight in a journal jack just placed on the market by the Duff-Norton Manufacturing Company, Pittsburgh, in two sizes, one a 15-ton capacity and the other 25 tons. Both models are equipped with a positive stop safety feature to prevent disengagement of the lifting standards. The 25-ton jack weighs 26 lb., or approximately 1 lb. per ton of capacity. The smaller jack weighs 19 lb.

Since the aluminum alloy shell is resistant to atmospheric corrosion

and the steel mechanism within the shell is packed with grease, the jack is said to be practically immune to all weather conditions. The jacks were found in manufacturer's tests to have a safety factor of at least 25 per cent more than rated capacity.

Self-Lapping Brake Valves

FOUR types of self-lapping brake valves, for hand or foot operation, for straight air or semi-auto-

matic equipment, have been developed by the Westinghouse Traction Brake Company. The simplest is a hand-operated valve for straight air equipment sets and releases the brakes by means of the straight-air pipe. Another hand-operated valve for semi-automatic equipment, besides straight air application and release, will vent the emergency pipe for an emergency application. A third hand-operated valve includes all functions possessed by the semi-automatic type and also

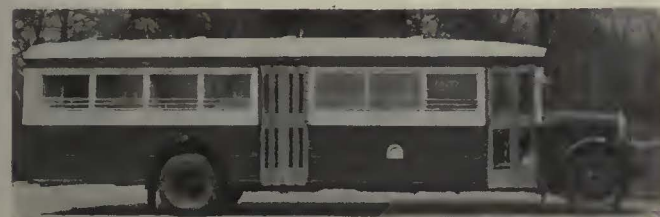
has a sanding feature and provision for opening and closing the car doors. Selective door control can be added. The foot-operated valve for straight air equipment provides for automatic straight air applications and interruptions of the power circuit if the operator's foot is not kept firmly on the brake pedal. The self-lapping feature obviates movement of the handle to service position and back to lap, as with the usual form of valves, when making a brake application.

New Models of Buses Shown at the Convention



Small Capacity Bus Developed by the Twin Coach Corporation

Designed to meet the demand for a low-priced vehicle, this bus, with a seating capacity of 15 passengers, is now the smallest on the market. It is a single-engine design with a 132-in. wheelbase. It is equipped with the self-operated automatic clutch recently developed.



Center-Exit Bus Built by the White Company

It has a seating capacity of 33 passengers and is equipped with a recently designed six-cylinder engine rated 130 hp. at 2,400 r.p.m. The bus has a large standee area at the front. The center door is operated by air treadles and is in full view of the operator.



Large Capacity Bus of the Street Car Type Now in Production by Mack Trucks, Inc.

The one illustrated is rated as a 42-passenger bus, but various capacities are available depending on the seating arrangement and type of exit door used. The wheelbase is 196 in. and the engine is rated at 110 hp. Power steering with a hydraulic booster is a feature.



All-metal, 40-Passenger Bus Built by the General Motors Truck Company

A feature of this bus is its low weight per passenger. It has a 150-hp. engine mounted at the rear that is removable in a unit with the rear axle center. The short drive line is said to reduce power losses. An easy-acting steering mechanism has been incorporated in this vehicle.



Light-Weight 21-Passenger Fargo for City Service

Aluminum alloys have been used generously throughout the body of this new model, keeping the weight down to 12,000 lb. The engine has eight cylinders and develops 120 hp. The body is carefully insulated against heat and noise.



First Trolley Bus Design of the General Motors Truck Company

The features of this vehicle include rear mounting of the motors, a new centralized underbody control system, light alloy trolley poles, and a blower system for ventilating the controllers, motors and compressors. The seating capacity is 44.

Trend of REVENUES and EXPENSES

	Operating Revenue \$	Increase or Decrease Per Cent*	Operating Expenses and Taxes \$	Increase or Decrease Per Cent*	Net Income \$*	Increase or Decrease Per Cent*		Operating Revenue \$	Increase or Decrease Per Cent*	Operating Expenses and Taxes \$	Increase or Decrease Per Cent*	Net Income \$*	Increase or Decrease Per Cent*	
Boston Elevated Railway, Boston, Mass.								Fonda, Johnstown & Gloversville Railroad, Gloversville, N. Y.						
Sept., 1930....	2,470,918	3.78	2,091,718	0.52	59,868	200.31	Sept., 1930....	72,267	11.61	63,549	5.42	8,497	436.09	
Oct.....	2,811,399	4.04	2,157,474	1.29	221,188	31.30	Oct.....	75,708	17.80	66,353	0.59	18,447	226.80	
Nov.....	2,579,899	10.34	2,066,206	2.66	71,150	77.85	Nov.....	72,024	13.82	66,314	0.23	21,171	158.25	
Dec.....	2,850,330	8.20	2,178,896	2.24	235,950	58.62	Dec.....	79,764	15.78	67,438	7.38	13,133	236.77	
Jan., 1931....	2,840,159	8.43	2,082,456	6.23	314,067	50.66	Jan., 1931....	74,018	13.38	62,239	7.93	13,594	75.36	
Feb.....	2,534,828	8.33	1,952,032	5.23	142,339	48.22	Feb.....	75,201	7.83	64,051	7.61	13,965	5.28	
Mar.....	2,769,564	7.30	2,019,081	4.92	309,212	29.08	Mar.....	70,660	0.48	62,685	4.90	16,298	23.64	
Apr.....	2,616,188	7.00	1,909,176	7.93	275,740	11.45	Apr.....	72,560	8.29	61,040	6.82	15,996	21.34	
May.....	2,579,265	8.70	1,993,753	4.36	143,804	52.47	May.....	63,338	13.81	59,346	9.15	24,700	97.48	
June.....	2,415,179	6.32	2,073,560	7.04	99,815	169.79	June.....	58,406	4.11	59,429	7.33	20,259	16.34	
July.....	2,188,942	7.68	2,021,305	4.12	271,777	82.23	July.....	61,749	4.40	57,896	7.34	7,823	46.23	
Aug.....	2,098,072	7.99	1,948,492	7.79	344,901	26.60	Aug.....	60,302	16.55	58,616	7.76	23,041	171.16	
Sept.....	2,243,491	9.20	1,931,683	7.65	239,950	300.79	Sept.....	42,823	16.49	28,052	14.83	84,893	144.43	
Brooklyn-Manhattan Transit System, New York, N. Y.								Galveston-Houston Electric Railway, Houston, Tex.						
Sept., 1930....	4,834,251	2.49	3,453,431	4.52	667,323	6.20	Sept., 1930....	38,032	11.66	27,266	6.85	8,493	144.43	
Oct.....	5,036,775	4.27	3,572,553	4.22	758,817	2.78	Oct.....	36,974	12.49	24,183	9.58	93,685	127.12	
Nov.....	4,769,083	4.37	3,366,923	6.98	689,470	2.34	Nov.....	36,166	15.00	27,949	1.79	99,343	112.93	
Dec.....	5,069,484	2.66	3,546,963	4.25	814,788	2.04	Dec.....	33,291	20.15	25,057	9.64	105,000	110.69	
Jan., 1931....	4,852,706	6.48	3,475,330	7.01	674,020	5.80	Jan., 1931....	32,990	19.80	22,990	9.64	111,369	110.17	
Feb.....	4,453,655	3.79	3,159,903	5.96	583,468	2.40	Feb.....	32,990	22.38	24,732	14.69	114,459	93.49	
Mar.....	5,028,562	2.66	3,475,847	5.37	814,360	4.73	Mar.....	34,729	16.98	24,132	11.98	117,394	189.69	
Apr.....	4,969,481	2.09	3,458,948	3.55	804,235	0.25	Apr.....	39,889	12.63	24,992	11.61	116,770	57.67	
May.....	5,056,779	1.71	3,438,037	3.49	913,877	1.64	May.....	41,484	11.27	25,961	11.24	116,819	49.64	
June.....	4,983,112	3.24	3,466,384	3.02	870,919	12.12	June.....	41,484	11.27	25,961	11.24	116,819	49.64	
July.....	4,841,635	3.27	3,419,932	3.90	631,791	7.21	July.....	41,484	11.27	25,961	11.24	116,819	49.64	
Aug.....	4,582,572	2.91	3,366,543	2.61	423,123	9.03	Aug.....	41,484	11.27	25,961	11.24	116,819	49.64	
Sept.....	4,693,503	2.91	3,366,543	2.61	597,074	15.27	Sept.....	41,484	11.27	25,961	11.24	116,819	49.64	
Brooklyn & Queens Transit System, New York, N. Y.								Houston Electric Company, Houston, Tex.						
Sept., 1930....	1,887,499	4.66	1,564,271	6.65	213,728	2.66	Sept., 1930....	251,919	9.00	175,905	10.42	571,857	6.84	
Oct.....	1,922,388	5.80	1,597,166	6.50	214,924	7.74	Oct.....	267,306	7.57	181,499	10.67	573,425	4.16	
Nov.....	1,820,498	6.65	1,522,735	7.58	187,822	5.20	Nov.....	247,210	10.00	176,739	1.96	550,635	9.56	
Dec.....	1,920,463	4.40	1,560,950	6.11	250,893	6.06	Dec.....	258,219	9.84	180,678	0.68	524,458	16.84	
Jan., 1931....	1,849,644	6.18	1,541,235	7.58	197,355	3.02	Jan., 1931....	242,554	10.68	176,792	11.08	518,843	17.70	
Feb.....	1,704,677	3.98	1,416,192	5.40	176,217	2.58	Feb.....	223,256	14.11	163,249	12.96	507,328	20.19	
Mar.....	1,941,078	1.98	1,602,862	2.66	227,472	1.21	Mar.....	244,396	10.97	170,067	12.70	502,405	19.39	
Apr.....	1,911,878	1.29	1,592,919	3.11	208,514	6.86	Apr.....	222,528	10.09	159,897	10.77	507,530	15.86	
May.....	1,980,118	1.24	1,585,293	1.85	286,334	7.89	May.....	214,241	13.29	158,175	10.50	404,721	30.72	
June.....	1,942,830	1.29	1,609,335	0.34	221,493	13.98	June.....	214,241	13.29	158,175	10.50	404,721	30.72	
July.....	1,893,414	1.24	1,550,897	3.34	227,012	11.59	July.....	214,241	13.29	158,175	10.50	404,721	30.72	
Aug.....	1,849,792	1.23	1,574,167	1.32	142,667	17.34	Aug.....	214,241	13.29	158,175	10.50	404,721	30.72	
Sept.....	1,930,047	2.25	1,583,777	1.25	219,515	2.70	Sept.....	214,241	13.29	158,175	10.50	404,721	30.72	
Capital Traction Company, Washington, D. C.								Hudson & Manhattan Railroad, New York, N. Y.						
Sept., 1930....	327,713	7.06	268,066	1.61	30,259	6.78	Sept., 1930....	974,433	2.80	506,845	0.23	132,332	18.68	
Oct.....	374,646	1.22	288,351	1.74	58,638	17.56	Oct.....	1,033,584	4.33	521,325	1.97	176,999	17.79	
Nov.....	346,054	2.70	273,481	1.64	42,659	11.06	Nov.....	994,735	6.18	489,761	4.08	169,465	21.42	
Dec.....	369,885	1.77	274,221	3.21	67,651	0.61	Dec.....	1,060,614	4.66	419,109	17.40	306,321	12.49	
Jan., 1931....	347,491	3.06	280,514	3.30	37,705	5.11	Jan., 1931....	1,005,022	7.62	512,350	7.23	157,098	21.78	
Feb.....	312,815	3.47	252,080	6.68	30,521	1.87	Feb.....	936,542	6.67	467,137	6.09	134,717	16.34	
Mar.....	344,191	2.65	270,962	3.86	43,847	4.03	Mar.....	1,013,577	6.05	497,695	6.34	180,554	15.13	
Apr.....	366,276	2.39	273,436	6.89	65,123	12.93	Apr.....	1,002,265	5.78	485,938	5.73	181,182	16.09	
May.....	362,502	1.87	281,344	1.61	50,959	6.60	May.....	974,737	6.24	481,504	5.63	158,191	18.77	
June.....	351,017	3.05	276,751	1.84	45,841	12.14	June.....	941,598	4.82	477,392	4.41	128,896	18.83	
July.....	360,826	0.10	258,341	1.52	9,438	91.25	July.....	897,211	6.00	470,918	6.28	91,288	21.80	
Aug.....	264,135	16.02	251,657	6.89	17,408	208.00	Aug.....	875,376	6.29	463,292	7.31	77,020	22.18	
Sept.....	276,418	15.65	236,952	11.61	9,452	63.76	Sept.....	897,981	7.73	454,556	10.32	108,624	17.91	
Chicago Surface Lines, Chicago, Ill.								Illinois Terminal Company, Springfield, Ill.						
Sept., 1930....	4,568,564	9.50	3,789,472	4.40	713,323	12.94	Sept., 1930....	654,477	5.26	454,818	9.66	160,897	14.62	
Oct.....	4,879,570	10.79	3,933,416	7.35	799,118	11.69	Oct.....	691,672	2.54	506,107	2.41	148,701	11.61	
Nov.....	4,537,647	13.48	3,769,538	6.86	712,177	20.77	Nov.....	542,672	11.02	430,907	6.24	80,529	23.11	
Dec.....	4,846,000	8.09	3,984,572	9.89	767,348	16.67	Dec.....	577,425	13.69	421,987	14.26	127,588	5.66	
Jan., 1931....	4,576,133	12.65	3,825,964	5.37	718,129	21.00	Jan., 1931....	509,641	20.77	395,953	19.80	87,742	9.83	
Feb.....	4,234,704	10.90	3,665,038	6.04	601,726	15.44	Feb.....	498,067	6.89	388,126	3.81	84,381	2.26	
Mar.....	4,584,224	4.35	4,287,237	5.34	557,167	15.05	Mar.....	568,653	1.95	398,855	6.94	143,325	28.98	
Apr.....	4,759,624	4.48	4,092,047	0.36	675,629	11.66	Apr.....	547,992	7.17	395,315	6.46	127,179	3.24	
May.....	4,541,847	9.38	3,802,582	4.61	724,514	12.88	May.....	581,953	4.34	389,538	8.87	162,905	13.83	
June.....	4,348,896	8.76	3,629,943	5.36	664,122	14.51	June.....	581,093	1.68	398,980	15.29	154,417	90.05	
July.....	4,093,702	9.74	3,579,566	6.98	580,118	10.55	July.....	550,906	8.41	395,741	12.33	123,420	40.89	
Aug.....	4,018,958	10.45	3,502,795	7.74	589,056	10.34	Aug.....	597,050	9.75	403,603	13.54	156,770	2.58	
Sept.....	4,061,261	11.14	3,307,020	12.73	684,161	4.88	Sept.....	597,050	9.75	403,603	13.54	156,770	2.58	
Department of Street Railways, Detroit, Mich.								Interborough Rapid Transit Company, New York, N. Y.						
Sept., 1930....	1,510,161	26.36	1,436,175	12.59	51,711	115.40	Sept., 1930....	5,684,267	0.17	3,983,368	7.78	131,270	206.26	
Oct.....	1,579,476	25.34	1,458,238	14.91	22,933	91.71	Oct.....	6,315,679	1.13	4,162,660	0.33	161,417	207.14	
Nov.....	1,481,136	23.35	1,333,571	13.38	4,890	98.14	Nov.....	5,965,365	4.96	3,869,340	0.00	272,021	121.79	
Dec.....	1,610,179	22.59	1,440,503	21.67	23,052	77.93	Dec.....	6,477,864	0.52	4,194,315	3.96	293,152	47.40	
Jan., 1931....	1,550,656	22.84	1,421,575	20.95	12,759	91.44	Jan., 1931....	6,123,645	4.42	4,538,833	10.83	348,972	65.92	

Trend of Revenues and Expenses by Months (Concluded)

	Operating Revenue \$	Increase or Decrease Per Cent*	Operating Expenses and Taxes \$	Increase or Decrease Per Cent*	Net Income \$*	Increase or Decrease Per Cent*
Kansas City Public Service Company, Kansas City, Mo.						
Sept., 1930	650,114	9.99	524,324	12.12	50,261	1.32
Oct.	725,428	4.89	700,311	12.90	60,435	190.35
Nov.	706,577	6.29	572,066	7.04	58,994	5.69
Dec.	758,045	1.73	570,065	14.68	108,444	284.88
Jan., 1931	711,215	6.52	577,741	12.67	61,108	137.10
Feb.	640,676	6.87	537,583	9.72	27,392	149.06
Mar.	216,637	2.58	577,319	7.25	66,013	72.81
Apr.	709,515	0.68	565,328	6.23	71,298	99.32
May.	701,286	2.37	562,482	7.66	64,474	114.33
June.	655,957	0.17	540,187	8.23	42,677	683.20
July.	613,628	3.19	533,084	9.23	6,643	119.18
Aug.	600,311	3.57	518,559	2.18	6,122	247.05
Sept.	603,215	7.21	523,601	0.14	6,503	87.06

	Operating Revenue \$	Increase or Decrease Per Cent*	Operating Expenses and Taxes \$	Increase or Decrease Per Cent*	Net Income \$*	Increase or Decrease Per Cent*
Long Island Railroad, New York, N. Y.						
Sept., 1930	3,589,671	7.33	2,467,056	7.07	928,655	6.58
Oct.	3,371,761	6.80	2,446,346	8.97	729,067	1.77
Nov.	2,954,624	4.20	2,249,258	14.66	483,180	89.15
Dec.	2,905,045	6.60	2,130,182	18.27	596,812	47.11
Jan., 1931	2,763,421	6.65	2,210,263	9.65	321,141	6.00
Feb.	2,561,169	7.43	2,074,216	9.13	332,002	3.88
Mar.	2,841,915	3.09	2,234,418	9.00	449,501	24.64
Apr.	2,976,402	4.89	2,269,029	7.37	533,425	1.97
May.	3,212,765	4.00	2,338,313	8.03	695,032	9.93
June.	3,414,354	6.78	2,351,016	7.86	907,010	6.76
July.	3,629,561	9.69	2,594,463	2.75	783,315	32.75
Aug.	3,513,473	11.48	2,504,287	5.04	781,691	32.08
Sept.	3,167,769	11.75				

	Operating Revenue \$	Increase or Decrease Per Cent*	Operating Expenses and Taxes \$	Increase or Decrease Per Cent*	Net Income \$*	Increase or Decrease Per Cent*
Market Street Railway, San Francisco, Cal.						
Sept., 1930	745,298	5.55	626,770	3.74	64,731	16.38
Oct.	786,012	6.73	675,908	6.49	57,384	15.68
Nov.	729,407	8.81	615,613	8.18	60,457	29.26
Dec.	775,508	6.12	639,249	6.62	83,460	0.03
Jan., 1931	738,092	5.65	641,519	4.83	45,011	12.31
Feb.	668,931	8.17	576,661	8.22	41,002	7.29
Mar.	757,960	6.40	633,346	6.81	72,828	0.06
Apr.	745,252	8.72	620,106	7.06	73,837	3.48
May.	733,105	7.60	619,934	8.21	62,805	2.08
June.	704,769	5.19	654,225	1.75	37,384	11.82
July.	700,996	4.68	598,082	7.97	52,186	60.40
Aug.	726,480	5.69	607,925	5.60	68,175	6.51
Sept.	700,563	6.00	581,479	7.23	68,712	6.15

	Operating Revenue \$	Increase or Decrease Per Cent*	Operating Expenses and Taxes \$	Increase or Decrease Per Cent*	Net Income \$*	Increase or Decrease Per Cent*
New York, Westchester & Boston Railway, New York, N. Y.						
Sept., 1930	203,617	8.18	165,256	6.57	192,861	29.53
Oct.	202,046	7.52	138,192	14.09	190,748	20.81
Nov.	184,690	8.74	170,542	2.52	170,451	19.76
Dec.	190,136	12.31	138,592	17.80	205,029	16.75
Jan., 1931	182,249	13.76	160,800	9.44	220,394	32.37
Feb.	161,311	15.02	149,571	11.18	222,308	29.42
Mar.	181,729	12.80	144,442	3.54	195,802	24.31
Apr.	186,708	13.03	142,832	0.31	189,142	19.00
May.	195,905	15.11	149,268	0.42	186,389	25.70
June.	193,820	14.62	142,600	3.45	183,007	23.70
July.	195,461	12.92	146,820	0.40	188,581	23.66
Aug.	180,965	8.79	142,111	6.62	197,099	6.56
Sept.	181,828	10.70	137,940	16.53	191,542	0.68

	Operating Revenue \$	Increase or Decrease Per Cent*	Operating Expenses and Taxes \$	Increase or Decrease Per Cent*	Net Income \$*	Increase or Decrease Per Cent*
Northwestern Pacific Railroad, Sausalito, Cal.						
Sept., 1930	548,282	8.68	471,657	3.78	16,471	33.57
Oct.	555,867	18.49	534,858	4.44	7,447	95.22
Nov.	333,193	27.74	421,717	10.33	97,567	120.86
Dec.	312,319	20.77	465,220	3.46	158,491	74.63
Jan., 1931	283,852	21.78	401,656	14.41	123,928	14.76
Feb.	273,818	27.40	387,512	12.96	122,521	68.87
Mar.	308,466	24.17	408,068	14.43	109,855	48.81
Apr.	322,742	25.66	402,400	16.55	88,300	68.51
May.	346,743	28.51	362,722	24.85	28,886	931.64
June.	380,604	24.50	368,559	17.22	1,970	95.39
July.	479,098	19.97	354,413	9.69	110,013	43.64
Aug.	464,342	27.27	368,885	11.22	82,947	65.23
Sept.						

	Operating Revenue \$	Increase or Decrease Per Cent*	Operating Expenses and Taxes \$	Increase or Decrease Per Cent*	Net Income \$*	Increase or Decrease Per Cent*
Staten Island Rapid Transit Company, New York, N. Y.						
Sept., 1930	206,908	15.93	165,525	4.87	26,127	60.73
Oct.	205,631	10.58	167,586	6.49	29,723	26.11
Nov.	178,652	17.42	161,608	0.68	10,788	80.37
Dec.	178,474	9.08	160,715	47.29	5,997	92.23
Jan., 1931	170,387	9.68	158,982	6.36	1,448	114.6
Feb.	161,415	13.58	142,565	9.20	2,151	93.49
Mar.	173,723	7.98	159,035	7.78	1,164	81.24
Apr.	176,863	10.76	147,210	13.23	23,169	31.97
May.	188,151	11.61	163,148	7.61	9,268	63.19
June.	204,452	9.12	150,345	16.01	39,203	0.38
July.	202,230	17.11	163,479	13.68	25,402	38.08
Aug.	197,386	15.42	159,702	6.00	23,973	61.56
Sept.						

	Operating Revenue \$	Increase or Decrease Per Cent*	Operating Expenses and Taxes \$	Increase or Decrease Per Cent*	Net Income \$*	Increase or Decrease Per Cent*
Third Avenue Railway System, New York, N. Y.						
Sept., 1930	1,428,136	3.48	1,167,528	8.36	45,636	277.91
Oct.	1,456,688	4.03	1,205,455	9.73	36,257	317.06
Nov.	1,373,335	5.07	1,146,168	10.17	12,079	130.15
Dec.	1,438,752	3.49	1,197,249	8.61	26,250	186.44
Jan., 1931	1,393,054	5.10	1,178,797	9.14	1,694	96.33
Feb.	1,274,832	4.27	1,070,307	8.56	11,143	126.49
Mar.	1,418,429	3.38	1,174,984	6.88	27,364	430.88
Apr.	1,408,235	3.25	1,155,880	5.98	44,331	250.25
May.	1,464,031	4.29	1,072,584	7.70	76,972	32.40
June.	1,440,848	2.88	1,145,871	6.19	79,746	76.91
July.	1,394,973	2.43	1,140,036	5.98	41,829	1,924.08
Aug.	1,302,353	3.53	1,087,507	7.90	1,067	129.27
Sept.	1,328,192	7.00	1,070,866	8.28	46,099	1.01

	Operating Revenue \$	Increase or Decrease Per Cent*	Operating Expenses and Taxes \$	Increase or Decrease Per Cent*	Net Income \$*	Increase or Decrease Per Cent*
United Electric Railways, Providence, R. I.						
Sept., 1930	493,296	12.72	434,036	10.39	8,376	72.04
Oct.	531,803	13.76			41,223	53.80
Nov.	506,318	14.58	439,930	12.83	16,958	54.37
Dec.	559,363	13.02	460,420	21.92	51,623	889.51
Jan., 1931	543,940	13.39	493,596	12.94	372	95.88
Feb.	482,566	14.30	437,444	13.02	4,503	160.71
Mar.	524,299	10.44	480,958	9.38	6,833	265.73
Apr.	510,645	9.39	470,964	7.60	9,992	456.60
May.	509,278	10.84	474,803	7.52	16,021	168.13
June.	482,703	9.40	438,362	8.16	4,633	201.09
July.	462,601	10.24	436,574	4.84	22,069	502.72
Aug.	445,932	10.16	420,929	4.78	23,467	744.17
Sept.	455,562	7.65	413,926	4.63	6,184	173.83

	Operating Revenue \$	Increase or Decrease Per Cent*	Operating Expenses and Taxes \$	Increase or Decrease Per Cent*	Net Income \$*	Increase or Decrease Per Cent*
United Railways & Electric Company, Baltimore, Md.						
Sept., 1930	1,261,734	6.71	995,805	5.02	10,050	76.81
Oct.	1,354,086	7.28	1,049,306	4.84	25,163	71.16
Nov.	1,263,811	10.26	983,047	7.40	9,200	87.30
Dec.	1,350,553	8.19	1,043,315	7.26	36,700	54.54
Jan., 1931	1,268,536	10.90	994,411	11.89	7,388	69.22
Feb.	1,136,604	15.78	891,421	15.97	24,088	31.16
Mar.	1,262,429	14.90	981,026	14.78	12,212	84.94
Apr.	1,253,764	13.50	966,424	13.56	11,440	82.93
May.	1,256,334	13.78	991,107	11.93	2,206	68.99
June.	1,195,126	10.29	963,857	7.59	34,952	198.98
July.	1,105,980	10.55	946,646	1.86	117,691	918.99
Aug.	1,038,314	13.34	947,614	1.76	180,963	3,057.40
Sept.	1,084,246	14.07			133,449	1,427.86

Monthly and Other Financial Reports

	Operating Revenue \$	Operating Expenses \$	Taxes \$	Gross Income \$	Net Income \$
British Columbia Electric Railway, Vancouver, B. C.					
July, 1931	1,131,941	803,106		328,835	
July, 1930	1,196,239	791,432		404,807	
Calgary Municipal Railway, Calgary, Alta.					
8 mo. end. Aug., 1931	529,879	372,173			51,701
8 mo. end. Aug., 1930					27,860
Cincinnati Street Railway, Cincinnati, Ohio					
September, 1931	596,264	392,850	55,713	188,733	2,425
September, 1930					
Community Traction Co., Toledo, Ohio					
September, 1931	160,917	174,378 ^a		18,461	73,576
September, 1930					
Des Moines Railway, Des Moines, Iowa					
September, 1931	133,533	97,289	14,000		20,163
September, 1930	150,998				

NEWS of the Industry

Improvement Projects

Chicago, Ill.—Workmen have started the construction of the Chicago Surface Lines extension of the North Avenue street car line. The present tracks will be extended from North Austin Boulevard to Narragansett Avenue. The work would be pushed rapidly in order to have all of the concrete laid before freezing weather.

Seattle, Wash.—The Municipal Street Railway will erect a steel girder span to replace the present wood span on the elevated bridge across the newly paved section of East Marginal Way, at a cost of \$6,000. The work will be financed by municipal railway funds.

Fort Wayne, Ind.—The maintenance of way department for the Indiana Service Corporation's local city railway completed the laying of 3,955 ft. of double trackage and pavement on Nov. 1 on Calhoun Street, Fort Wayne's main traffic artery. In the meantime, the operating department maintained its schedule uninterruptedly, moving 1,580 cars daily over the sector under construction. The project was begun on Aug. 3, and completed at a cost of \$100,000. The new 102-lb. rails are ballasted with concrete. Granite paving blocks were used at all intersections. Crews worked night and day to complete the job.

Hammond, Ind.—A. C. Colby, new general manager of the recently-organized Chicago & Calumet District Transit Company, serving Hammond, East Chicago and Whiting, Ind., will immediately undertake a traffic survey to determine the railway and the bus needs of the territory as a guide to the rehabilitation of transportation facilities. Urgent track repair work will be started on the lines at once and as many of the cars as can be spared are to be sent to the shops immediately for renovation, but the major program of reconstruction work will not start until next spring.

Fare Changes

Youngstown, Ohio—The Youngstown Municipal Railway reduced the price of weekly passes on its lines from \$1.25 to \$1, effective with the passes used in the week of Oct. 18. With a total of 6,813 \$1 weekly passes sold in one week, A. W. Hartford, local street railway commissioner, expressed pleasure of the first week's trial. The 6,813 pass sale figure compares with an average of 3,300 \$1.25 passes sold during the last few weeks.

(Continued on Page 660)

New England Meeting Stirred by Mr. Dana's Talk

Experimentation based on the firm foundation of facts, not opinions, will help to solve the problems of the electric railways. This was the gist of Edward Dana's talk at the dinner of the New England Street Railway Club on Oct. 29. He said experimentation is sound if based on facts. The work of the Presidents' Conference Committee was cited as a significant step in this direction, although belated, adding that the present depression intensified the need for experimentation, called for hard work, and emphasized the need for more efficiency.

Mr. Dana deplored the tendency of the industry to think of the problems of the mass transportation area, the small city and the interurban lines as being alike. The problems of these three branches differ greatly. They should be studied separately.

There are two ways by which railways can better their positions: by greater operating economy and by the production of more revenue. Greater operating economy can be accomplished by co-operation of management and men. Much can be done and should be done in getting more revenue. Not everybody wants the same kind of transportation. The industry was on an unsound economic foundation with a flat

5-cent fare. Mr. Dana said the industry has been remiss in not trying more fare experiments. It is now feeling its way in co-ordinated transportation.

Mr. Dana's talk was followed by a display of the film showing the work of the car research committee.

Thomas Carens, assistant to the president of the New England Power Association and former Washington correspondent for the Boston *Herald*, talked on happenings in Washington. He gave an amusing account of personalities in Congress.

John Dean analyzed the pull-in records of the southern properties at the afternoon meeting, showing by charts the records of pull-ins and of maintenance costs of member companies. He said the adoption of a uniform classification and the submission of records to that association had done much to improve service and lower maintenance cost by fostering competition. He urged the New England club to adopt a similar plan.

Seattle Recommendations Expected Soon

Mayor Robert Harlin's street railway commission is preparing a report embodying its recommendations about Seattle's Municipal Railway system. The commission, it is expected, will recommend a program for reorganization of the railway system, also policies for its operation and management, and other changes that will require either State law or city charter amendments. Chairman Maxwell states he is not prepared to divulge the recommendations in advance of final action by the commission, but he did say that the commission has not given definite consideration to the various candidates for general manager of the railway system. He said:

"We have just confined ourselves to a survey to determine the kind of a man we want for this job."

City-Owned Bus System Not Authorized

G. E. McCrossan, K. C., corporation counsel for the city of Vancouver, B. C., has informed the Civic Finance Committee of that city that civic authorities have no legal power under the present charter to operate a city-owned bus service in competition with the British Columbia Electric Railway. Alderman will consider an amendment of the charter to include such powers. Several years ago the Provincial Legislature refused to amend the charter along the lines suggested.

The Business Outlook

CONSUMER necessity industries, catering to immediate short-range requirements, continue encouragingly active, but the big basic construction and equipment industries still show no sign of stimulation by obsolescence or investment expansion, and probably none is to be expected in the next two months. Wheat, cotton and a few other commodities have reacted strongly from bottom price levels as the speculative possibilities on the short-side have become exhausted, as foreign demand has improved and as the expectation of an inflationary session of Congress is discounted in advance.

The securities markets have so far been able to extract little nourishment from the Hoover-Laval conversations and the British elections, and need further injections of encouraging news or official action to emerge from the soggy swamp of slow liquidation in which they linger. These events, however, are of long-range importance as they indicate a decisive turn toward intensified national effort and individual initiative in Europe, which should give the cue to policy in this country.—*The Business Week*.

Accounting Conference Called by Wisconsin Commission

Electric utilities in Wisconsin have been requested to send representatives to a hearing before the Public Service Commission to study proposed revision of the uniform classification of accounts prescribed for electric utilities having gross operating revenues in excess of \$250,000 a year, to be held at Madison on Nov. 2, 3 and 4. The new rules are to be made effective on Jan. 1, 1932.

The classification now in effect was adopted in 1922 and is substantially identical with the accounting classification recommended by the National Association of Railroad and Utilities Commissioners. Commissioner Lilienthal said:

The key to genuinely effective and expeditious regulation is a classification of accounts which adequately reveals all the essential facts upon which regulation must be based. Judged by this test, we concluded some months ago that the existing classification falls short in a number of essentials.

The proposed new classification contemplates that if an electric utility is engaged in rendering one or more other utility services it shall keep for all of its utility services the same classification of balance sheet, income surplus, general fixed capital undistributed, and overhead construction cost, and general administrative expense accounts for all departments, and the instructions and definitions pertaining to each of these groups of accounts as prescribed for the electric department, are to apply to all classes of utility services whether electric street railway, gas, water, etc.

In view of the fact that the subject of accounting for utilities is one in which there is interest beyond the boundaries of Wisconsin, ideas and suggestions are invited from interested parties wherever located.

Commission Reports on Adequacy of Columbia Service

In eight of the ten cities visited by the board of engineers, appointed under authority from the South Carolina Supreme Court, to conduct an investigation into street railway and bus transportation, particularly as it relates to the city of Columbia, S. C., the board found the local transportation systems in the process of transition. Among the cities visited by the board were Raleigh, Durham, Danville, Lynchburg, Richmond, Petersburg, Augusta, Athens, Atlanta and Macon.

The board concludes that there is no reason why the modern bus cannot give as reliable service as the street car and afford equally rapid and comfortable riding for passengers under traffic conditions as they are in Columbia. Routes can easily be extended or altered and the passenger is taken on and put off at the curb.

The board also discusses the trolley bus, saying that except for the saving effected by the use of electric current, the board "can see no advantage that the trolley bus has over the gas bus." However, should the court find that the bus service furnished was unsatisfactory and order street cars restored, "it probably would be found advisable to use trolley buses."

The board says it considers it would be an economic loss to require the Columbia Railway, Gas & Electric Company to operate the fair grounds line on a regular schedule, but the "track should be kept in good condition and cars operated on special

occasions and when required by the Railroad Commission and the City Council."

W. S. Tomlinson and Walter E. Rowe, two members of the board, signed a report to the effect that they thought the railway had complied with all the orders of the board relating to cars and is now using a type of car which "renders adequate and satisfactory service."

G. E. Shand, the other member of the board, said he could not agree that the one-man cars now being used are acceptable, and cannot agree that they fulfill the orders of the court which required that the system be equipped with "comfortable up-to-date cars." The cars in use in Columbia, he said, were installed about 1922. The buses in use, he says, are modern and the trolley cars compare unfavorably with the buses.

Is the Taxi a Public Utility?

The questions of whether a taxi is a public utility and whether the number to be licensed can be determined on the basis of "public convenience and necessity" are expected to be raised in a suit if the Cincinnati City Council approves the report of its utilities committee, sustaining Utilities Director Gilman in denying ten additional taxicab licenses to the Parkway Cab Company.

Attorneys representing the Parkway Cab Company say that if City Council approves the report they will apply to the Court of Appeals for a writ of mandamus to compel city authorities to issue the additional licenses.

Chairman Pollak of the utilities committee of the Council insisted that the taxicab, if a public utility, must be considered in relation to all local means of transportation. He said that the question of taxi fares should be discussed. This would involve consideration of both a maximum and minimum fare, or a classification of service as to rate of fare and quality of equipment, he said.

New Working Agreement Plea in Indianapolis

Failing to secure an eight-hour working day, a seven-day week agreement for all employees with time and a half for overtime by petitioning the Public Service Commission, employees of the Indianapolis Street Railway have taken their requests

to James P. Trenton, company superintendent.

The original petition laid before the commission was dismissed on the grounds that the matter should first be taken up with the company, and failing an agreement, referred to the commission for consideration. The new petition asks recognition for the right to collective bargaining.

Baltimore's Mixed Chorus

Back in 1920, a male chorus, recruited from the ranks of the platform men, was organized under the patronage of the management of the United Railways & Electric Company, Baltimore. From the large number of men who presented themselves for a test, eighteen were selected and rehearsals started. Six months after the first rehearsals the chorus arrived at that state of proficiency that warranted its public appearances. Ever since then the chorus has been giving concerts before civic bodies and improvement associations and at club functions, banquets, and other functions.

The success of the male chorus aroused the women employees of the company to petition the management to sanction the organization of a chorus among them. To this the management readily assented, and the Ladies' Choral Club was formed with some 30 voices.

This chorus was successful from the very beginning and has appeared frequently before church bodies, business organizations and over the radio. The members of the Ladies' Choral Club are all in the general offices of the company.

For a while the activities of the male chorus and the choral club were entirely individual, and the success of each prompted the idea of combining them and giving joint concerts, a portion of the program being given by each section, and the latter portion by the ensemble. The male chorus was augmented to give proper tonal balance. The choruses still rehearse separately once a week, but hold a general rehearsal monthly in quarters provided by the company.

Shortly after the Christmas holidays each year a formal concert is given in one of the large auditoriums in Baltimore to which the public is invited free.

A dance orchestra assembled within the past year has been of great value in providing music for dances following concerts by the choruses when dancing was part of the program.



Baltimore company's mixed chorus in public demand

Fare Changes

(Continued from Page 658)

Cleveland, Ohio—Approved by directors of the Cleveland Railway, a 5-cent experimental rate is in effect on the Superior, Payne and Wade Park lines between the Public Square and East 21st Street. Moreover, a proposal to sell passes good on cars during off-peak hours is being considered. Revenue under the recently adopted plan of 10 cents cash, four tickets for 30 cents, still shows a decrease over the comparable period last year.

Indianapolis, Ind.—A special excursion fare offering a round trip for one-and-a-half times the regular one-way fare was placed in effect on all lines of the Indiana Railroad System during the Indiana State Teachers' Association meeting here, Oct. 22, 23 and 24. Extra cars were placed in service on a number of regular runs. New high-speed cars, recently purchased by the system, were successfully operated in two and three-car units.

Trenton, N. J.—Application has been filed with the Board of Public Utility Commissioners by the Reading Company for an increase in trolley fare for passengers who use the Trenton-Princeton Traction Company's line within the local city limits. The present rate of fare is 3 cents. The company would charge 8 cents. For many years, residents of Trenton have been using the Princeton line's trolleys to ride within the city limits. The Trenton Transit Company maintains an 8-cent fare.

Indianapolis, Ind.—Representatives of local civic clubs have asked the Board of Public Works to reduce city bus fares from 10 cents to the 6½-cent level in force on street cars. The buses are operated by the People's Motor Coach Company, affiliated with the Indianapolis Street Railway.

Bus Operations

St. Louis, Mo.—The Public Service Commission will conduct a hearing here on Nov. 9 on the application of the St. Louis Public Service Company to substitute service by bus on its Jefferson Barracks rail line and on a part of its Natural Bridge line between Grand Boulevard and Kingshighway.

Binghamton, N. Y.—The Triple Cities Traction Corporation, operating both bus and railway service in Binghamton, Endicott and Johnson City, plans to substitute service by bus for the rest of its trolley lines in the three cities not later than May, 1932. To this end, the company has applied to the Public Service Commission for permission to make the change. The substitution program will require the purchase of approximately 60 bus units to replace the 34 trolley cars now in use. The company plans a large garage and service station on its property in State Street. The cost of the change is estimated at \$800,000.

Change of Address

ELECTRIC RAILWAY JOURNAL and other McGraw-Hill publications are now located in the new building at 330 West 42d Street, New York, built to bring all the operations of the company in New York together in one place. It will facilitate the affairs of the **JOURNAL**, of the McGraw-Hill Publishing Company, Inc., and of those who have occasion to address the **JOURNAL** if prompt note is made of the change of address. There has been no change in the telephone address. It remains: Medallion 3-0700.

Princeton, W. Va.—Officials of the Tri-City Traction Company plan to apply for permission to operate buses between Princeton and Bluefield to replace railway service.

Brooklyn, N. Y.—The Brooklyn Bus Corporation, affiliated with the Brooklyn-Manhattan Transit Corporation, has placed in service two more bus routes of the twenty routes included in its franchise contract with the city of New York. The two new lines are: Route No. 9, Staten Island Ferry-3rd Avenue-60th Street; Route No. 16, Fort Hamilton Parkway.

St. Louis, Mo.—The State Public Service Commission has denied the application of the Ferguson-Wellston Bus Company for a certificate to operate a bus line between Ferguson and Florissant in St. Louis County. The commission held that, under the State bus act, it has no authority over bus lines operated within municipal confines or in suburban territory. The commission has already authorized the St. Louis Public Service Company to substitute service by bus for rail service on its Florissant line north of the Wabash Railroad tracks, a distance of about 3 miles.

Columbia, S. C.—Buses of the Columbia Railway, Gas & Electric Company carried 348,925 passengers during the past three months while street cars carried 257,587, the Supreme Court was told on Oct. 15 by engineers who conducted a survey of the transportation situation here in connection with the plan looking toward a complete readjustment.

Service Changes

Winston-Salem, N. C.—The Aldermen will be asked by the Southern Public Utilities Company for permission to operate an experimental bus in Buena Vista and place its street cars on twenty-minute schedules throughout the day except during the rush periods, when a ten-minute schedule will be maintained.

Los Angeles, Cal.—The Pacific Electric Railway has asked the Railroad Commission for authority to reroute its Los Angeles-Hollywood-Venice line on week days into the subway terminal via

Glendale Boulevard and the subway instead of via Sunset Boulevard and Hill Street. The routing on Sundays is to remain as at present. The proposed change will result in better operating conditions and will permit a proper coordination of the present Hollywood Boulevard local service with the through line. Except on Sundays traffic on the line is light between points east of Glendale Boulevard and points west of West Hollywood.

Sandusky, Ohio—The Lake Shore Coach Company, controlled by the Lake Shore Electric Railway, has asked the Ohio Public Utilities Commission for permission to abandon its Amherst-South Amherst line, temporarily suspending service on its Lorain-Sandusky route and extend its Cleveland line to Sandusky, via Lorain and Amherst. The hearing has been scheduled for Nov. 20.

Philadelphia, Pa.—According to the *Philadelphia Ledger*, the franchise rights of the underlying company of the Philadelphia Rapid Transit Company, traffic difficulties, the objections of Ridge Avenue business interests, the cost to the P. R. T., all stand in the way of making the stretch of Ridge Avenue between Ninth and Broad Streets an unobstructed outlet for traffic from the Delaware River Bridge. In short, so many technical and financial factors stand in the way, that it now seems to be inevitable that the surface tracks will have to go back on Ridge Avenue when the subway construction work now under way is completed. The plan was to divert surface cars away from this thoroughfare.

Financial News

Indianapolis, Ind.—The Indianapolis & Southeastern Railway, operating lines from Indianapolis to Connersville and Greensburg, has petitioned the Public Service Commission for permission to abandon interurban service on the two lines. In the meantime, a Chicago creditor sought the appointment of a receiver to protect an unpaid claim. In filing its petition for abandonment the company stated that its lines earned only \$2,300 in 1930, and lost more than \$14,000 in the first seven months of 1931.

Cincinnati, Ohio.—Figures on the cost of Cincinnati's never-used rapid transit system, not previously made public, were revealed at a meeting of Federated Civic Associations by Henry Urner, auditor, on Oct. 27. Total cost to the taxpayers, according to Mr. Urner, on the "hole in the ground" as it now is, will be \$19,001,200. A way is being sought to utilize the transit system in its present uncompleted form. It is estimated that \$12,000,000 to \$18,000,000 additional would be required to develop the system to make it usable. Officials of the Cincinnati Street Railway are understood to take the stand that the system even if tied in with its lines could not be made to pay a fair return on so huge an investment.

(Continued on Page 662)

Pass Authorized for Bus Use

In the matter of the application of the Washington Rapid Transit Company, requesting authority to issue and sell two classes of weekly passes, good for transportation on its various lines within the District of Columbia, the Public Utilities Commission has ordered:

1. That the Washington Rapid Transit Company is hereby authorized to put into effect weekly rates for transportation on all of its lines operated within the District of Columbia. The rates are as follows:

(a) Weekly pass good for transportation of bearer on the lines of this company within the District of Columbia at all times during the week for which issued (from beginning of service Sunday morning to close of service Saturday night), to be sold for \$1.25. (Not redeemable.)

(b) Weekly "Shopper-Theater" pass good for transportation of bearer on the lines of this company within the District of Columbia during the week for which issued (from beginning of service Sunday morning to close of service Saturday night) when boarding the bus during the following hours: Week days, 9 a.m. to 4 p.m., and after 6:30 p.m.; Saturdays, after 9 a.m.; Sundays, at anytime. This weekly pass to be sold for 75 cents. (Not redeemable.)

2. That these weekly passes be sold on buses and at other places to be designated by the operating company.

The commission approved these reduced fares effective Oct. 18, 1931, to remain in force for an experimental period of eleven weeks, to and including Jan. 2, 1932.

Painting the Picture Differently

Hearings were held recently at Belleville, Neb., by the State Railway Commission on the plea of the Omaha & Southern Interurban Railway operating between South Omaha and Fort Crook, for authority to substitute buses for rail service over the 8-mile road. Two hundred persons from the territory served appeared in protest, but the commission announced that unless the company was allowed to make the substitution it would not be able to prevent it from carrying out its determination to suspend all service. Opposition came largely from owners of unsold suburban lots and commuters since the route to be followed by the buses will open up new territory. The company is owned by the Omaha & Council Bluffs Street Railway. The accumulated deficit is \$30,000. Patrons complained that the servicing charges of the parent company and the division of transfer receipts were unfair to the interurban. Members of the commission recalled that when the affairs of the parent company were under scrutiny two years ago patrons of that company complained that the interurban was in effect subsidized by the city railway.

Brief Submitted Covering Taxis in Washington

The Capital Traction Company, Washington, D. C., on Oct. 26, submitted a brief to the Public Utilities Commission asking that the taxicab industry be so regulated that it will not offer unfair competition to the street railways. The brief constituted a summary of the company's testimony at the hearing recently together with arguments and references.

Two principal points are made in the document: (1) The taxicab industry is "in a most chaotic and unregulated condi-

tion" and (2) the basis of competition with the street railways is "unfair and discriminatory."

While the brief makes no direct plea for a return to meter operation, it denounces the zone system and the present low rates of fare. As to the flat-rate charge, the company contends that the "public is in no way protected against exorbitant or discriminatory charges."

The low fare enables the public "to secure transportation at far below the actual legitimate cost," the petition states, and "by such an unfair basis of competition there is diverted from the street railroads a large proportion of their legitimate patronage."

Move for Substitution in Milwaukee

Fifty Shorewood residents, living on North Downer Avenue and adjacent streets between East Edgewood Avenue and East Capitol Drive, recently asked the village board to take steps to have service by bus substituted for the present trolley service by the Milwaukee Electric Railway & Light Company. The company is open-minded in the matter although it has considerable money invested in tracks on the Downer Avenue line. Moreover, the Shorewood board on Oct. 12 passed an ordinance ordering the company to move its present bus parking space at East Capitol Drive and North Downer Avenue from the south side of Capitol Drive west of Downer to the east side of Downer Avenue north of Capitol Drive to take effect on Nov. 1. The company contended that an order to change the parking space should come only from the Public Service Commission.

Seattle School Fare Liberalized

School children of Seattle, Wash., will be given the privilege of riding the Municipal Railway's cars and buses on Saturdays at their regular schoolday rate of 2½ cents, effective at once. The Utilities Committee, in granting the action, turned down a counter proposal from A. E. Pierce, acting superintendent of the railway system, that a new school fare of 5 cents every day be adopted for school children instead of extending the privileges of the present fare to include Saturday. The hours for school tokens are from 6 a.m. to 6 p.m.

Councilman Ralph Nichols protested on the ground that the railway is not paying; that the Council should not act contrary to recommendations of officials of the Municipal Railway, and that it should give all possible support to Mr. Pierce and the recently appointed Street Railway Commission. Use of school tokens, except on school days, was suspended at the end of the vacation period, during which children were allowed to ride to and from the parks, beaches and other summer attractions at the regular 2½-cent school fare.

In submitting his counter proposal Mr. Pierce declared that the 2½-cent token fare is being "grossly abused." He pointed out that the hours for school fares have been so greatly extended, along with vacation and Sunday privileges, "that even young men and women of 20 or 21 years enrolled in mechanical and beauty culture courses use school fares." Mr. Pierce contends that this constitutes a serious loss of revenue to the railway.

San Bernardino Service Cut

The application of Pacific Electric Railways to reduce its service and rearrange its schedules on its Los Angeles-San Bernardino branch has been granted by the California Railroad Commission. The change will save approximately \$3,000 a month by reducing the present operation from 4,200 car-miles per day to about 3,700. During the hearing the railway amended its schedule as first proposed to provide for an additional trip during the evening peak hours. At the hearing it developed that the number of fare passengers using this service had decreased from 1,406,455 from January to August, inclusive, in 1929, to 1,198,583 for the similar period in 1930, and 1,041,176 for the like period in 1931. Revenue for the corresponding months dropped from \$484,674 in 1929 to \$451,406 in 1930, and to \$382,591 in 1931.

Parking Still a Problem

In order to determine the parking facilities that can be provided for the 20,000 government employees who will soon occupy the new buildings in the triangle area, the Treasury Department has recently completed a survey of the situation. The results of this survey are not being announced at this time, but it is understood that it has been ascertained that a large expenditure would be necessary to furnish sufficient parking accommodations for the government employees who drive their cars to work. Previous counts have disclosed that one-third of the total number of government employees ride down to their offices in automobiles. Heretofore, street space has been available, but among many officials the attitude prevails that it is not incumbent on the government to supply parking facilities for its employees — particularly when mass transportation facilities are available. Furthermore, the point is made that, in developing the triangle area for park purposes, nothing should be done to reduce the number of street car and bus lines serving the section. Tentative plans under consideration by those in charge of the park development call for the removal of some of the street car lines and the closing up of some of the streets that transverse the area. Traffic experts believe that the situation will be made worse if too much stress is laid on park development at the expense of transportation facilities.

Trolley Buses for Fitchburg

All street cars of the Fitchburg & Leominster Street Railway, Fitchburg, Mass., are to be replaced with trolley buses. The mileage of trolley bus operation will be 12 miles of double route. Tracks now in the street will be covered with asphalt to give a smooth surface. Orders have been placed with the Brill Company for seven trolley buses, each seating 40 passengers, at a cost of \$80,000. The Ohio Brass Company will supply the overhead at a cost of \$35,000. The General Electric Company will supply the motors and control. Trolley bus operation is expected to start soon after Jan. 1. Headways will be reduced from 30 to 20 minutes.

Chicago "El" Sustained in Fare Case

Deciding in the Chicago Rapid Transit rate case that the city of Chicago has no status separate from the Illinois Commerce Commission and the attorney general of the State, the United States Supreme Court has dismissed the appeal filed by the city in an effort to bring about lower fares on the elevated lines. Specifically, the city sought to have an injunction set aside by which the elevated lines have prevented the enforcement of a lower rate schedule ordered by the Illinois Commerce Commission.

The city of Chicago was permitted to intervene in the original injunction suit in the district court. Upon the submission of a report of a special master appointed in the case, the district court held that the rates prescribed by the commission were confiscatory, and granted a permanent injunction against the enforcement of the order. It was brought out that the commission, while denying that the prescribed rates were confiscatory, introduced no evidence before the master or the court and took practically no part in the proceedings.

It is pointed out in the order of the Supreme Court dismissing the appeal that the Illinois Commerce Commission and the attorney general of the State were not parties to the appeal. The report of the special master dealt with the evidence in detail. It was stated in this report that the value of the Chicago Rapid Transit properties is not less than \$125,000,000 and that the company is entitled to a return of 7½ per cent a year upon this value.

G. E. Employees Accept New Unemployment Relief Plan

Employees of the General Electric Company have accepted the new unemployment relief plan, a tabulation of the votes announced on Oct. 28, showing that 89.5 per cent of employees eligible to vote had cast their ballots and that 97 per cent of these ballots favored adoption of the plan.

The total number of eligibles is slightly more than 39,000. These are employees who are members of the original and basic unemployment pension plan adopted by employee vote on Aug. 1, 1930. The number of votes cast thus far for the new plan is approximately 35,000. It was announced that voting would continue until Nov. 1 to permit participation by employees who were absent.

The plan provides for rotation of available work and other means by which hourly-rated and piecework employees on the payroll on Nov. 1 may be assured of receiving, during the following six months, not less than the equivalent of one-half of their average full-time weekly earnings up to an average of \$15 per week, and their actual earnings in case the latter amount to more than \$15 per week.

The unemployment emergency fund of the company, to which those employees earning 50 per cent or more of their average full-time earnings (including all office, administrative and executive employees and officials of the company) now contribute 1 per cent of their earnings will be augmented on Nov. 1 by increasing this contribution to 2 per cent, the com-

pany contributing an equal amount. The plan has been approved in principle by the board of directors, and in case these provisions prove inadequate, the board will be asked to authorize additional payments to the fund by the company, without additional payments by employees.

Financial News

(Continued from Page 660)

New York, N. Y.—In discussing the future of the Belt Line Railway Corporation, the sole remaining active property of which is the 59th Street cross-town line, S. W. Huff, president of the Third Avenue Railways, said on Oct. 26 that for the foreclosure proceedings last spring his company bid for the belt line property, but continued to operate it as a separate company. The sale was approved about ten days ago by the Transit Commission, and as soon as the absorption plans are completed the old name will be dropped. The line makes a profit, and will be useful for tie-in with the Third Avenue system.

Stuebenville, Ohio—The State Utilities Commission has set Nov. 12 as the date for a hearing of the application of the Union Motor Transit, Inc., to sell its operating certificates and 22 buses to the Penna Bus Company, Martins Ferry, for \$90,834.

Baltimore, Md.—The United Railways & Electric Company is planning to place its request for relief from paying the park tax before the members of the City Council. This action will be taken as a result of Mayor Jackson's suggestion that the subject go before the Council. It is expected that the request will be in the form of an ordinance. The latest issue of *Trolley News*, published by the railway, is devoted almost entirely to the subject. On the front appears a reproduction of a sign reading "Motorists! Use and enjoy Baltimore's beautiful park system built and kept up for 72 years by street car revenues—now more than \$1,000,000 a year."

St. Louis, Mo.—The State Board of Tax Equalization on Oct. 20 voted two to one to reduce the tax valuation of the St. Louis Public Service Company from \$40,001,026 as recommended by the State Tax Commission to \$35,000,000. The reduction will probably cut the company's tax bill this year \$130,000. The \$40,001,026 recommended by the State Tax Commission was approximately the amount agreed upon by the company and tax authorities of St. Louis and St. Louis County early this year after the company had resisted in the courts the \$44,482,395 tax assessments made by the State in 1930. Through consent decrees in the St. Louis and St. Louis County Circuit Courts the assessments were reduced to \$40,001,894. That reduction cut the company's 1930 tax bill by \$115,838. The reduction just approved means the company's tax bill this year will be \$245,000 below the original assessment for 1930. The company sought to be taxed on \$30,000,000 this year.

Memphis, Tenn.—The assessment of the Memphis Street Railway for purposes of taxation has been decreased from \$8,000,000 to \$7,500,000.

East Liverpool, Ohio—J. D. Deweese has been discharged as receiver for the Youngstown & Ohio River Railroad, an electric line running between Salem and East Liverpool, abandoned several months ago. An order entered by Judge Lones in Common Pleas Court directed Mr. Deweese to turn over all railroad records in his possession to Briggs & Turvais, Blue Island, Ill., who purchased the property for dismantling. The application of the receiver for confirmation of all reports has been sustained, and accounts have been approved as modified.

Newark, N. J.—Theodore Boettger has been elected a director of the Public Service Corporation of New Jersey to fill the vacancy caused by the death of Uzal H. McCarter.

St. Louis, Mo.—The State Public Service Commission will conduct a public hearing at Jefferson City on Nov. 17 on the application of the St. Louis Public Service Company for permission to sell its two power plants to the Union Electric Light & Power Company and to enter into a new service contract with the power company.

New York, N. Y.—J. V. Davies has been elected a director of the Hudson & Manhattan Railroad to succeed the late William H. Williams.

Boston, Mass.—Governor Ely has re-appointed Henry I. Harriman of Newton as a trustee of the Metropolitan Transit District.

New York, N. Y.—The Commonwealth & Southern Corporation has declared for six months ending March 1, 1932, a dividend of 15 cents on the common, payable March 1, 1932 to stock of record of Feb. 5, against previous declaration of 10 cents quarterly. The company stated it deemed it wise to reduce the current dividend to a rate which is well within present earnings.

Regulation and Legal

Rochester, N. Y.—The New York Central Railroad is opposing franchises granted to Rochester, Niagara Falls & Buffalo Coach Lines, Inc., successor to the electric railway of similar name, by Public Service Commission. Illegal competition with its passenger service between Albany and Buffalo is charged by the road.

Reading, Pa.—The Public Service Commission has decided in the case of the Reading Transit Company against the Central Taxicab Company that a taxicab company which makes a practice of calling for certain school children and taking them to and from school is not violating the terms of its certificate. The record showed that the taxi com-

(Continued on Page 663)

Calumet District Sale Approved

The Public Service Commission of Indiana has authorized the sale of the Calumet Railways, Inc., the Shore Line Motor Coach Company and the Mid-West Motor Coach Company, all properties of the Midland United Company, Chicago, to the Chicago & Calumet District Transit Company, controlled by Walter J. Cummings, Chicago. All three transportation units operate in the Calumet region of Indiana, chiefly in Hammond, East Chicago and Whiting and between these cities and Chicago.

The Cummings organization will ultimately pay \$1,050,000 for the properties. Under an agreement approved by the commission the purchasers will pay \$5,250 every three months for 50 years, beginning Oct. 1, 1931. The sale involves 27 street cars of the Calumet Railways, Inc., and 110 buses of the Shore Line and the Mid-West companies. Maintenance equipment is also included. The new company is to lease the garage of the Shore Line Motor Coach Company in Hammond for a period of five years and will establish headquarters there.

Mr. Cummings is to spend \$150,000 in a general reorganization of the three carriers. The street car line will be the backbone of the system, with the buses in general acting as feeders. More money will be spent on trolley buses and other improvements as fast as conditions warrant. All this will be done without applying for new operating franchises in any of the affected cities. The new company will operate under the present franchises and the permits of necessity and convenience.

The Midland United Company had originally applied to the Indiana Commission for permission to discontinue the operation of the Calumet Railways, Inc., after attempts to obtain a "service-at-cost" franchise in Hammond, East Chicago and Whiting had been unsuccessful. Its request to discontinue was granted by the commission, but later the plea was withdrawn when Mr. Cummings arranged to purchase the properties.

Receiver for Fort Wayne-Lima Road

Frank H. Cutshall, president of the Old First National Bank & Trust Company, Fort Wayne, recently took over the operation of the Fort Wayne-Lima Railroad as federal court receiver. Subsequently, Mr. Cutshall and Frank C. Kahle, Lima, Ohio, were named ancillary receivers for the company in Ohio by the Northern Ohio District Federal Court at Toledo. The court ordered operation of the 65-mile line from Fort Wayne to Lima, Ohio, to be continued. The petition asking for appointment of a receiver charged that the company was insolvent, owing large sums for track and terminal rentals in Indiana to the Indiana Service Corporation and to the Lima Street Railway. The company has about \$440,000 of mortgage bonds outstanding and owes approximately \$75,000 to general creditors.

The road forms an important link in the electric railway systems of Indiana and Ohio. It has been operated by the Indiana Service Corporation for a number of years and will continue so under the receiver.

Regulation and Legal

(Continued from Page 662)

pany had been transporting a group of school children to and from several schools on regular school days under an arrangement made with the parents of the children to call every morning, transport the children to school and return them to their homes in the afternoon. Regular meter rates were charged for this service under a tariff that provided the same rate for one or five persons. At the hearing an officer of the company testified that where there were small children, no extra charge was made if the number exceeded five.

Washington, D. C.—In indicating his intention to reintroduce his bus regulation bill next session, Senator Couzens, chairman of the Interstate Commerce Committee, has announced his intention of including trucks. Senator Couzens is not in sympathy with the proposals that the dominant feature of regulation should be devoted to reducing the competition of buses and trucks on the railroads. Since highway transportation is becoming more important to the country every year, he is understood to feel that whatever legislation is decided upon should be designed to promote rather than to restrict the bus and truck industry.

Omaha, Neb.—The Omaha & Council Bluffs Street Railway says of Commissioner Koutsky's proposal that the city ask the Nebraska State Railway Commission to establish a 5-cent street car fare in Omaha, that it is a continuation of the commissioner's purpose to make the street railway his political football. If the city applies for a 5-cent fare, the company's answer will be that the present fare does not give a return on the fair value of the property.

General

Brooklyn, N. Y.—The Downtown Brooklyn Association has retained Day & Zimmerman to make a survey of the Fulton Street elevated line of the Brooklyn-Manhattan Transit Corporation to determine: Its value, present and future, to the downtown business section; and the value to that section of its removal with the substitution of the four-track subway now in course of construction and intended to take its place as a traffic carrier.

Oakland, Cal.—B. W. Campbell, A. B. Peterson and R. F. Gutchard have submitted an application before the Council for a franchise to operate freight lines on Poplar Street from Third to Twelfth Streets. About two years ago, the predecessor to the present East Bay Street Railway asked a revocable permit for a spur track connecting the Key Route at Twelfth Street and Poplar and the Western Pacific main line at Third and Poplar, thus creating a proposed belt line service which would link many industrial plants to both railroads.

Indianapolis, Ind.—The Store-Door Delivery Corporation, a motor trucking concern, has petitioned the Public Service Commission for permission to operate twelve motor freight lines throughout Indiana. If established, most of the routes would parallel existing interurban routes but some would replace railway routes withdrawn.

Toronto, Ont.—Facing a continued reduction in the number of passengers carried and the consequent decrease in revenue, the Toronto Transportation Commission, operating the local city-owned railway and bus lines, has been forced to adopt a program of economy consistent with the efficient operation of the system. In keeping with other economies, it has accordingly been decided to reduce the size of *The Coupler*, employee publication, from twelve to four pages, through greater condensation.

Vancouver, B. C.—Work is being completed on the installation of a number of the latest type fluted-steel trolley poles on Granville Street along sectors between Broadway and Sixteenth Avenue and 25th to 41st Avenues. The new poles carry ornamental lighting fixtures besides holding the street railway wires. The electrical engineering department of the British Columbia Electric Railway has already made several installations of this kind on the main streets here. Formerly, wooden poles held the trolley wire, and lighting standards were set alongside.

Worcester, Mass.—Negotiations between the Boston, Worcester & New York Street Railway and the State Department of Public Works have failed to produce an agreement to have the company remove the rails from the 5-mile stretch intended for use as part of the Boston and Worcester superhighway from Framingham Center to the Wellesley line. The railway is dissatisfied with the price which the State is prepared to pay, and the Public Works Department is going ahead with plans on the assumption that the rails will still be there when construction begins. The Boston, Worcester & New York now runs trolley cars from Boston to Framingham, but from there buses are employed to Worcester. The railway at the same time runs a bus line between Boston and Worcester by way of Marlboro, Waltham and Watertown.

Jacksonville, Fla.—Negotiations between representatives of the Jacksonville Traction Company and members of the City Council's Special Franchise Committee appear to be moving toward settlement. At a conference between the company representatives and the committeemen, the latter made it plain that they would favor a franchise that will relieve the city of the \$155,000 bond debt it will acquire Jan. 1 by annexation of South Jacksonville. That amount is represented in outstanding bonds on the municipally owned South Jacksonville Street Railway. Views of the committeemen were expressed after railway officers had submitted a new proposal to give the city \$155,000 of 6½ per cent income bonds for the Southside lines as a concession toward obtaining a new franchise.

Able Analysis of Seattle Municipal System's Troubles

In a report on the Municipal railway, Philip Tindall, president of the Seattle City Council, expresses a hope for the future security of the system, under the unhampered expert management and revised debt-payment contract now sought for it. He advocates:

1. Transfer of contributions of \$150,000 a year to the railway trainmen's pension fund from the railway budget to the general fund.

2. Reduction by \$533,000 a year in payments, interest and principal to the Puget Sound Power & Light Company.

3. A decrease of \$58,000 a year in the railway's power bill.

These three measures, he states, would save the railway system about \$741,000 a year. He attributes the present financial difficulties of the railway to four primary causes:

1. Inadequate and diminishing revenues, due to loss of patronage and to insufficient early fares.

2. Excessive cost of rehabilitating and maintaining the system, due to its run-down condition when acquired by the city.

3. Excessive interest payments on the purchase price bonds, due to excessive price agreed to be paid for the system.

4. Excessive payments on the principal of the purchase price bonds.

Councilman Tindall declares that with "half a chance" the railway will pull through successfully. He is opposed to abandoning it as a municipal enterprise.

The Tindall report shows that at the close of 1930, the system, in addition to meeting the costs of operation and maintenance, had paid \$7,324,100 on the principal and \$7,962,272 interest on its various utility and revenue bonds and warrants. The interest on \$775,000 of general bonds had been paid from taxation. It had paid eight installments aggregating \$6,664,000 on the principal of the \$15,000,000 purchase price bonds. With one more installment, the purchase price would have been half paid. This, Councilman Tindall contends, is a remarkable record.

His report points out that the lines sustained a staggering cash deficit during the first year and nine months of city ownership due to the inadequacy of the 5-cent and 6½-cent fares. With the inauguration of 8½ cent fare at the beginning of 1921, a start was made toward reduction of the deficit. The return to the 5-cent fare for 108 days in 1923 resulted in a decrease of \$518,139 in revenues that year. This, added to the weight of other factors, has made recovery from the original cash deficit impossible. At the close of 1930, the cash deficit, notwithstanding the moratorium, amounted to \$812,435.

Analysis of Mr. Tindall's report shows that 11,673,790 fewer pay passengers used the municipal lines in 1930 than in 1921, the first year under the 8½ cent fare, and that the revenues were \$942,171 less in 1930 than in 1921. He contends that the revenues since 1921 were \$4,001,047 less than they would have been had the patronage continued as it was that year, and had the 5-cent fare not been restored for 108 days in 1923.

Because of the run-down condition of

Coming Meetings

Nov. 19-20—Middle Atlantic States Equipment Men's Association, York, Pa.

Jan. 27-29, 1932—Electric Railway Association of Equipment Men, Southern Properties, Richmond, Va.

the tracks and equipment when the purchase was made, the report cites, maintenance alone cost \$9,748,596 up to the end of 1930, while extensions and betterments cost \$2,532,143, a total of \$12,280,738 in approximately twelve years. This, the report declares, is far in excess of the amount applied to other systems. Mr. Tindall holds that the city paid at least \$5,000,000 too much for the system, and that the interest on this excess price has amounted to \$3,000,000 since the system was bought. The report holds that the original contract should have spread the payments designed to liquidate the cost over 40 years.

Among secondary causes for the railway difficulties, the report cites a bond issue of \$1,655,000 to acquire other private lines and pay for new construction; the Supreme Court ruling in 1926 that compelled the city to pay a tax of \$545,370 for 1919, the year the lines were taken over.

Operating and other economies have reduced the payroll \$799,942 from 1920, the first full year of city ownership, in which the men received an increase of 9.4 cents an hour. The number of opera-

One Useless Anxiety

It is devoutly to be hoped that we shall soon abandon the search for ways to insure that "nothing like this shall ever be allowed to happen again. First, every generation is infatuated with its own wisdom and bent upon making its own mistakes. Second, we are still too shaken in nerves and to engrossed in the immediate tasks to spare time or energy or cool judgment for the wise remodeling of our economic machinery for the longer future.

Of one thing we may be sure, the successors to whom we solemnly entrust a planned economy will in due time perceive how obsolete and inapplicable it has become. We know, of course, that this world depression has come in sequence to the World War, and the spirit of all-around recklessness which it bred. But who knows that the world, relieved of the horrid spectre of war, will not go straightway into such a chain of South Sea Bubbles as will inevitably produce the depression of 1951-54, with its unprecedented millions of unemployed and its glittering plans for preventing a repetition of such disasters in the future? All of which, of course, is no reason why we should not abolish war if we can. But as for the abolition of future depressions, let us first get rid of the only one we have.

—Condensed from *Barron's*.

tors has been reduced from 1,932 to 905, but the increased pay has offset the effect of the reduced number of trainmen to the extent of about \$430,000 a year. Wages have been raised from 50 cents in 1919 to 80 cents an hour in 1930. Mr. Tindall also challenges the theory that the entire cost of paving between tracks should be paid for by the railway system.

Councilman Tindall urges the City Council and the citizens to back the railway commission of five citizens named by Mayor Harlin, in a determined effort to adhere to business principles in the operation of the system. He declares political interference to be largely responsible for the system's present condition.

Junior Engineers Wanted for Commission Work

The New York State Civil Service Commission will hold an examination on Nov. 21 for which application must be filed not later than Nov. 7 for the position of assistant engineer (heavy electric traction work) Department of Public Service. The salary will be \$2,641 to \$3,240. One immediate appointment is expected at \$3,000. The duties of the position include examination of heavy electric traction equipment of railroads. Candidates must have had not less than seven years of experience in heavy electric traction, including not less than three years of shop experience, and not less than four years of supervisory experience. Technical education will be credited in lieu of experience.

Also an examination will be held for assistant engineer (valuation), Department of Public Service, State division, Public Service Commission. The salary will be \$2,000 to \$2,640. One immediate appointment is expected at Albany at \$2,000. Candidates must have had not less than four years of satisfactory experience in valuation or construction. Technical education will receive credit in lieu of experience in proportion to its value.

Receivers for Empire Public Service

Chancellor Wolcott of the Delaware Court of Chancery, at Wilmington, upon petition of the Empire Corporation, has appointed former Federal Judge Hugh M. Morris, of Wilmington, and W. E. Kennedy, of Baltimore, as receivers for the Empire Public Service Corporation, and, upon petition of Robert W. Rea, appointed Judge Morris and Herbert W. Briggs, of New York City, as receivers for the Electric Public Utilities Company. The Empire Corporation controls the Empire Public Service Corporation, which, through its subsidiaries, one of which is the Electric Public Utilities Company, renders utility services in various communities in nine States. Among the affiliated properties is the Western Ohio Railway & Power Corporation, Lima. A debenture holders' committee to represent the \$3,500,000 principal amount of debentures of the Empire Public Service Corporation has been formed for which Bankers Trust Company will be depositor and Rushmore, Bisbee & Stern of New York City, counsel.

PERSONAL MENTION

A. C. Colby Made Manager in Calumet District

A. C. Colby, for the last eleven years superintendent of equipment for the Detroit Municipal Railway Detroit, Mich., has been appointed general manager of the newly organized Chicago & Calumet District Transit Company, operating in Hammond, East Chicago and Whiting, Ind., and between those cities and Chicago.

Mr. Colby assumed control, on Oct. 8, of the former Calumet Railways, Inc., the former Shore Line Motor Coach Company, and the former Mid-West Motor Coach Company when these carriers were consolidated into the Chicago & Calumet District Transit Company following their purchase from the Midland United Company, Chicago, by Walter J. Cummings under approval from the Public Service Commission of Indiana.

Mr. Colby is widely known as a successful operator. In Detroit, in less than ten years, he directed the purchase of \$30,000,000 in physical equipment for the municipal railway. In the Calumet region of Indiana he will have charge of the immediate expenditure of \$150,000 to reorganize the carriers just purchased by Mr. Cummings. As conditions permit, trolley buses and other modern equipment will be added to the system. The street cars will be the backbone of the system with buses serving as feeders.

A. C. Spurr Reassigned

A. C. Spurr, for the past five years manager of the Wheeling Traction Company, Wheeling, W. Va., has been reassigned to the staff of the West Penn Company at Pittsburgh, Pa. In the changes in personnel at Wheeling which Mr. Spurr's withdrawal has necessitated, E. L. Yaeger, receiver for the Wheeling Traction Company, has appointed H. B. McCune to succeed Mr. Spurr. The new personnel of the company announced with the appointment includes R. T. Carnes, comptroller; C. M. Farsh, general superintendent; Frank C. Martin, master mechanic; F. W. Neer, storekeeper; Ray C. Beuter, cashier; Edward W. Wright, auditor; and E. L. Lash, claim agent.

Messrs. Plake and Flanders in New Posts

F. M. Plake has resigned as chief engineer of the Public Service Commission of Missouri, and J. E. Flanders, assistant chief engineer, has been appointed chief engineer.

Mr. Plake has been connected with the engineering department of the commission for the past ten years and has been chief engineer for more than four years. He is a graduate of the engineering school of the University of Kansas and went with the commission after years of valuation duties with the Interstate Commerce Commission. He has been appointed to the newly created position of valuation engineer with the Union Electric Light & Power Company, St. Louis.

Mr. Flanders received his engineering education at the University of Missouri. He has been connected with the engineering department of the commission for nine years during which time he has had active charge of a number of appraisals of the larger utility properties of the State.

T. Julian McGill Heads Twin City Rapid Transit

T. Julian McGill, former vice-president and general manager, of the Twin City Rapid Transit Company, Minneapolis, Minn., has been named president by the board of directors of the company to succeed Horace Lowry, who died on Aug. 22. Mr. Lowry had been president of the



T. Julian McGill

company since 1916. Mr. McGill will continue as manager of the lines.

The board also accepted the resignation of Donald Goodrich as a director and named in his place Frank Carrel, Quebec City, Que.

Regarded as an authority on transportation problems, Mr. McGill was largely responsible for development of passenger transportation by bus between Minneapolis and St. Paul and surrounding territory.

While he is an electrical engineer by training, much of his work has been in the sales end of the industry. For many years he was associated with the Westinghouse Electric & Manufacturing Company.

Mr. McGill was born at Leesburg, Va., on Aug. 26, 1877. He was educated in public schools and at Johns Hopkins University.

After four years with an electric company in Chicago as a sales manager, he came to Minneapolis in 1898 as district sales head for the Westinghouse company. In 1909 he was transferred to Atlanta to take charge of the Southern district and in 1914 to Chicago to head the Western territory. In July, 1921, he became vice-president and general manager of the Twin City Rapid Transit.

Additional Post for W. H. Sawyer

As noted in *ELECTRIC RAILWAY JOURNAL NEWS* for Oct. 24, Willits H. Sawyer has been elected chairman of the Executive Committee of the Iowa Public Service Company, Sioux City Gas & Electric Company and Sioux City Service Company, and will devote a portion of his time to active supervision in Iowa of these properties. Mr. Sawyer will continue his New York office at 120 Broadway, and also his consultant and sponsorship activities including his positions as co-receiver of Southern Public Service Company, co-receiver of Carolina-Georgia Service Company and receiver of Springfield Railway, Springfield, Ohio.

C. W. Milner Leaves Louisville Railway

Charles W. Milner, of the law firm of Humphrey, Crawford & Middleton, who served as general counsel for the Louisville Railway, Louisville, Ky., since 1928, has resigned from the railway. Prior to 1928 Mr. Milner was assistant general counsel under Churchill Humphrey as counsel. Churchill Humphrey's father before him was company counsel. Since 1921 Mr. Milner has taken part in company rate, franchise and other cases.

No explanation of the resignation was made, but it has been intimated that the company may be planning to discontinue regular employment of a general counsel under a retaining fee. In view of his knowledge of company matters and his ability Mr. Milner may continue to represent the company under retainer.

Changes in British Transport Managerships

Major Robert McCreary, B.A., B.Sc., M.Inst., C.E., has been appointed general manager of the Belfast Corporation tramway and bus undertakings, succeeding W. Chamberlain, appointed chairman of an area traffic commission under the Road Traffic Act. Major McCreary has had a varied professional experience, and during the war, as an officer in the Royal Engineers, he carried out much railway construction in France and Belgium, and gained the M. C. Latterly, he has been permanent way engineer at Belfast.

Percy Clegg, hitherto electrical engineer and manager at Bingley, has been appointed electrical engineer and transport manager at Haslingden.

H. E. Blackiston, general manager and engineer of West Hartlepool transport service, has been appointed engineer and transport manager for Ipswich.

Robert Taylor, chief assistant in Dundee Corporation transport department, has been appointed manager, in succession to D. P. Morrison, appointed manager at Hull. From time to time, Mr. Taylor has had complete control as interim manager. He has made a special study of road transport legislation, and has frequently given evidence before the area traffic commissioners.

Messrs. Dunn and Lee Head Simmons-Boardman Company

Directors of the subsidiary companies controlled by the Simmons-Boardman Publishing Corporation have elected the following executive officers: Simmons-Boardman Publishing Company, Samuel O. Dunn, chairman of the board, and Henry Lee, president; American Builder Publishing Corporation, Henry Lee, chairman of the board, and Samuel O. Dunn, president. These executive positions were held by the late Col. Edward A. Simmons. Out of respect to the memory of Colonel Simmons, the chairmanship and presidency of the Simmons-Boardman Publishing Corporation, the holding company, were not filled at this time.

Heretofore, Mr. Lee has served the Simmons-Boardman companies as vice-president in charge of its business department, while Mr. Dunn has been vice-president and editor-in-chief of the *Railway Age* and its other publications.

H. B. Hewitt has assumed the management of a new division of the Moto Meter Garage & Equipment Company, Toledo, Ohio. He was formerly assistant to J. A. Queeney, vice-president in charge of operations of Mitten Management (Philadelphia Rapid Transit). Mr. Hewitt will undertake the further development and distribution of Moto Vita, a recently developed instrument for analyzing exhaust gas. His previous engineering experience in carburation in relationship to engine performance and economy makes him particularly well fitted for his new duties.

William F. Allen has resigned as advertising manager for the St. Louis Public Service Company, St. Louis, Mo., T. M. Pegram, assistant advertising manager, is temporarily in charge. Mr. Allen plans to return to newspaper work.

Roy Chambers has resigned as superintendent of the Westfield division of the Springfield Street Railway, Springfield, Mass. Mr. Chambers began 23 years ago as conductor and was subsequently inspector, chief inspector and division superintendent.

Charles Michaels, Logansport, has been appointed chief railroad inspector for the Public Service Commission of Indiana. He succeeds the late William P. Holmes. He will retain J. K. Smith, Elkhart, and Louis Phillips, Vincennes, as inspectors.

Col. Albert T. Perkins, president and general manager of the People's Motor Bus Company, St. Louis, Mo., has returned from a three-month trip through Central Europe. He noticed no disposition in Central Europe to adopt the bus on a scale comparable to that in the United States.

Sidney H. Sayles has resigned as superintendent of the Palmer division of the Springfield Street Railway, Springfield, Mass. Mr. Sayles has been connected with the company for 39 years, beginning as a conductor in Springfield in 1892. He has been superintendent at Palmer for nineteen years.

Leon M. Bazile, former assistant attorney-general, has been elected president of the Richmond-Ashland Railway, Richmond, Va., to succeed the late S. W. Zimmer, Petersburg. Mr. Bazile is understood to have been given a free hand in his efforts to rehabilitate the road, which in recent years has felt the effects of competition from motor vehicles, particularly privately operated cars.

Frank Lythgoe, manager of buses for the Leigh (England) Corporation, has been appointed manager of Rawtenstall Tramways at a salary of £500 a year, rising to £550.

C. C. Coulthard has resigned as superintendent of the New Castle Electric Street Railway, New Castle, Pa. He has been with the company 25 years, starting as a motorman. He will be succeeded by T. C. Moore, Niles, Ohio, long in the service of the Penn-Ohio System, of which the New Castle line is a part.

William F. Boyd has been appointed superintendent of the Steubenville and Wellsburg-Weirton, W. Va., division of the Wheeling Traction Company. Mr. Boyd has been division superintendent in Steubenville for eight years.

Charles E. Lawrence ended 31 years of service with the street car system of Hammond, East Chicago and Whiting, Ind., when on Oct. 12 he tendered his resignation as general manager of the Calumet Railways, Inc., to the Chicago & Calumet District Transit Company, new owners of the line. Mr. Lawrence entered electric railway work in South Chicago, Ill. When the operations of the "Green Line," serving Hammond, East Chicago and Whiting, were centered in Hammond he became superintendent. Later he was made vice-president and general manager. With the reorganization of the line as the Calumet Railways, Inc., he retained the position of general manager.

M. T. Montgomery, connected with electric railways in the United States, Mexico and Cuba for more than 30 years, has sailed for Chile under a retainer which contemplates a special railway assignment for him under A. W. McLimont in connection with utility work at Valparaiso and Santiago for properties included in the group which is operated under American and Foreign Power Corporation auspices.

Perry S. Painter has resigned as assistant general counsel of the Missouri Public Service Commission to accept a place on the legal staff of the United States Department of Agriculture at Washington, D. C. In 1921 Mr. Painter became private secretary to Arthur M. Hyde, then Governor of Missouri and now Secretary of Agriculture in President Hoover's Cabinet. Later he served as a member of the Public Service Commission and also as chief counsel before becoming assistant general counsel of the commission. At Washington he will be counselor for the solicitor of the Department of Agriculture.

G. W. Evington, formerly chief inspector and superintendent of the ferry terminals for the Market Street Railway, San Francisco, has been advanced to the position of superintendent of the Sutro and McAllister divisions of the company. William Loughrey, formerly inspector for the company stationed at Gough and Market Streets, has been named to succeed Mr. Evington as chief inspector and superintendent of the ferry terminals. Mr. Evington started with the company in 1913 as a motorman. Mr. Loughrey entered the service in 1903 as a gripman.

H. S. Williams has succeeded A. C. Colby, resigned, as acting superintendent of equipment for the Detroit Municipal Railway, Detroit, Mich. Mr. Williams was formerly assistant superintendent of equipment.

Ed. Hamprecht has been appointed traffic manager of the Western Ohio Railway & Power Corporation, Findlay, Ohio, to succeed the late C. O. Sullivan.

John J. Curtin, trial lawyer and counsel to Alfred E. Smith during most of his administration as governor of New York, has been engaged by the New York Transit Commission to render special legal services with respect to transit unification in New York City, including the preparation and completion of the plan and hearings thereafter, preparation of the final plan and proceedings necessary to carry it into effect. Mr. Curtin was graduated from Manhattan College, where he received B.A. and M.A. degrees, and has an L.L.B. from St. Lawrence University.

Joseph A. Devery, assistant corporation counsel, will retire from New York City's law department to enter private practice, specializing in franchise and public utility litigation. Since he entered the corporation counsel's office in 1918, Mr. Devery has been known as one of the city's fare experts. Preparation of the city's 5-cent fare case fell to him, and he has handled most of the transit and bus litigation in the past ten years.

W. C. Myers, formerly special representative at St. Louis, Mo., has assumed his new duties as general superintendent of the St. Louis Electric Terminal Railway, St. Louis & Alton Railway and McKinley Bridge Roadway, a part of the Illinois Terminal Railroad in St. Louis. C. F. Handshy, inspector of transportation, has also assumed the duties of freight claim agent. His headquarters are in the Shell Building, St. Louis, Mo.

Carroll J. Sinnott has been elected vice-president of the Transportation Management Corporation, a subsidiary of the Parmelee System (taxicabs), in charge of public relations in New York. Mr. Sinnott also continues as president of the Yellow Taxi Corporation, another Parmelee unit. E. A. Dannemann will succeed Mr. Sinnott as manager of the Manhattan division of Parmelee.

J. Lightbody, publicity manager of the British Columbia Electric Railway, Vancouver, B. C., was named to serve as chairman of the Publicity Committee in connection with British Columbia Week, organized recently under the auspices of the Vancouver Board of Trade. Mr. Lightbody is also chairman of the advertising and sales bureau of the Vancouver Board of Trade.

Charles Venable, Noblesville, Ind., for many years superintendent of the Indianapolis-Logansport division of the Union Traction Company, succeeded by the Indiana Railroad, has resigned. He was with the company 28 years. He ran the first car between Tipton and Indianapolis. He had served as motorman, conductor, dispatcher and superintendent.

E. G. Hall

Edward Grayson Hall, communication engineer for the Chicago Rapid Transit Company, the North Shore Line, the Chicago Aurora & Elgin Railroad, and the Public Service Company of Northern Illinois, died at Youngstown, Ohio, on Sept. 8, from injuries received when he crashed in his airplane while attending the national air races at Cleveland.

Born at Burkes Garden, Va., on Nov. 20, 1885, Mr. Hall received his education at schools in Graham, Va., and the Polytechnic Institute at Blacksburg, Va. He entered the employ of the Chicago Rapid Transit Company on Aug. 1, 1908, as chief electrician in the electrical department, and served in various other capacities until his appointment as communication engineer in 1927. His ability in his chosen field of service is attested by the fact that a complete telephone system interconnecting the various companies serving the greater Chicago area was installed and developed to a high point of efficiency under his direction.

An amateur air enthusiast, Mr. Hall had flown his own plane extensively since receiving his pilot's license months ago.

OBITUARY

Thomas A. Edison

The death of Thomas A. Edison on Oct. 18 brought not only nation-wide but world-wide mourning in its train. At first as the marvelous youth, then as the accepted miracle worker and finally as the Grand Old Man of his country, his contemporary fame spanned the terms of a dozen Presidents, and, despite his own modesty, dimmed the renown of all other Americans who have worked in the same broad field of science and invention. It spread abroad further than that of any other American contemporary with him until in men's minds the electric age and the age of Edison became synonymous.

The range of the man's activities has long been a matter of public record. So far as this industry is concerned his most material contributions were made in the pioneer period of development. Edison had invented an electric motor before he perfected the incandescent lamp. Early in 1880 he began the construction of a stretch of track close to the Menlo Park laboratory, and at the same time built an electric locomotive to operate over it. The first track was about a third of a mile in length, this being increased afterward to 2½ miles. Operation on this miniature line was successful. In 1883 patents of Edison and Stephen D. Field were exploited on an early third-rail exhibition track built at Chicago. Edison never followed up his inventions in the traction field. He was later interested in storage-battery cars, but the overhead trolley drove them from the field. He went to Europe in 1889 and installed a \$100,000 exhibit at the Paris Exposition of that year.

With the opening of 1930, the investment in the United States alone in the light and power industry, the electric railways and the electrical manufacturing industry—all founded in whole or part on Edison's inventions—was \$19,500,000,000; the annual gross revenue was more than \$6,000,000,000, and the annual capital additions were \$1,250,000,000. The combined capitalization of electric light and power companies alone in the United States is now \$11,800,000,000, the invested capital of the great electric manufacturing companies approximates \$3,000,000,000, and the valuation of all affected industries of every sort would reach figures of almost astronomical dimensions. The effect of Edison's inventions on the single item of copper has been incalculably vast.

As *Electrical World* said in an appreciation of Edison, courageous, optimistic, unsentimental, loving to overcome obstacles, charitable in his impulses and



Thomas A. Edison

adhering to high moral standards, he united iron nerve with an active imagination. Usually phlegmatic, he could be roused to anger by faults in others, particularly—among the more venial shortcomings—those of laziness and incompetence. His philosophic cast of mind was shown by the view he took of his own deafness, which he held had an advantage in facilitating concentration upon the task in hand. His religious views were summed up by himself as embodied in a belief in the existence of "some vast intelligence governing this and other planets." He was a man without any hobbies apart from his work, unless a love of sketching could be called one.

Albert J. Beall, 75, who prior to his retirement served as day and night supervisor of the Ames carhouse of the Omaha & Council Bluffs Street Railway, Omaha, Neb., is dead. Mr. Beall entered the employ of the company in December, 1887, while street cars were still being drawn by horses. After five years, during which time he also served as gripman on the cable cars, Mr. Beall was promoted to night supervisor of the Ames carhouse, later being transferred to the Pierce Street carhouse as day foreman. In 1917 he again resumed his duties as day supervisor of the Ames division. This position he held until the time of his retirement, April 1, 1929.

J. K. Bruce

Joshua Kidd Bruce, formerly general manager of London County Council Tramways, died on Sept. 23. He retired from the service more than a year ago on account of ill health, and at the time of his death he had barely attained the age of 60 years. His career as a tramway manager and organizer was remarkably successful, as he changed the undertaking from one working at a loss to one working at a profit, and this despite specially heavy capital liabilities inflicted by the wide use of the conduit system, for the inauguration of which he was not responsible, and despite intense bus competition.

Born in Strathmore, Scotland, in 1871, he went to London as a veterinary surgeon, and took charge of the stud of horses then belonging to the London Tramways. When that undertaking was bought by the London County Council, he became a municipal employee, and turned to administration when the system was electrified in 1899.

When in 1925 he became general manager he was faced with intense difficulties, but his long experience with the system stood him in good stead. Slowly new ideas and new methods were introduced. He speeded up the cars, and made them more comfortable and attractive to the public. Results soon came, and the London County Council trams produced profits. Not only were his services publicly acknowledged, but he was given money grants. The average speed including stops of the London cars is now about 10 m.p.h., probably the highest speed on crowded streets anywhere in Great Britain.

Capt. John B. Mattingly, prominent in the business life of Yazoo City and Vicksburg, Miss., since the Civil War as an operator of boats on the Mississippi and the Yazoo rivers, as a coal merchant in Vicksburg, and as a capitalist interested in predecessor companies to the Mississippi Power & Light Company, died on Oct. 3.

Ferdinando Cusani Confalonieri

Marquis Ferdinando Cusani Confalonieri, who by his efficient work, notably in electric traction, had attained for himself in Italy and abroad an imperishable place in engineering annals and in civic circles, died on Sept. 24 at his home, Palazzo di Carate Brianza, Milan, Italy, at the age of 35 years. He succumbed to a long painful heart ailment, believed to have been greatly intensified by tremendous tasks self-imposed in connection with the problem of traffic regulation at Milan incident to the recent international exposition held there. He was the son of Marquis Luigi Cusani Confalonieri, former ambassador from Italy to the United States, and of Marchioness Cusani Confalonieri Casati. A man of powerful intellect and extraordinary culture, his whole life since boyhood had been a marvelous example of



Ferdinando Cusani Confalonieri

activity dedicated to the public good. Reared largely in the United States during the time of the portfolio of his father at Washington, Marquis Cusani had an attachment for the United States made ineradicable by his early associations here, and kept alive by a large number of personal contacts, and through his contributions to publications here, notably *ELECTRIC RAILWAY JOURNAL*, on scientific subjects of which he was a master.

A man of simple habits and a great love for knowledge, he had acquired a profound appreciation of scientific subjects pertaining to modern mechanical traction in general, and, in particular, to city tramways. He served in the World War.

So wide was his range of interest that on his many trips to foreign lands he studied methods of fire prevention, and did great work in forming technical associations and voluntary fire departments. He was always ready to advise and to give the benefits of his experience to large cities in their technical undertakings. New undertakings did not daunt him. In fact, they spurred him to greater incentive as the record of his accomplishments testified.

He is survived by his parents, a sister and many relatives and friends.

William F. Jenkins, known for the part he played in the development of an electrified street railway system in Richmond, Va., is dead. He was one of the

promoters of the company under which the Broad Street horse car lines in Richmond were electrified by the late John Skelton Williams, comptroller of the currency in President Wilson's cabinet. Later, he helped to organize the Richmond & Henrico Railway. While he was serving as general counsel for this group, a line was constructed from the city limits in the west on Brook Avenue to Fulton, in the extreme eastern section of the city. This line now forms a part of the Virginia Electric & Power Company's property. Mr. Jenkins was 72 years old.

J. A. Hanna

Joseph A. Hanna, well known in the electric railway supply trade, died at his home at Warren, Ohio, on Oct. 12 after a short illness. Practically all of Mr. Hanna's business life was devoted to the electric railway carbuilding industry. He started in 1885 with the Brill Company in Philadelphia, and served subsequently with the McGuire Manufacturing Company, Peckham Motor Truck & Wheel Company and the Niles Car & Manufacturing Company, of which he became sales manager. During the latter years of his life he devoted his attention particularly to railway appraisal work, for which his long experience in car and truck sales particularly fitted him.

Frank Samuelson, Jr.

Frank Samuelson, Jr., auditor of the Interborough Rapid Transit Company in New York City, died on Oct. 19 of pernicious anemia after a long illness. He was 61 years old.

Born in New York, Mr. Samuelson attended Kearny High School and New York University. After becoming a certified public accountant, he was associated for a time with the New York accounting firm of Haskins & Sells, and later was auditor for the Metropolitan Street Railway, New York.

About twenty years ago Mr. Samuelson became auditor for the New York Railways, then an affiliate of the Interborough, and eight years ago became auditor of the latter.

E. M. Beeler

Edwin Mead Beeler, brother of John A. Beeler, an associate of the Beeler Organization, New York, died at his home in Scarsdale, N. Y., on Oct. 18. He is survived by his widow and two children.

Mr. Beeler was born in Cincinnati, Ohio, on July 2, 1871. He went to Denver, Col., in 1893, where he was employed successively in the transportation and engineering departments of the Denver Tramway for more than ten years. Later he was connected with the city engineer's office and the Board of Public Works of the city of Denver for a number of years. He was associated with the Beeler Organization, engineers and consultants, for the past ten years. By his unassuming and genial manners, Mr. Beeler won a host of friends in Denver and New York. He had been ill for several months.

C. O. Sullivan

C. O. Sullivan, of Lima, Ohio, traffic manager of the Western Ohio Railway & Power Company, who has been affiliated with the electric railway industry for about 25 years, died on Oct. 15. Mr. Sullivan was very active in the affairs of the various associations affiliated with electric railways.

Mr. Sullivan began his railroad career with steam lines in the Southwest at an early age. After several years in the Southwest he became affiliated with the Big Four Railroad system, and located at Wabash, Ind., where he remained for about eight years. At this time the electric railways were coming into prominence, and he decided to cast his lot with this new and promising enterprise, accepting a position with the Winona Interurban Railway, Warsaw, Ind., as traffic manager. This position he filled for about four years. About



C. O. Sullivan

this time the electric railways in Ohio were making rapid progress and as offering greater opportunity to him, Mr. Sullivan severed his connection with the Winona Interurban Railway in 1911 to join the Western Ohio Railway as traffic manager, in which capacity he remained until his death.

Mr. Sullivan was one of the pioneers in establishing interurban freight service throughout Ohio, Indiana, and Michigan. Since he was always optimistic of a great future for the service he was undertaking to establish, the electric railway industry loses by his death one of its staunch supporters.

Mr. Sullivan was born at Wabash, Ind., on July 29, 1869.

James H. Griffin

James Harold Griffin, one of the pioneer workers of the electric railway industry in Kansas City, died there recently. Mr. Griffin was a notable character in the street railway industry, having been closely associated with the transportation field since the days of the mule cars. He had served as mechanic, superintendent, chief of instruction and inspector under various administrations of the affairs of the business in Kansas City. At the time of his death, having served some 44 years in the business, he was still active in the instruction of operators.

INDUSTRY MARKET AND TRADE NEWS

\$14,154,000 Car Contract Awarded in New York

The Board of Transportation of New York City has awarded a \$10,531,500 contract to the American Car & Foundry Company, the lowest of five bidders, for 500 new steel cars to be used on the Bronx, Brooklyn and Long Island City sections of the new city subway system.

The Board has also awarded a \$2,392,500 contract to the General Electric Company for motors, and the Westinghouse Electric & Manufacturing Company received a \$1,300,000 contract for control equipment.

The combined contracts total \$14,154,000, or \$28,308 per car, which is \$8,991 less than the cost per car of the 300 now being put through service tests on the new Eighth Avenue-Washington Heights subway line.

Block signaling and safety equipment for the Bronx line is to be supplied by the General Railway Signal Company under a \$2,317,800 contract.

Brooklyn Bus Corporation Orders 50 Mack Buses

The Brooklyn Bus Corporation has placed an order for 50 Mack street car type buses for an amount in excess of \$500,000. Production of these vehicles has already been started. The new buses will be among the largest single-deck motor buses in operation in the country, having a seating capacity of 44 passengers.

Entrance is at the front and exit in the center, the doors being 46 in. wide. Street car type leather seats accommodate two passengers to a seat and are placed crosswise. Distinctive features of the new buses include power steering and the use of rubber fenders. Full driver vision to all entrance and exit spaces is made possible by the latest type of rear-vision mirror.

General Electric Earns \$30,753,850

The General Electric Company announced that its net profit available for dividends on the common stock during the first nine months of this year was \$30,753,850, equivalent to \$1.07 a share on 28,845,927 shares outstanding. This compares with a net profit of \$42,518,708, or \$1.47 a share, in the corresponding period of last year. The quarterly dividend on the stock is 40 cents a share. The net profit in the third quarter was equivalent to 32 cents a share, compared with 37 cents in the second quarter and 45 cents in the third quarter of last year.

Orders received by the company in the first nine months of this year amounted to \$202,700,016, compared with \$267,651,832 for the corresponding period of last year, Gerard Swope, presi-

dent of the company, announced. Sales billed for the nine months of this year totaled \$206,138,967, compared with \$287,886,541 for the corresponding period of last year.

F. J. Griffiths with Timken

F. J. Griffiths has joined the Timken organization at Canton, Ohio, as director and president of the Timken Steel & Tube Company. M. T. Lothrop, president of the Timken Roller Bearing Company, has been made chairman of the board of the Timken Steel & Tube Company.

Mr. Griffiths has a broad understanding of the present problems of the steel industry, with which he has been prominently identified for 30 years. Until recently he was associated with the Republic Steel Corporation as president of the Republic Research Corporation. Mr. Griffiths began his career in the steel industry with the United Steel Company at Canton. Later he helped to organize the Central Steel Company in Massillon, Ohio, of which he was president and general manager. When these two companies were merged to form the Central Alloy Steel Company, he was chosen chairman of the board, which office he held until the Central Alloy merger with Republic.

Roscoe Seybold Appointed Westinghouse Comptroller

Roscoe Seybold has been advanced by the Westinghouse Electric & Manufacturing Company to the position of comptroller from the post of assistant to the president. A native of Rockville, Ind., and a graduate of Purdue University, he joined the Westinghouse organization in 1907 as a graduate student. After completing this training course, he entered the price department, where he remained until 1926. From 1909 until 1922 he was manager of the price section of the power and railway headquarters sales departments. From 1922 until 1926 he served in an executive capacity with the general sales manager. He has been assistant to President F. A. Merrick since 1926.

Philadelphia Awards Contract To Union Switch & Signal

The city of Philadelphia, through the Department of City Transit, has contracted with the Union Switch & Signal Company for the complete installation of automatic block signals, electro-pneumatic train stops and interlockings, with centralized traffic control of all switches and signals on the Ridge Avenue extension of the Broad Street subway, and the consolidation of the Spring Garden and Girard Avenue electro-pneumatic interlockings. The work involves the installation of a 67-lever electro-pneumatic interlocking with a centralized traffic control machine.

Order for Insulators to Westinghouse

Westinghouse Electric & Manufacturing Company has received an order from the Pennsylvania Railroad for porcelain insulators to be used to suspend the high tension lines for the new electrification work now being continued toward Washington from Wilmington. The order will result in additional employment at Westinghouse factory at Derry, Pa., as well as in employment for suppliers of the raw material, including clay, feldspar and flint.

Yellow Coach Reports Net Loss for Nine Months

Yellow Truck & Coach Manufacturing Company reported net loss after provision for depreciation amounting to \$1,893,352 for the nine months ended Sept. 30, 1931. In the similar period a year ago the company had a net profit amounting to \$1,053,431.

Net sales for the first nine months of this year totaled \$20,659,471.

The net loss for the quarter ended Sept. 30, 1931, amounted to \$846,471. This compared with a net loss of \$384,432 for the third quarter of 1930.

Prof. Dudley Returns to Westinghouse Air Brake

Prof. S. W. Dudley, Strathcona professor of mechanical engineering and chairman of the department of mechanical engineering in Yale University, has rejoined the engineering organization of the Westinghouse Air Brake Company in an advisory capacity, with the title of assistant to the vice-president, while retaining his university connections.

After completion of his college course in mechanical engineering at Yale University and serving for a short period on the faculty, Prof. Dudley entered the employ of the Westinghouse Air Brake Company as special apprentice in 1905 and advanced rapidly through many important positions until he was appointed chief engineer in 1914. That position he retained until 1921, when he was induced to accept the chair of mechanical engineering in his alma mater. Many outstanding air-brake developments mark the period during which he was associated with this company, and in these achievements he had a prominent part.

Because of his broad experience, pleasing personality and keen insight into human affairs and his extensive knowledge of engineering practices, Prof. Dudley has been in demand for various activities and positions of responsibility with the college. He is a member of the board of trustees and governing board of Sheffield Scientific School, chairman of the university committee on transportation, member of the industrial committee of the Institute of Human Relations in Yale, and member of the committee on relations between railroads and colleges of the Society for the Promotion of Engineering Education.

Trade Notes

C. H. Will Motors Corporation, Minneapolis, Minn., has filed an amendment to its incorporation articles changing its name to Greyhound Motors & Supply Company.

Harry L. Erlicher has been appointed purchasing agent of the General Electric Company, succeeding L. G. Banker, who retired on Oct. 1. In his new position Mr. Erlicher will direct purchases of materials aggregating more than \$100,000,000 a year.

J. M. McKibben, Jr., has been appointed sales promotion and advertising manager of the newly organized industrial department of the Westinghouse Electric & Manufacturing Company.

Ohmer Fare Register Company has announced the appointment of J. B. Wallis as manager of its Eastern district, with headquarters in New York City. Mr. Wallis was formerly southeastern district sales manager for the Remington Cash Register Company.

E. R. Dougherty has joined the sales organization of the American Manganese Steel Company. He will work with E. F. Mitchell, district manager, in the engineering and sale of Fahralloy castings in Chicago and the surrounding territory.

The American Manganese Steel Company has moved its Chicago office to the

McCormick Building, 332 South Michigan Avenue, where it is located with the parent company, the American Brake Shoe & Foundry Company.

Bus Deliveries

Boston Elevated Railway, Boston, Mass., ten A.C.F., 40-passenger, Metropolitan type.

Brooklyn Bus Corporation, Brooklyn, N. Y., 41 Twin Coach; one Model 40, and 40 Model 30.

Connecticut Company, New Haven, Conn., six Yellow Coach, 29-passenger, Type V.

Denver Tramways, Denver, Col., two Yellow Coach, 21-passenger, Type U.

Grand Forks Street Railway, Grand Forks, N. D., one Mack, Model BG.

Highway King Buses, Ltd., Hamilton, Ont., eleven White, Model 54.

Madison Railways, Madison, Wis., one Yellow Coach, 21-passenger, Type W.

Milwaukee Electric Railway & Light Company, Milwaukee, Wis., five Yellow Coach, 21-passenger, Type U.

United Traction Company, Albany, N. Y., seven Twin Coach; four Model 40, and three Model 30.

Virginia Electric & Power Company, Norfolk, Va., 25 White, Model 65A.

Material Prices

OCTOBER 27, 1931

Metals—New York

Copper, electrolytic, delivered, cents per lb.	7.00
Lead.....	3.77
Nickel, ingot.....	35.00
Zinc.....	3.60
Tin, Straits.....	22.20
Aluminum, 98 to 99 per cent.....	22.90
Rabbitt metal, warehouse	
Commercial grade.....	34.75
General service.....	29.00

Track Materials—Pittsburgh

Standard steel rail, gross ton.....	\$43.00
Track spikes, 1/2-in. and larger, per 100 lb....	\$2.70
Tie plates, steel, cents per 100 lb.....	1.85
Angle bars, cents per 100 lb.....	2.75
Track bolts, per 100 lb.....	3.90
Ties, 6m.x 8m.x 8 ft.,	
White Oak, Chicago.....	1.05
Long leaf pine, New York.....	1.00

Waste—New York

Waste, wool, cents per lb.....	11.00
Waste, cotton (100 lb. bale), cents per lb.:	
White.....	6.50-9.00
Colored.....	5.50-8.00

Wire—New York

Bara copper wire, cents per lb.....	9.00
Rubber-covered wire, No. 14, per 1,000 ft....	\$3.75
Weatherproof wire base, cents per lb.....	11.00

Paint Materials—New York

Lined oil (5 bbl. lots), cents per lb.....	8.20
White lead in oil (100 lb. keg), cents per lb..	13.25
Red lead in oil.....	14.75
Turpentine (bbl. lots), cents per gal.....	38.00
Putty, com'l grade, 100 lb. tubs, cents per lb.	5.50

Hardware—Pittsburgh

Wire nails, per keg.....	\$1.90
Sheet iron (24 gage), cents per lb.....	2.40
Sheet iron, galvanized (24 gage), cents per lb.	2.90
Auto body sheets (20 gage), cents per lb.....	3.10
Fender stock (20 gage), cents per lb.....	3.20

Bituminous Coal

Pittsburgh mine run, net ton.....	\$1.30
Central Ill. screenings.....	1.00
Kansas screenings, Kansas City.....	1.00
Big seam, Ala., mine run.....	1.45
Smokeless mine run, Chicago.....	1.90

Paving Materials

Paving stone, granite, 5 in., f.o.b.:	
New York—Grade 1, per thousand.....	\$120.00
Wood block paving 3 1/2, 16 lb. treatment, N.Y., per sq. yd., f.o.b.....	2.00
Paving brick, 3 1/2x8x4, N.Y., per 1,000 in. carload lots, f.o.b.....	50.00
Paving brick, 3x8x4, N.Y., per 1,000 in. carload lots, f.o.b.....	45.00
Crushed stone, 1-in., N.Y. wholesale, f.o.b. per cu. yd.....	1.80
Cement, Chicago, in carload lots, without bags, delivered.....	1.95
Gravel, 1-in., N.Y. cu. yd., wholesale, f.o.b.....	1.60
Sand, cu. yd., wholesale, f.o.b.....	1.00
Asphalt, in pkg. N.Y., f.o.b. ref., per ton....	16.00

Scrap—New York

Heavy copper, cents per lb.....	4.90
Light copper.....	4.15
Heavy brass.....	2.60
Zinc.....	1.50
Lead, heavy.....	2.50
Mixed babbitt.....	3.00
Battery lead plates.....	0.85
Cast aluminum.....	4.75
Sheet aluminum.....	8.25
Auto radiators.....	2.85
Tires, standard, mixed, per ton.....	\$3.00
Infer tubes, mixed, per cwt.....	\$1.20

Old Material—Chicago

Steel car axles, net ton.....	\$11.25
Cast iron car wheels, gross ton.....	9.25
Steel car wheels, gross ton.....	9.00
Leaf springs, cut apart, gross ton.....	9.75
Angle bars, gross ton.....	8.75
Brake shoes, net ton.....	6.00
Steel rails (short), gross ton.....	10.75
Relaying rails, gross ton (65 lb. and heavier)	24.50
Machine shop turnings, gross ton.....	4.25
Coil springs, per gross ton.....	10.00
Frogs, switches and guards cut apart, per gross ton.....	8.00

Conspectus of Indexes for October, 1931

Compiled for Publication in ELECTRIC RAILWAY JOURNAL BY

ALBERT S. RICHEY

Electric Railway Engineer, Worcester, Mass.

	Latest	Month Ago	Year Ago	Last Five Years	
				High	Low
Street Railway Fares* 1913 = 4.84	Oct., 1931 7.85	Sept., 1931 7.81	Oct., 1930 7.79	Oct., 1931 7.85	Oct., 1926 7.37
Electric Railway Materials* 1913 = 100	Oct., 1931 116	Sept., 1931 116	Oct., 1930 133	Dec., 1926 159	Aug., 1931 113
Electric Railway Wages* 1913 = 100	Oct., 1931 231.9	Sept., 1931 232.9	Oct., 1930 231.8	April, 1931 233.2	Oct., 1926 226.2
Electric Ry. Construction Cost* Am. Elec. Ry. Assn. 1913 = 100	Oct., 1931 165	Sept., 1931 167	Oct., 1930 195	Nov. 1928 206	Oct., 1931 165
General Construction† Cost Eng'g News-Record 1913 = 100	Oct., 1931 169.8	Sept., 1931 171.4	Oct., 1930 198.7	Jan., 1927 211.5	Oct., 1931 169.8
Wholesale Commodities U. S. Bur. Lab. Stat. 1926 = 100	Sept., 1931 69.1	Aug., 1931 70.2	Sept., 1930 84.2	Sept., 1928 100.1	Sept., 1931 69.1
Wholesale Commodities Bradstreet 1913 = 9.21	Oct., 1931 8.30	Sept., 1931 8.49	Oct., 1930 10.30	Jan., 1928 13.57	Oct., 1931 8.30
Retail Food U. S. Bur. Lab. Stat. 1913 = 100	Sept., 1931 119.4	Aug., 1931 119.7	Sept., 1930 145.6	Dec., 1926 161.8	June, 1931 118.3
Cost of Living Nat. Ind. Conf. Bd. 1923 = 100	Aug., 1931 85.9	July, 1931 85.9	Aug., 1930 94.7	Nov., 1926 104.0	June, 1931 85.9
General Business The Business Week Normal = 100	Oct. 3, 1931 71.4	Sept. 5, 1931 72.2	Oct. 4, 1930 86.6	Oct. 6, 1928 117.6	Aug. 29, 1931 71.0
Industrial Activity †† Elec. World, kw.-hr. used 1923-25 = 100	Sept., 1931 100.4	Aug., 1931 97.3	Sept., 1930 110.7	Feb., 1929 140.4	Aug., 1931 97.3
Bank Clearings † Outside N. Y. City † 1926 = 100	Sept., 1931 63.4	Aug., 1931 66.0	Sept., 1930 82.7	Oct., 1929 111.8	Sept., 1931 63.4

*The four index numbers marked with an asterick are computed by Mr. Richey. 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 115 of the largest street and interurban railways operated in the United States, weighted according to the number of such men employed on these roads.
† Revised.

Accident Insurance *or Accident prevention?*



**INSURANCE
PAYS FOR THE ACCIDENT**



**BUT PEACOCK STAFFLESS BRAKES
PREVENT IT!**

*Peacock Brakes are
powerful, fast, safe and absolutely*

CERTAIN

National Brake Company

890 Ellicott Square, Buffalo, N. Y.

Canada:—Lyman Tube & Supply Co., Ltd., Montreal

The Elleon Co., General Sales Representative, 50 Church Street, New York City

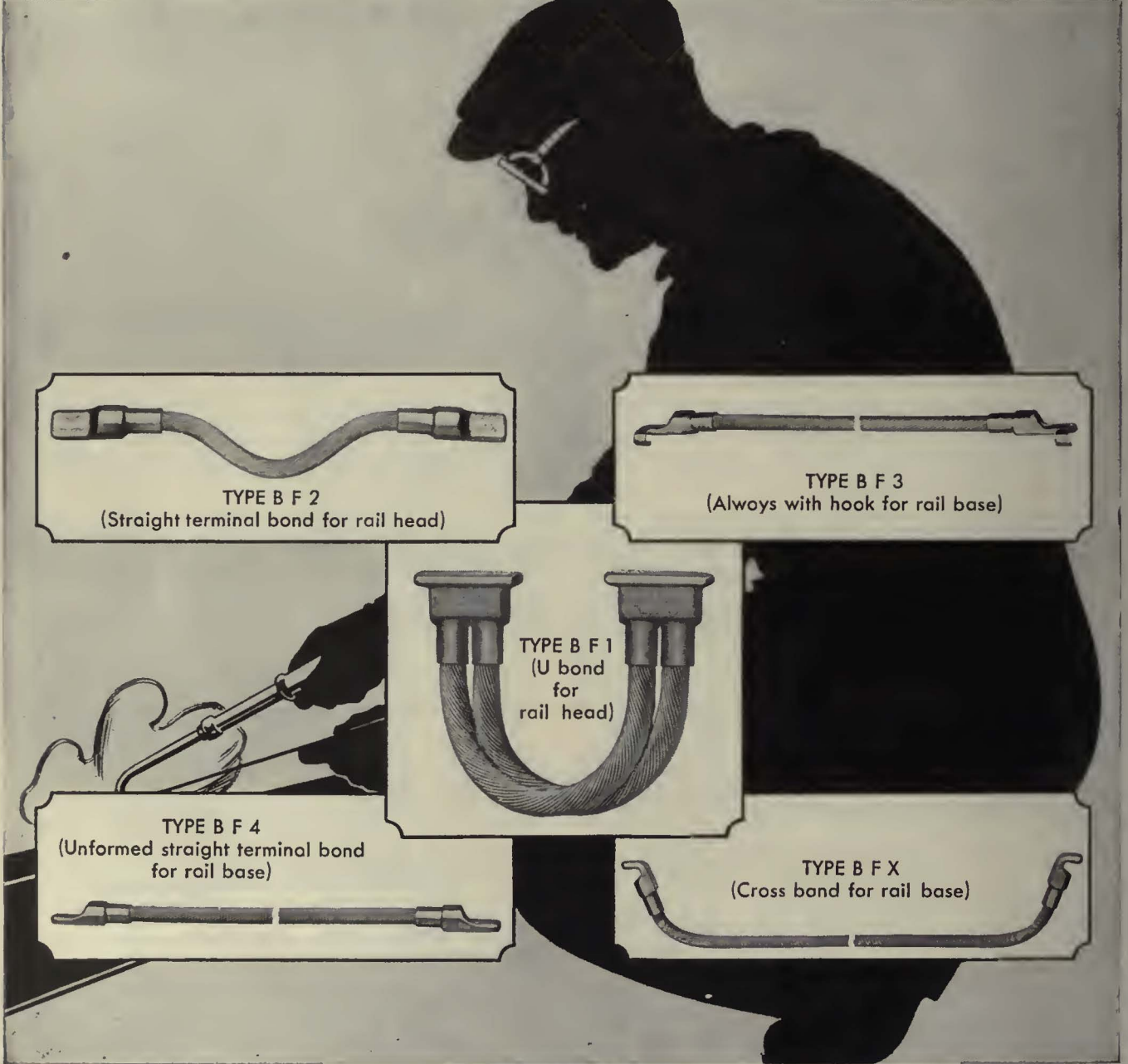
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POWER BONDS

THIS latest and most significant advance in power bond design assures welding simplicity and economy never before realized—as well as higher resistance to vibratory stresses. By newly developed manufacturing methods, the wires are intimately flash butt-welded to solid soft steel terminals, making it easy for any welder to give you better installations at lower cost. Five types—adaptable to flame or arc welding—each bond stretch-tested to insure positive unity. Full particulars and samples on request. Address the nearest office.

A TRIUMPH IN PERFORMANCE AND ECONOMY



TYPE B F 2
(Straight terminal bond for rail head)

TYPE B F 3
(Always with hook for rail base)

TYPE B F 1
(U bond for rail head)

TYPE B F 4
(Unformed straight terminal bond for rail base)

TYPE B F X
(Cross bond for rail base)

1831  1931

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208 South La Salle Street, Chicago SUBSIDIARY OF UNITED STATES STEEL CORPORATION And All Principal Cities
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The Charles A. Coffin Medal Won by The Milwaukee Electric Railway & Light Company

For

Distinguished Service!

Two First Awards for Development and Efficiency Won by Systems Equipped with Goodyear All-Weather Tread Tires

The 1931 winners of two most coveted national awards—the Charles A. Coffin Medal for Distinguished Contribution to the Development of Electric Transportation, and the Bus Transportation Maintenance First Award in Class B City Operation—both rely on Goodyear Bus Tires.

The Milwaukee Electric Railway and Light Company, operating 169 buses over 887 miles of route, receives the Charles A. Coffin Medal as a signal citation for advances which promote public convenience and redound to the benefit of the industry. Most of its motor coaches are equipped with Goodyear Bus Tires.

The Capital Traction Company, of Washington, D. C., is awarded first place in its metropolitan

class for efficient maintenance methods and practices. Capital operates 47 buses, all for the last several years equipped with Goodyear Tires.

“Our tire record,” says Capital



Bus Transportation First Award, Class B City Operation. Won by Capital Traction Company, Washington, D. C.



Traction in its brief on operations, “is entirely due to the manufacturer... a record of over 100,000 miles operated per tire failure delay. Practically our entire fleet is equipped with balloon tires, with a consequent easier riding for the passengers and ease on the bus.”

Goodyear extends congratulations to the victors, and pledges the same character of manufacturing interest and tire quality to every user of Goodyear Bus Balloon Tires.

THE GREATEST NAME IN RUBBER

GOODYEAR

IT PAYS TO SPECIFY GOODYEARS WHEN YOU ORDER NEW COACHES

Lubrication costs have been lowered. The maintenance dollar covers more ground than it ever did before. Railway executives have discovered a new system of lubrication. Car buyers are specifying it for new equipment. Many of the most successfully operated lines in the country are completely equipped.

This new system—the Texaco System of Car Journal Lubrication — offers definite operating economies. No one can predict the exact amount it will save on your lines, but Texaco engineers can promise you that it will be substantial.

Texaco Lovis Oil, a revolutionary new lubricant, and the Texaco Car Journal Oil Seals are the essential elements. Bearing and journal wear are cut down, power consumption is less and shop time for lubrication and maintenance lower than was ever possible under the older methods.

Records of actual experiences on well known electric railways are available on request. Find out what has been done, then make the test on your own cars. Texaco engineers will freely cooperate. Write The Texas Company today.

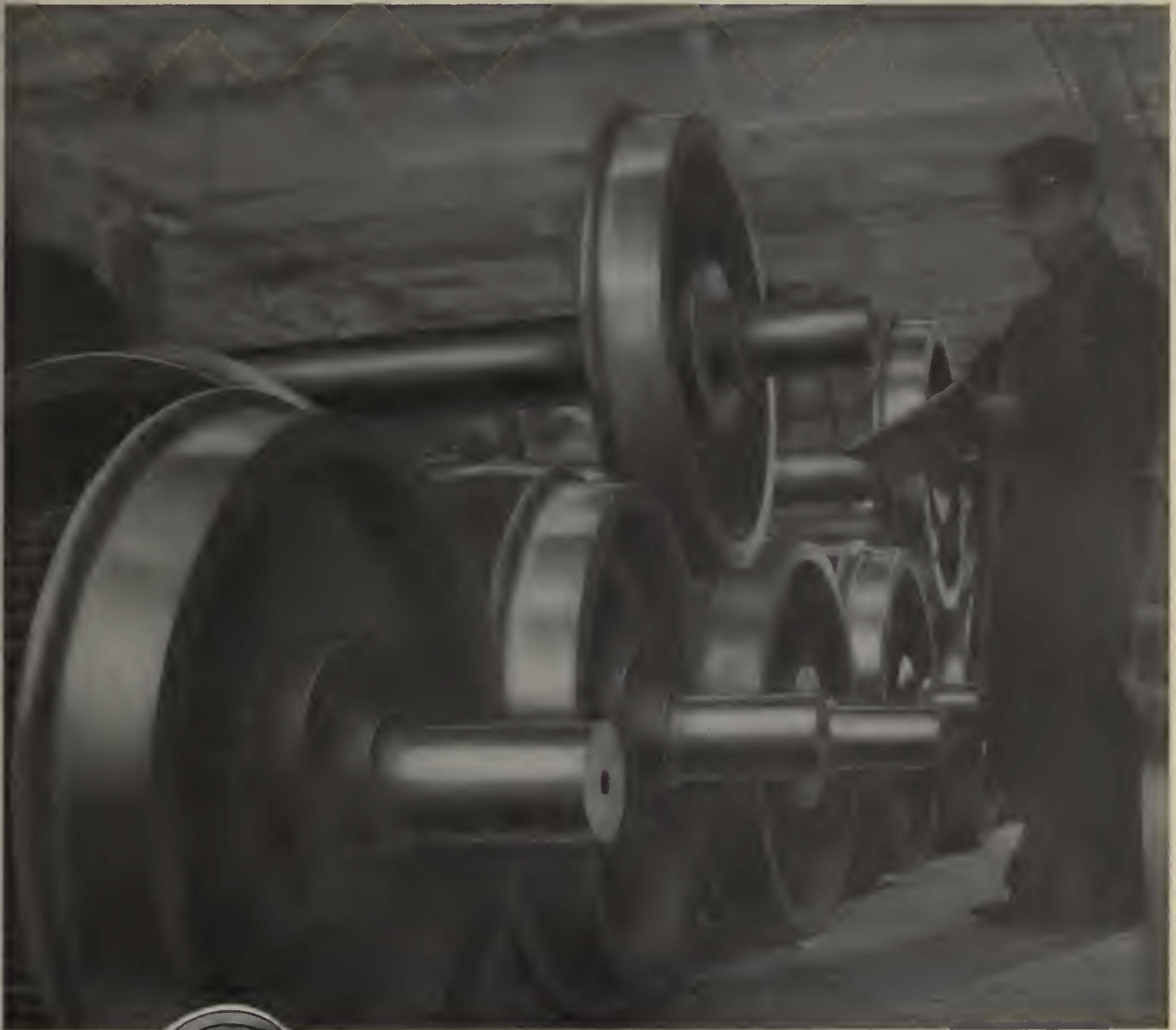
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“Standard” Quenched and Tempered Wheels have demonstrated in severe service superior structural strength and wear life. Scientific heat treatment is responsible for the super-service of “QT” wheels. Use them on your service to get maximum safety and minimum operating costs.

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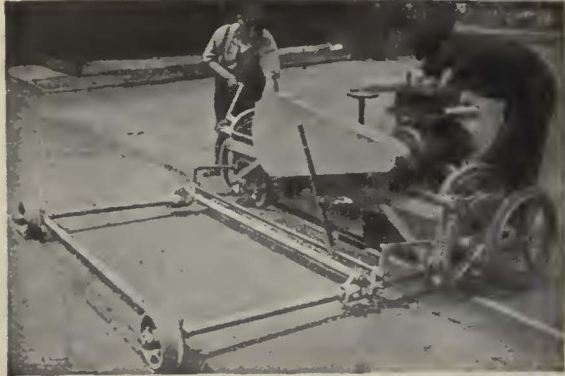
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Reciprocating Track Grinder



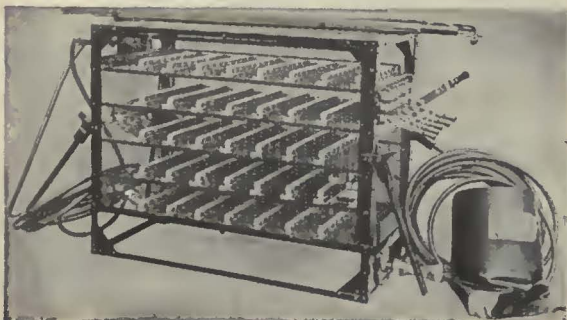
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Bestir or be stirred

“WE must bestir ourselves to hold our patronage by giving to our passengers the closest approximation we can to the comfort they enjoy in riding on rubber . . .

“It is of the utmost importance, therefore, that the electric street car be provided with the smoothest and best type of roadbed . . .”

The words are those of Mr. W. W. Wysor. Need we add even a word?

Railway Trackwork Co.

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 H. F. McDermott, 208 S. La Salle St., Chicago
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HOW MUCH SHOULD A WHEEL WEIGH



?



ENOUGH metal must be put in a car wheel to give adequate strength and wear resistance. How much of it is necessary to fulfill these conditions depends upon the kind of metal used. By reason of its special heat-treated composition the Davis "One-Wear" Steel Wheel can secure a given result with a minimum weight. It's the special metal that makes the difference.

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HEADQUARTERS FOR SPRAY-PAINTING and FINISHING EQUIPMENT

for

Electric Railways



Winter slows up exterior maintenance work, and at the same time it is the hardest season on exterior structures. Winter maintenance problems on electric railways however, are solved by DeVilbiss Spray-finishing and Spray-painting Equipment, because it is so fast that you can take advantage of the short periods of "open weather" to accomplish a large volume of this type of work.

The spray method with DeVilbiss Equipment is three to five times faster than brush painting methods. One man, or a small crew, can paint a job and finish it in a space of time which would be impossible with brush methods. With the proper DeVilbiss Equipment to meet your needs, there is no longer any reason why outside works should deteriorate and suffer from lack of painting in the winter time.

Electric railway executives should send for Catalog "RB". It shows why DeVilbiss Equipment is almost universally used on the electric railways of the country.

THE DEVILBISS COMPANY : TOLEDO : OHIO

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Los Angeles San Francisco Windsor, Ontario

Direct sales and service representatives available everywhere

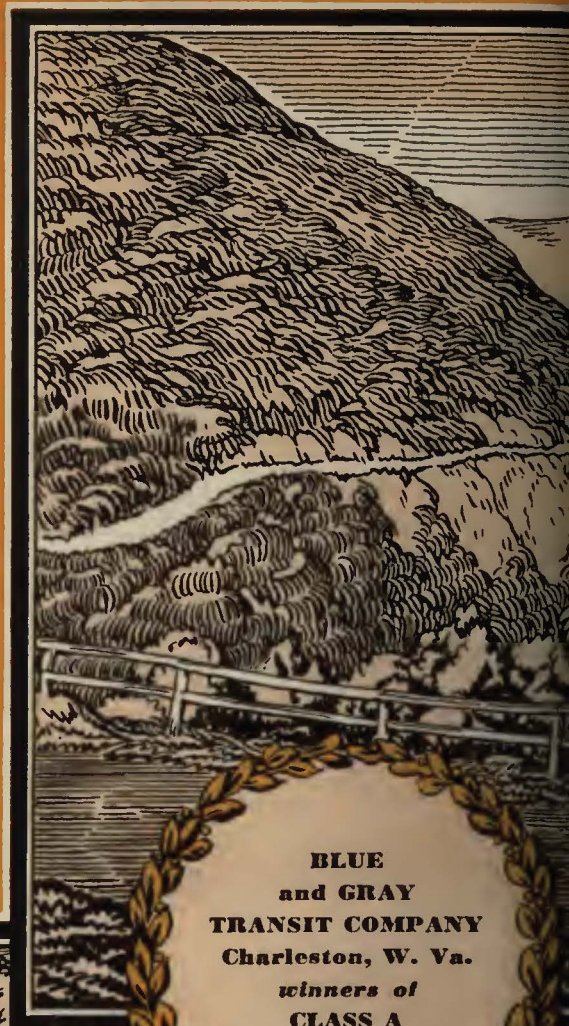
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**Maintenance award
winners use
Yellow Coaches**

THE fact that Yellow Coaches overwhelmingly predominate on three out of four of the winning properties for the Bus Transportation Maintenance Awards, again conclusively establishes the superior excellence of Yellow equipment.

Out of a total fleet of 89 coaches used by Blue & Gray—76 were Yellows—almost 100 per cent. Out of a total fleet of 57 coaches used by Capital Traction—31 were Yellows. And in Toledo Yellow Coaches predominate with Community Traction.



**BLUE
and GRAY
TRANSIT COMPANY
Charleston, W. Va.
winners of
CLASS A
INTER-CITY**



**CAPITAL
TRACTION COMPANY
Washington, D. C.
winners of
CLASS B
CITY**



In inter-city service and in city service Yellow Coaches can always be depended upon to give uniformly reliable service at low cost.



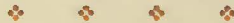
**COMMUNITY
TRACTION COMPANY**
Toledo, Ohio
winners of
CLASS A
CITY

Thank you
Mr. Hill

"NATURALLY," said Mr. Hill, Association President and head of The Blue & Gray Transit Company, winners of the Class A Bus Transportation Maintenance Award for inter-city operation, "good equipment has proved a very important factor in helping keep our maintenance costs low.

"However, our most valuable discovery was the manner in which new equipment invariably increased riding. Our lines on which new equipment was introduced this year showed decided increases in revenue. While we found that old equipment will often maintain regular riding, we learned that new motor coaches are a big asset in attracting additional riders and a higher class of patronage—especially women.

"Modern, new equipment makes all the difference in the world when it comes to building for increased revenue."



These statements, so kindly and decisively offered by so well recognized an authority, are truly significant. Yellow Coaches, because of design and outstanding performance, yield the results outlined so clearly and experienced by Mr. Hill.

It can be done - - with

Yellow Coaches

GENERAL MOTORS TRUCK CO., Pontiac., Mich.
Subsidiary of Yellow Truck & Coach Mfg. Co.



These Combustion Engineers have cut fuel costs for many operators.

HOW much would a 17% increase in motor fuel mileage save you in a year? How much would it be worth to you to reduce obnoxious odors in your motor coaches? And wouldn't you like to receive better lubrication from motor oil?

These are some of the problems which motor coach combustion engineers of the Standard Oil Company (Indiana) are solving for Midwestern motor coach operators. The efficiency of hundreds of motor coaches has been greatly increased by these engineers . . . and as the operating efficiency was increased the motor fuel cost and the amount of obnoxious combustion odors released were

decreased. A check taken of twenty-five of these motor coaches picked at random from different companies shows an average saving of 17% in motor fuel mileage and 42% less carbon monoxide.

It may be also possible to improve your gasoline mileage and lower motor fuel costs. Your motor coaches serviced by Standard Oil Company (Indiana) combustion engineers and using Red Crown Gasoline and Polarine Motor Oil will be as efficient and economical as perfect gasoline and motor oil performance can make them. Call in one of these motor coach engineers. His investigation places you under no obligation.

STANDARD OIL COMPANY


(Indiana)

1208-B

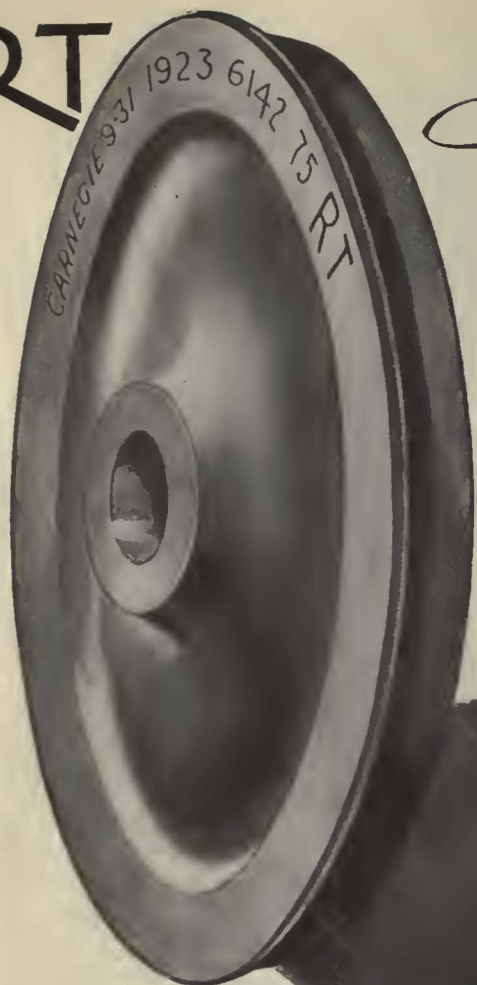
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MATCHED TO GIVE  PERFECT PERFORMANCE

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And now

NEW WHEEL SATISFACTION

Stamped on Carnegie Wrought Steel Wheels, the initials "RT" (Rim Toughened) identify wheels particularly adapted to modern heavy duty service. These initials indicate the additional refinement of heat treatment, the process of which produces a wheel with an especially tough rim and with high physical properties . . . a wheel that will give you greatly increased service because it has the extra stamina to endure the stress and strain of modern traffic conditions.

You already know the outstanding advantages of Wrought Steel. Learn now of this further improvement. Let our wheel engineers bring you complete details. Carnegie Rim Toughened Wrought Steel Wheels have created a new standard of service and value . . . have brought to users a new wheel satisfaction.



CARNEGIE STEEL COMPANY ≈ PITTSBURGH, PA.

Subsidiary of United States Steel Corporation

162



CARNEGIE WROUGHT STEEL WHEELS

STABILITY



There is no insurance for prosperity like a sustained effort which is not diminished in face of discouraging outlooks, nor over-stimulated by too much optimism.

For many decades, Collier Service Car Cards have kept steadily at it, urging riders to buy. Rain or shine they have been promoting business and so helping to maintain traffic. Better still, they have been a source of income on which the Electric Railway Operating Companies have been able to rely.

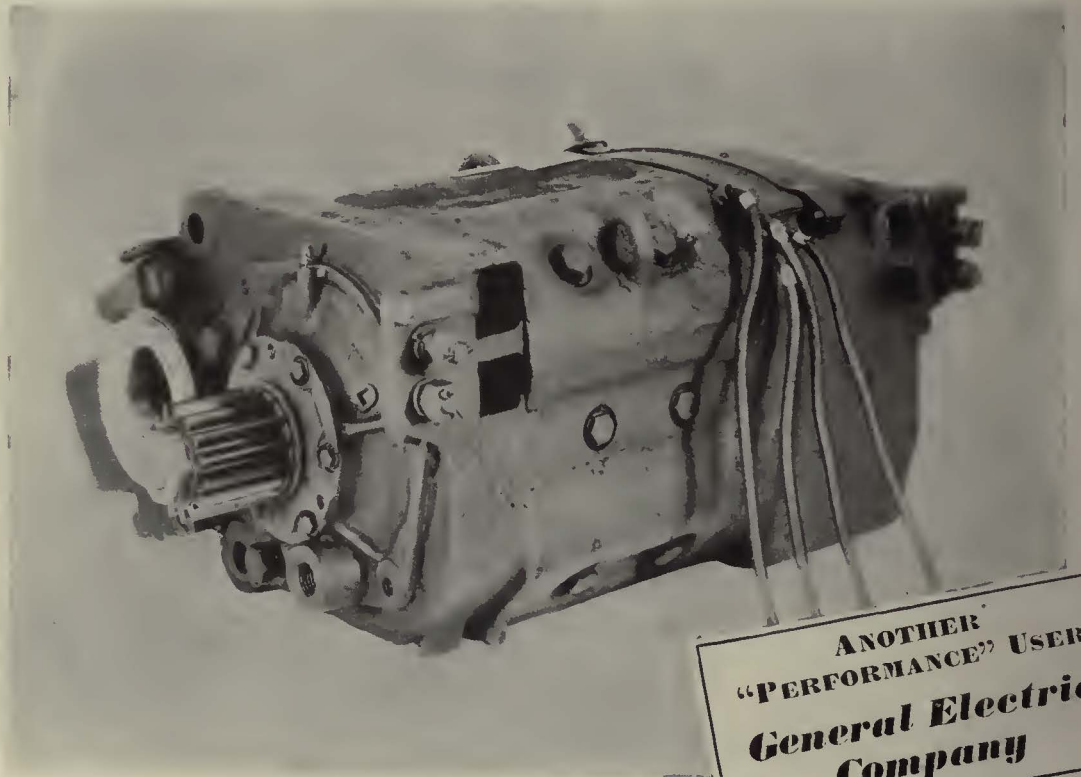
**CAR CARD ADVERTISING
ALMOST EVERYWHERE**

BARRON G. COLLIER

INCORPORATED
220 W. 42nd ST., N.Y.C



LOWEST COST PER CAR MILE WITH LESS MAINTENANCE



ANOTHER
"PERFORMANCE" USER
**General Electric
Company**

WHERE PERFORMANCE TAKES PREFERENCE OVER PRICE

Hand in hand go operating economies and public approval when street railway equipment is modernized. On new or old rolling stock SKF Bearings are a step in the right direction. Especially is this true of traction motors. It is here that SKF Performance Takes Preference Over Price.



D. C. Street Car Motor SKF's on each end of the armature shaft are a decisive factor in maintaining the original efficiency plus freedom from electrical troubles due to bearing wear. SKF's never require adjustments and have a wide margin of reserve stamina to insure uninterrupted schedules at lowest cost per car mile.

You may buy a bearing as a bargain but try and get a bargain out of using it, for nothing is apt to cost so much as a bearing that cost so little.

On the General Electric #712

2796

SKF INDUSTRIES, INC. 40 EAST 34th STREET, NEW YORK, N. Y.

SKF

Ball and Roller Bearings

120,000 MILES
per **EXIDE**
11,000,000 MILES
per **YEAR**

**EXIDES GIVE LOWEST
COST PER BUS MILE**

. . . and not one battery plate renewal



One of the 185 modern buses of the Northland Greyhound Lines which have used Exide Batteries as standard since their organization.

SOUNDS like a record. Maybe it is. There's one thing certain—"Exides give lowest cost per bus mile" is being proved every day, by hundreds of bus companies, large and small. This time by the Northland Transportation Company (Northland Greyhound Lines) of Minneapolis, Minn. 120,000 miles—24 months—has been the *average* life this company has obtained from Exide Motor Coach Batteries . . . and without plate renewals.

It's the built-in dependability, uniform rugged construction, that makes Exide Batteries cost least per mile. There are no weak spots in an Exide . . . rebuilding is not necessary. An Exide is in your bus till it wears out, and gives you reliable performance all the way.

Of course you want to keep maintenance figures from getting too big. The question is, "How?" Use Exide Motor Coach Batteries and our extensive engineering experience which enables us to show you how to get lowest cost per bus mile. Don't hesitate to make your problem ours. We want to serve you as well as sell batteries. Write today for facts. No obligation.



Here is a typical Exide Motor Coach Battery that assures economy to any operator. Batteries that can average 120,000 miles without a plate renewal are worth looking up, don't you think?

Exide
MOTOR COACH
BATTERIES

THE ELECTRIC STORAGE BATTERY COMPANY, Philadelphia
THE WORLD'S LARGEST MANUFACTURERS OF STORAGE BATTERIES FOR EVERY PURPOSE

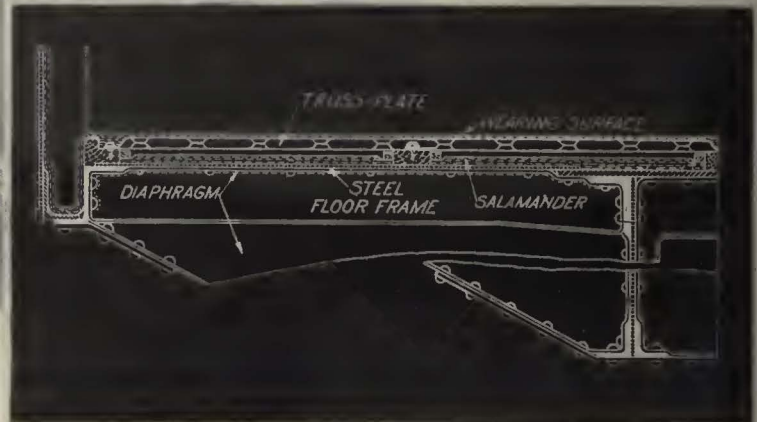
Exide Batteries of Canada, Limited, Toronto

15 years without repair...



Subway car in use on the Interborough Rapid Transit System, New York. The J-M Truss Plate steel car flooring has been in service since 1916 without any repairs.

J-M Truss Plate has the advantage of light weight—great strength and stiffness—easy application to car frame—high thermal resistance—low maintenance cost.



J-M Truss Plate steel car floor-

ing has perfect record on Interborough Rapid Transit Test

J-M "Type A" Tile Flooring is a finished decorative flooring that is waterproof, resilient, acid proof and will outlast any other resilient type of floor covering. It is available in 9 different colors and several sizes and shapes.



IN 1916 the Interborough Rapid Transit System in New York City placed in operation the first car equipped with J-M Truss Plate steel car flooring. For fifteen years this car has been subjected to the heaviest passenger traffic in the world—and not one cent has been spent on the sub-flooring for repair. Today, hundreds of units have been installed in the subway cars of New York City.

J-M Truss Plate can be adapted to any type of underframe—it will give you the same satisfactory results on your equipment that the Interborough Rapid Transit System has experienced. Address Johns-Manville, 292 Madison Ave., New York.

Johns-Manville



Service to Transportation

Suburban Cars for Electric Steam Road Service

weigh 13,140 lbs. less

"ALUMINIZED"

Power savings alone will absorb
the extra cost in 39 months

"ALUMINIZED," the average suburban car for electric steam road service can weigh 112,000 lbs. instead of the usual 125,140 lbs. "Aluminized" cars have equal strength and are over 6 1/2 tons lighter. 8,650 lbs. of the light strong alloys of Alcoa Aluminum displace 24,100 lbs. of steel. Result, the "aluminized" car, lifting 525,600 ton-miles a year off your tracks, cuts power costs, wear and tear on motors, brakes, etc.

The additional cost of "aluminizing" suburban cars for electric steam road service is absorbed in 39 months by savings in power costs alone. Based on a cost of .067 cents per 1,000 lbs. of car per mile, it costs 8.38 cents to move the old fashioned (125,140 lbs.) car 1 mile. The "aluminized" car weighing only 112,000 lbs. costs 7.50 cents per mile. Operating the usual 86,000 miles per year of suburban cars for electric steam road service, this power saving of .88 cents per mile by the "aluminized" car results in a power saving of \$704 per year.

When you "aluminize" you can use the light strong alloys of Alcoa Aluminum for under frame, including body bolsters, side sills, cross members and apparatus supports. Use it too for all metal work in the body, including side plates, end plates, roofs and finish inside and outside. It can also be used for numerous truck, motor and apparatus parts.

Standard structural shapes of the light strong alloys of Alcoa Aluminum from which street cars and railway coaches are made are carried in stock. Plates, rivets, bolts and screws are also available.

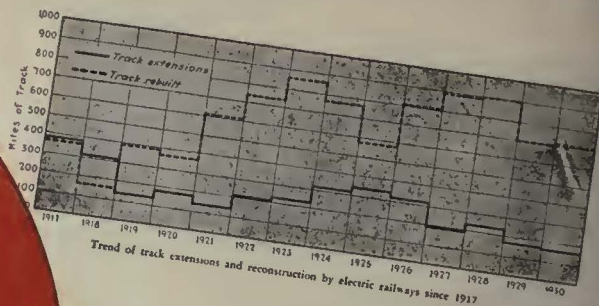
The engineering handbook, "Structural Aluminum," is available at \$1.00 a copy. Address ALUMINUM COMPANY of AMERICA; 2463 Oliver Building, PITTSBURGH, PENNSYLVANIA.



REG. U. S. PAT. OFF.

ALCOA ALUMINUM

out
JAN. 2ND
**ANNUAL
 PROGRESS AND
 STATISTICAL
 NUMBER**



Track Activity

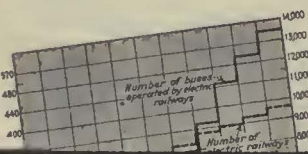
show moderate gain previous years. Sixty-five

Well Sustained

Bus Service and Equipment Increased

By J. R. STAUFFER, Assistant Editor, Electric Railway Journal

More than 1,600 new buses bought during past year. Route extensions were over 5,000 miles. Bus service is now being given by 390 electric railway companies operating 13,522 vehicles on 26,098.65 miles of route



The total number of buses purchased by 171 companies during 1930 was 1,768, of which 1,614 were new vehicles and 154 were bought second hand. A number of the latter were acquired with the absorption of lines of independent operators. At the same time there were approximately 750 buses disposed of by scrapping. The average age of these scrapped vehicles was 10.5 years. The net gain for the year in the number of buses operated was 1,614.



One of more than 500 taxicabs now operated by Public Service Co-ordinated Transport in conjunction with its street cars and buses

Taxicab Operation by Electric Railways Growing

By JOHN A. MILLER, Jr., Editor Electric Railway Journal

of all street transportation progressing through joint street car, bus and taxicab operation. The number of taxis operated under auspices of electric railways is growing.

principle that the taxicab is, in reality, a street car should be subject to the same regulations.

A RELIABLE, up-to-date picture of what's been happening in the community transportation field—surface, subway and elevated railways, electrified railroad lines, taxis, buses, trolley buses, freight lines and terminals.*

Transportation men in all departments of operation will wish to study the factual information

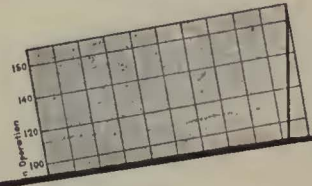
in this Statistical Number and to keep it handy for reference throughout the coming year. It is the one reliable source of complete information covering every phase of the industry—a master tabulation, describing and comparing the last year's operations with previous years, and indicating the trends for 1932.

* TO ADVERTISERS: Sales plans and market studies should be built around this conception of the community transportation field.

Advertising Forms Close December 21!

Trolley Bus Experiences Unprecedented Growth During Past Year

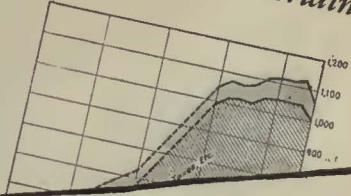
Five new installations add 105 vehicles and 34.90 route miles. With additions of 11 trolley buses and 7.36 route miles by systems already in operation totals for industry rise to 182 vehicles and 70.05 miles



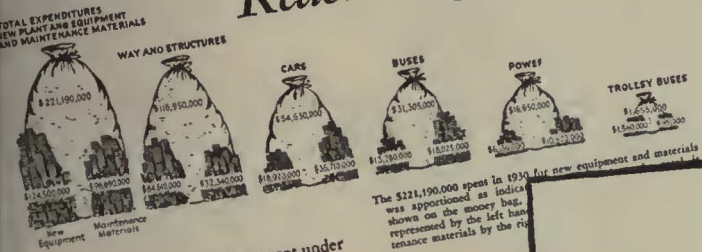
1930 Sees Rapid Strides in Railroad Electrification

Cleveland terminal and Lackawanna suburban system are notable additions to electrified trackage. Construction work progressing on Pennsylvania, New York Central and Reading installations

Changes in Electrified Steam Railroad Track in 1930



Expenditures for New Equipment and Maintenance Reach High Figure



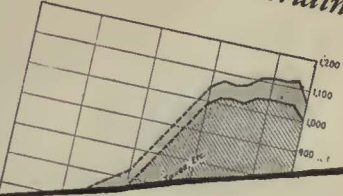
The \$221,190,000 spent in 1930 for new equipment and materials was apportioned as indicated on the money bags represented by the left hand maintenance materials by the right

Total for 1930 less than 6 per cent under that for 1929. Increases shown for way and structure and trolley bus capital accounts, as well as maintenance materials for trolley buses, buses and power equipment. Budgets for 1931 indicate rise of almost 4 per cent over past year

Electric Railways Make Good Showing in a Year of Uncertainty

Unfavorable business trends the year carried nearly as many passenger operating expenses aided in a reasonable net revenue

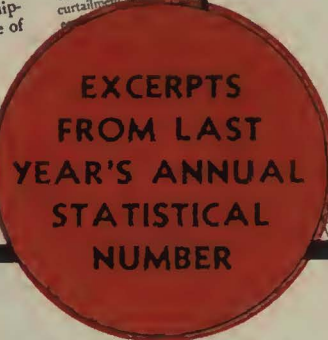
Electric railway operation in the year has been far from discouraging. While revenues have been less than in 1929, considering the general business depression by the railways nearly two with unabated vigor. While the country as a whole pre-empting revenue save in a few isolated



Rapid Transit Makes Advance

Comparatively little new track is added during the year, but the way is paved for important increases in New York, Chicago, Newark and Cleveland

INTEREST in rapid transit was unabated during the year, particularly in the larger metropolitan centers. Naturally, the greatest importance attaches to the Chicago situation, because it means the expansion of rapid transit facilities on a large scale. Ever since the Chicago elevated lines were started at the time of the World's Columbian Exposition in 1893, there has been a steady expansion of the city's facilities for rapid transit. Plans have been made for independent operation by the city, in case negotiations for unification with one or both of the present operating companies, the Interborough Rapid Transit Company and the New York Rapid Transit Company, the latter a part of the Brooklyn Manhattan Transit System, should be unsuccessful. At the present time a virtual agreement of policy has been reached between the two private companies, which has been a more favorable attitude by the city.



Among the subjects covered in the Statistical Number will be:

- Cars, buses, trolley buses and taxicabs purchased in 1931. Number of vehicles in operation. Vehicle and route mileage.
- Miles of new track constructed and reconstructed.
- Expenditures for new equipment and maintenance during 1931.
- Forecast of expenditures for new equipment and maintenance budgeted for 1932.
- 1931 revenues, costs and fares, and comparisons with previous years.
- Rapid transit developments and steam road electrification.
- Taxicab operation.
- Trolley bus developments.
- Study of industry trends and forecast for the coming year.
- Advertising pages, containing reliable and practical information regarding developments in rolling stock, shop equipment, tools, operating materials, and the sources from which this equipment can be purchased.

A BIG, FAST, POWERFUL HEAVY-DUTY CARRIER . . . *at an Extremely Low Price*

Climaxing years of truck building experience Reo offers the new 4-Tonner, a commercial carrier built in tractor, dump, trailer and van types for every heavy hauling need.



Engine, frame, axles, brakes, springs and all component parts are coordinated in a perfectly balanced chassis, which boasts maximum power for weight, extreme sturdiness, and utmost safety under all load and travel conditions.

REO MOTOR CAR COMPANY
LANSING · TORONTO

REO

- 150-inch wheelbase chassis \$2800
- 170-inch wheelbase chassis \$2875
- 190-inch wheelbase chassis \$2950

Reo Trucks and Speed Wagons range from 1/2 ton to 4 tons. Prices \$625 to \$2800, chassis f. o. b. Lansing

BIG 4 TONNER \$2800

REDUCES COST
32¢ PER 1000 CAR MILES
WITH NEW LUBRICANT



High speed
train running
sixty miles
an hour.

FLYING over the rails . . . at sixty and sometimes seventy miles an hour . . . the trains of one large high speed electric railway system* had long been subject to excessive bearing failures.

For the past ten months this company has operated all cars with L. C. Motor Journal Oil. A recent check up for this period of operation showed practically complete elimination of hot boxes. It discloses a saving of waste consumption for the first five months of \$1,001.00 and \$497.00 saved in journal brasses consumption. A total saving of nearly 32 cents per thousand car miles has been accomplished.

On other high speed lines and in ordinary

street car service Standard Oil Company (Indiana) lubricants and service have proved equally successful. In practically every instance marked savings have been made in power and waste consumption with an attending increase in the life of bearings and a reduction in bearing temperatures.

You will find it profitable to investigate L. C. Motor Journal Oil. Our engineers will be glad to furnish information and data. Address your request to the Electric Railway Division.

*Name on request.

STANDARD OIL COMPANY
(Indiana) (1209)
910 So. Michigan Avenue Chicago, Illinois

L. C. MOTOR
JOURNAL OIL

THE IDEAL YEAR AROUND MOTOR JOURNAL OIL FOR ELECTRIC RAILWAY SERVICE

Better Pole Lines are Being Built with MONOTUBE POLES

ELECTRIC railway officials were among the first to use Union Metal Poles when they were introduced some years ago. Today Fluted Steel and Monotube Poles are being used in many of our largest cities. They are supporting span wires and feeder lines and, in joint service with other utilities, they are carrying distribution lines, street lighting units and traffic signals. Wherever they are used they are doing a better job.

Union Metal Poles are made in one piece from high grade steel, with an electric welded vertical seam and then cold rolled. The poles possess unusual strength; they have no horizontal joints; they are attractive; they will take an abnormal load without a permanent set — factors which provide simple, economical installation and maintenance and long efficient service.

And so we say, better pole lines are being built with Union Metal Poles. If you would like to see for yourself, we would be glad to refer you to an installation of Fluted Steel or Monotube Poles in your locality.



THE UNION METAL MANUFACTURING COMPANY
GENERAL OFFICES AND FACTORY . . . CANTON, OHIO



SALES OFFICES . New York . Chicago . Boston
Los Angeles . San Francisco . Dallas . Atlanta



DISTRIBUTORS

General Electric Merchandise Distributors Graybar Electric Company, Inc.
Offices in all principal cities



● Monotube Poles Installed in
Denver, Colorado

UNION METAL MONOTUBE POLES

"Cancel the Inspection

Buy 100%
R B & W
Stock"

Why a great railroad system discontinued professional factory inspections of its R B & W purchases



A process in the manufacture of R B & W Bolts and Nuts. BOURKE-WHITE PHOTO

A GREAT American railroad system is now buying its entire requirements of slotted nuts from R B & W. When this railroad decided to make R B & W its exclusive supplier, it also decided to discontinue inspections at our factory prior to shipment.

Its experience in always receiving an acceptable product from us, and its confidence that we would continue to produce the railroad's requirements satisfactorily, led to the cancellation of

its professional factory inspection service and the consequent saving in the cost of the product.

Slotted nuts are the most important type of nuts used by the railroads. They must be made very accurately in size and must possess uniform strength. The quality of R B & W slotted nuts is



such that they are known as the standard by railroads everywhere.

To be sure of the best in all types of bolting material, specify R B & W products. If you have a problem involving the use of bolting material, consult the R B & W Engineering Service.

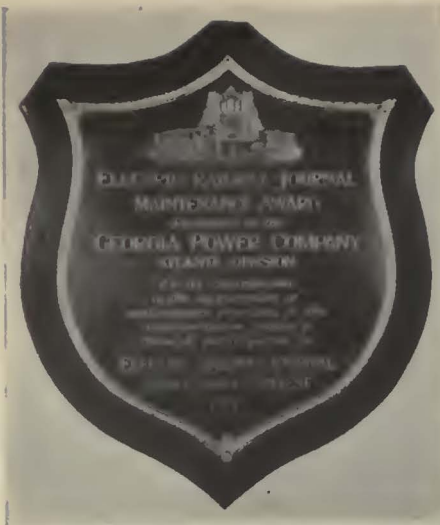
RUSSELL, BURDSALL & WARD BOLT & NUT CO.

ROCK FALLS, ILL.

PORT CHESTER, N. Y.

CORAOPOLIS, PA.

Sales Offices at Philadelphia, Detroit, Chicago, San Francisco, Los Angeles, Seattle, Portland, Ore.



ANOTHER WINNER!

GEORGIA POWER CO.
(Atlanta Division)

Based on data from various companies showing the general character, quality and cost of maintenance work done during the year, Atlanta has achieved the distinction of winning the Electric Railway Journal's Annual Maintenance Award. This is another outstanding electric railway property which installs

THERMIT JOINTS



View on Whitehall Street, Atlanta showing standard track construction with Thermit welded rail joints.

The

METAL & THERMIT

120 Broadway, New York, N. Y.

Pittsburgh

Chicago

Albany

So. San Francisco

Toronto

IT IS the stated policy of this prize-winning electric railway company to build track construction which will be economical in first cost and yet which will require very little maintenance for a long term of years. To achieve this result they recognize that joints must be as nearly as possible one hundred per cent perfect. Carrying out this idea, they have made

Thermit welded joints their standard construction practice in Atlanta . . . More and more companies are finding that Thermit welding practically ends the rail-joint maintenance problem. This means the elimination of broken-up paving every sixty feet. It means faster operation of cars, with smoother riding and less noise. And it means substantial savings in maintenance costs as proved in Atlanta.



Pouring a Thermit weld, with 80 lb. A.S.C.E. rail in East Point line, Atlanta.



With Thermit welded joints, Atlanta's track is smooth and unbroken by bad joints.



CORPORATION

120 Broadway, New York, N. Y.,

Pittsburgh Chicago Albany So. San Francisco Toronto

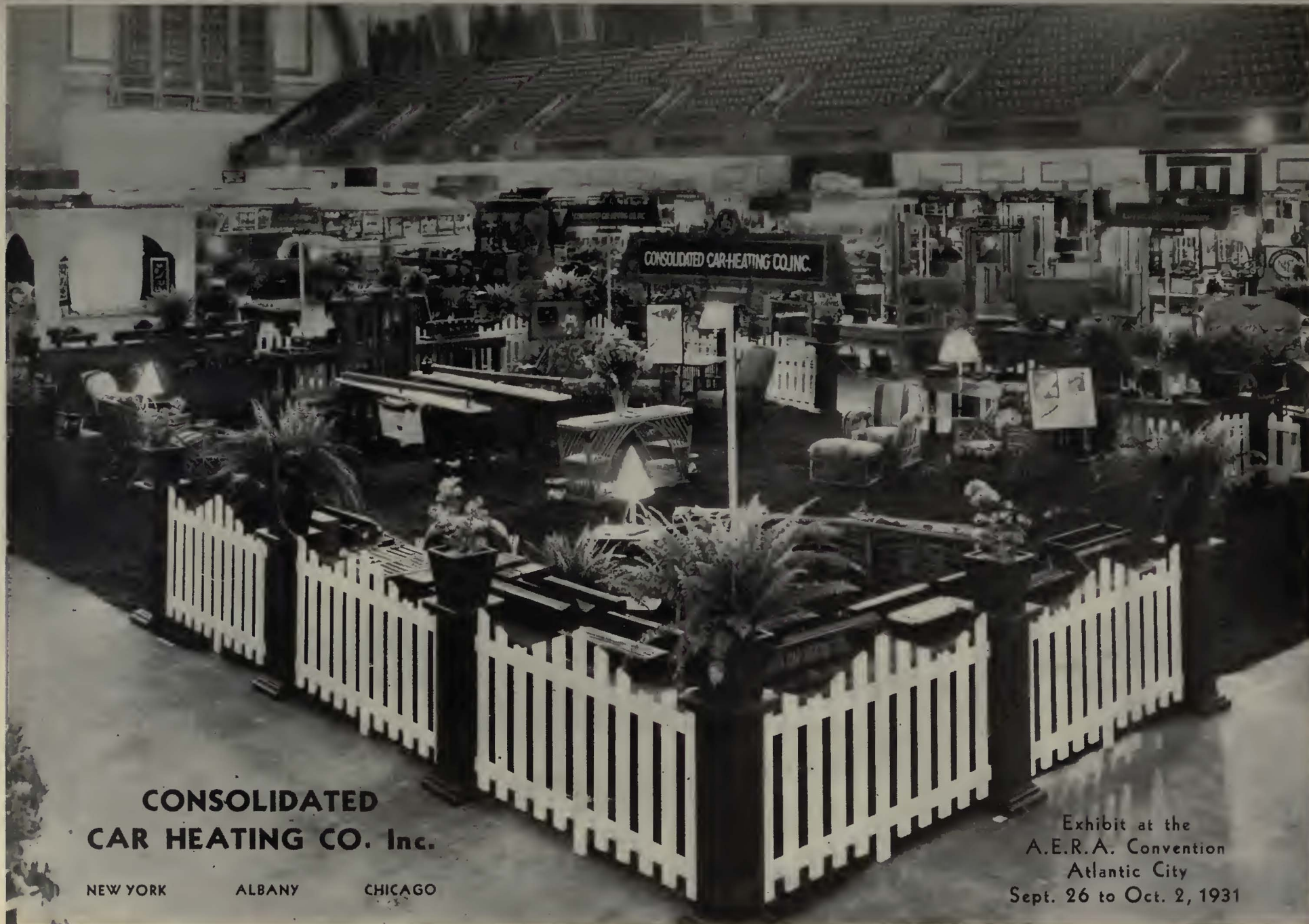


The dependability of electrical apparatus is determined often by the quality of its insulating materials. General Electric, to insure this dependability, manufactures the Insulating Materials used in its many products. These same Insulating Materials that are manufactured, used and recommended by the General Electric Company can be obtained from your nearest General Electric Merchandise Distributor. See him, or write Section M-3111, Merchandise Department, Bridgeport, Connecticut.

GENERAL  ELECTRIC

INSULATING MATERIALS

MERCHANDISE DEPARTMENT, GENERAL ELECTRIC COMPANY, BRIDGEPORT, CONNECTICUT



**CONSOLIDATED
CAR HEATING CO. Inc.**

NEW YORK

ALBANY

CHICAGO

Exhibit at the
A.E.R.A. Convention
Atlantic City
Sept. 26 to Oct. 2, 1931

Keep his head up and we'll all come through!



You recognize this man. He lives in your own town, not far from you . . .

Though faced with unemployment, he is combating adversity with courage. He has retreated step by step, but fighting. He has spread his slender resources as far as they will go.

This winter he and his family will need your help.

There are many other heads of families much like him in the United States. This winter all of them will need the help of their more fortunate neighbors.

This is an emergency. It is temporary. But it exists. It must be met with the hopefulness and resource typical of American conduct in emergencies.

Be ready! Right now in every city, town and village, funds are being gathered for local needs—through the established welfare and relief agencies, the Community Chest, or special Emergency Unemployment Committees . . .

The usual few dollars which we regularly give will this year not be enough. Those of us whose earnings have not been cut off can and must double, triple, quadruple our contributions.

By doing so we shall be doing the best possible service to ourselves. All that America needs right now is courage. We have the resources. We have the man power. We have the opportunity for world leadership.

Let's set an example to all the world. Let's lay the foundation for better days that are sure to come.

*The President's Organization on
Unemployment Relief*

Walter S. Gifford

WALTER S. GIFFORD, DIRECTOR
Committee on Mobilization of Relief Resources

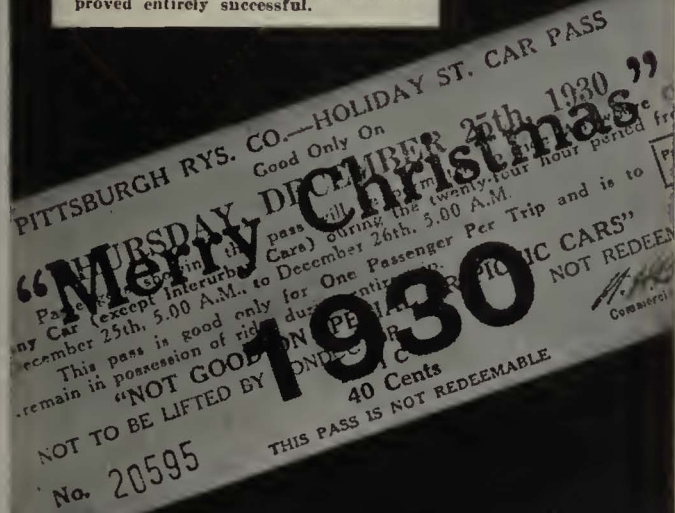
Owen D. Young

OWEN D. YOUNG, CHAIRMAN

The President's Organization on Unemployment Relief is non-political and non-sectarian. Its purpose is to aid local welfare and relief agencies everywhere to provide for local needs. All facilities for the nation-wide program, including this advertisement, have been furnished to the Committee without cost.

You must sell rides!

Pittsburgh used this novel Christmas Pass last year to get the celebrating public away from their firesides. It proved entirely successful.



How the aggressive selling of Weekly Passes, Sunday Passes, Nickel Passes, Shoppers' Passes and Special Passes increases volume, net and off-peak business

Retail merchants have been able to hold up their business volume by inducing shoppers to buy in quantity. Similarly, many progressive railway and bus operators are actually increasing their revenue by selling passes for various uses—at bargain prices. Results prove that this is sound business policy.

Passes should be designed to stimulate off-peak riding, such as during shopping hours, during the evening, on weekends and holidays. Our extensive experience will be valuable to you in this line.

Correct pass design results in:

1. Cash in advance.
2. Great saving in time, particularly on one-man cars.
3. Increase in riders, revenue and good will.
4. Uniform distribution of riding hours.

Let us help you

**GLOBE
TICKET COMPANY**
PHILADELPHIA

FACTORIES:

Philadelphia Los Angeles
Boston Atlanta New York

SALES OFFICES:

Cincinnati Pittsburgh
Baltimore Cleveland
St. Louis Des Moines



Washington is using this form of pass with great success. It is keyed and colored for instant identification.

THE SAFETY CAR CONTROL EQUIPMENT

*—will wake up
your Drowsy Cars*

IT IS surprising how easily old cars may be given new life and energy . . . They can be converted into Safety Cars—which are safer, and **FASTER**, especially when equipped with the Relay Valve and the Self-Lapping Brake Valve . . . These devices assure very quick build up of brake cylinder pressure and unusually flexible control of this pressure.

SAFETY CAR DEVICES CO.

OF ST. LOUIS, MO.

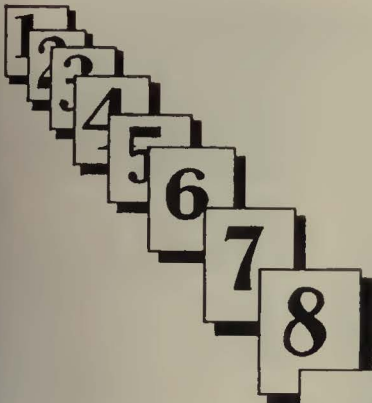
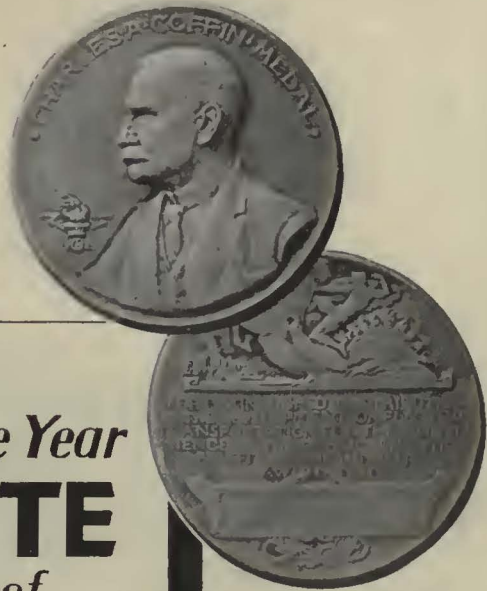
Postal and Telegraphic Address:

WILMERDING, PA.

CHICAGO SAN FRANCISCO NEW YORK
WASHINGTON PITTSBURGH



Congratulations to
The Milwaukee Electric Railway
and Light Company
1931 Coffin Award Winner



-and now **9th** *Consecutive Year*
HASKELITE
is used by Winner of
CHARLES A. COFFIN AWARD

Haskelite opened up new possibilities to engineers in car and bus design. Consequently it has become an important factor in promoting better service, greater safety, and in establishing lower operating costs.

The more attractive bodies made possible by Haskelite can in large measure be credited for increasing the number of riders and building a more friendly public relationship.

LOWER PRICES AND
FREIGHT RATES ON
PLYMETL
NOW IN EFFECT

WHEN IT'S
TRANSPORTATION
IT'S
HASKELITE
AND
PLYMETL

3 out of 4 Winners
BUS MAINTENANCE AWARDS
are HASKELITE users

The light weight and great strength of Haskelite materially helped these winners to reduce maintenance costs. The Blue and Gray Transit Company, and the Community Traction Company, Class A winners, and the Capitol Traction Company, one of the Class B winners, are to be congratulated on the use of Haskelite and Plymetl in their equipment.

Specify Haskelite and Plymetl. Let us cooperate with you in reducing operating costs.



HASKELITE MANUFACTURING CORPORATION
120 So. LA SALLE STREET, CHICAGO, ILL.
In Canada: RAILWAY & POWER ENGINEERING CORP., LTD.

There are . . . No Uncertainties in Dixie Grading Methods!



The production of Dixie Poles is an operation of major proportions

Adequate facilities in space for sorting and drying—and in mechanical equipment, too—supplement the finest of Dense Long Leaf Yellow Pine cut from our own timber.

All Dixie products pass under the eye of our expert inspector—a definite factor for sustained uniformity in grading.



Selling Agents

GEORGE G. LEAVETTE
Room 416
25 Broadway
New York City

F. B. MERRITT
Room 1560
First National Bank Bldg.
Detroit, Mich.

JACKSON LUMBER Co.

Manufacturers
Lockhart, Alabama

A CROSSETT WATZEK GATES INDUSTRY



TO EVERY MAN who subscribes to the Library of Electrical Maintenance and Repair NOW we will give a copy of Braymer and Roe's Repair Shop Diagrams and Connecting Tables for Induction Motors, the latest and most practical book on the subject. No charge for it—it comes to you FREE with this helpful maintenance and repair library.

Electrical Maintenance and Repair

5 volumes—1810 pages—1756 pictures and diagrams

Below we list the seven principal reasons why every ambitious electrician should have this library.

1. The five books in the library discuss actual repair jobs and show you step by step what to do when anything goes wrong.
2. They show you how to locate and remedy motor and generator troubles.
3. They show you how to reconnect motors to meet any condition of voltage, phase, frequency and speed.
4. They give you suggestions for preventing electrical machinery troubles.
5. They cover fully the rewinding of motors.
6. They present information that will help you get better service out of your electrical equipment.
7. They give you tables, data, kinks and diagrams that you will find of priceless value every day on every job.

Every maintenance and repair man needs them

(The books contain hundreds of photographs, diagrams and tables, which show you how to go about it to make an effective repair job. There are wiring diagrams covering A.C. and D.C. generators, feeders, transformers, potential regulators, synchronous converters, batteries and boosters, substations, lamp mechanism connections, rheostats and controllers, lightning arresters, automatic switches, railway controllers, etc.)

Free examination—no money down—only \$1.00 in ten days and \$2.00 a month until paid.

Fill in and mail the coupon attached and we will send you the entire set of five volumes for ten days' Free Examination. We take all the risk—pay all charges.

You assume no obligation—you pay nothing unless you decide to keep the books. Then \$1.00 in ten days and the balance at the rate of \$2.00 a month. Send the coupon NOW and see the books for yourself.

McGraw-Hill FREE EXAMINATION COUPON

McGraw-Hill Book Co., Inc., 370 Seventh Ave., New York.
Gentlemen:—Send me the New Library of Electrical Maintenance and Repair, all charges prepaid for 10 days' Free Examination. If satisfactory I will send \$1.00 in ten days and \$2.00 a month until \$15.00 has been paid. If not wanted I will return at your expense. Upon receipt of my first payment you are to send me a free copy of Braymer and Roe's Repair Shop Diagrams.
(IMPORTANT—To secure books on approval write plainly and fill in all lines.)

Name

Home Address

City and State

Name of Company

Occupation

E-11-31

“TOOL STEEL” GEARS ON GEORGIA POWER COMPANY

helped Atlanta make their fine record and secure the Electric Railway Journal Maintenance Award—1931

● From 1925 to 1927 Atlanta's new car purchases were 60% equipped with “Tool Steel” gears and pinions.

Likewise many orders were placed for replacement gearing.

The long life of “Tool Steel” gears means low maintenance cost and less pull-ins, etc.

●
AS USUAL—in the last 10 years almost any classification of the Live Wires in the Industry, the Winners of Contests, the Men on important Rolling Stock Committees are predominantly “Tool Steel” gear users. In any discussion of gear quality “Tool Steel” is always considered the standard.

The Tool Steel Gear & Pinion Co.
CINCINNATI, OHIO



The Standard of Quality

TOOL-STEEL QUALITY
GEARS AND PINIONS

THE PEAK LOAD PROBLEM—

— is simplified; track capacity is increased by permitting higher car speeds and making closer meets possible; capacity of single track lines is increased; platform hours and other operating expenses are reduced by installing "Union" Automatic Signals.

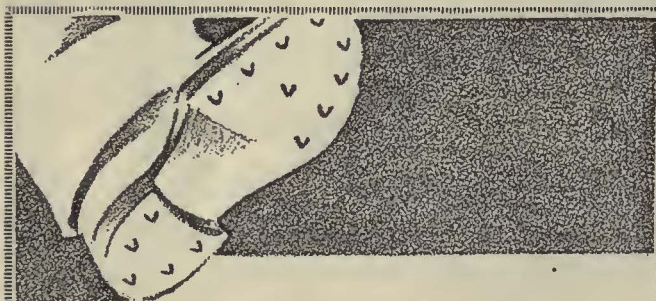
No obligation is incurred by consulting our experts on your traffic problems.



Union Switch & Signal Co.



SWISSVALE, PA.



TUCOLITH FLEXOLITH Long Wearing

Even the rough brogans of stamping workmen do not injure the hard, tough surface of Tucolith floors.

6 REASONS WHY

Tuolith is the popular flooring material for cars and busses.

- | | |
|---------------------|-------------------|
| 1. Long Life | 4. Fireproof |
| 2. Attractive | 5. Sound Deadence |
| 3. Non-Slip Surface | 6. Sanitary |

TUCO PRODUCTS CORP.
30 CHURCH ST., NEW YORK
PEOPLES GAS BLDG.
122 S. MICHIGAN AVE., CHICAGO

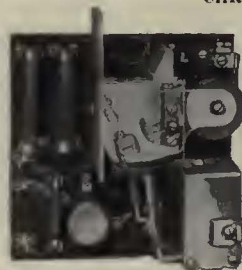


Car Heaters fitted with

ENCLOSED HEATING elements carry the Underwriters' Laboratories Label. They give 100% energy output for what you put in.



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UTILITY HEAT REGULATORS economize in current consumption.

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COMB VENTILATORS keep the air pure and wholesome.

RAILWAY UTILITY COMPANY

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J. H. DENTON, Eastern Mgr.
1328 Broadway, New York



THE OLD AND THE NEW

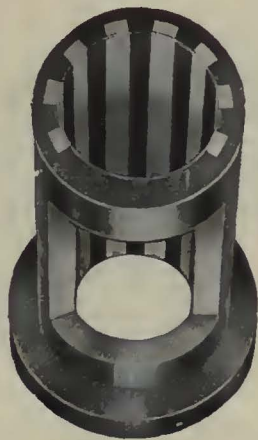
Time marches on—everything changes, and it is necessary to realize that traditional processes of the past become obsolete in the future.

Speed has cut down distances, but, as a consequence, many unforeseen operating problems have accompanied this marvelous development.

In the manufacture of Electric Motor Bronze Axle and Armature Bearings, Trolley Wheels and Harps, and Babbitt Metals, we have always made it a point to incorporate the last word in design and mechanical efficiency.

The "VIGNE" Bimetallic Armature Bearing, one of our latest developments, is the result of many years of study in search of an Armature Bearing that would give longer life for less money. You should be interested to know more about this Armature Bearing.

Descriptive booklet will be sent you upon request.



THE "VIGNE" BIMETALLIC ARMATURE BEARING

NATIONAL BEARING METALS CORP.
St. Louis, Mo.

New York, N. Y. Jersey City, N. J. Pittsburgh, Pa.
Meadville, Pa. Portsmouth, Va. St. Paul, Minn.

Illinois Resurfaces

63²³ MILES WITH BRICK



(Above) Completed brick resurfacing of worn concrete by Illinois State Highway Department on Route 4 south of Springfield. This gives the highest type highway at low cost.

(Inset) Worn slab being prepared for curb and brick resurfacing.

Photos by courtesy of Division of Highways, State of Illinois

ILLINOIS began a brilliant chapter in highway economy this year, by widening and resurfacing worn concrete roads with brick.

A total of 63.23 miles constituted the initial program.

Thus, slabs that have not too far approached the end of their usefulness are being saved for many years to come. *Brick* pavements built 30 and 40 years ago are in constant use today, although not nearly so well constructed as these Illinois brick resurfaced sections.

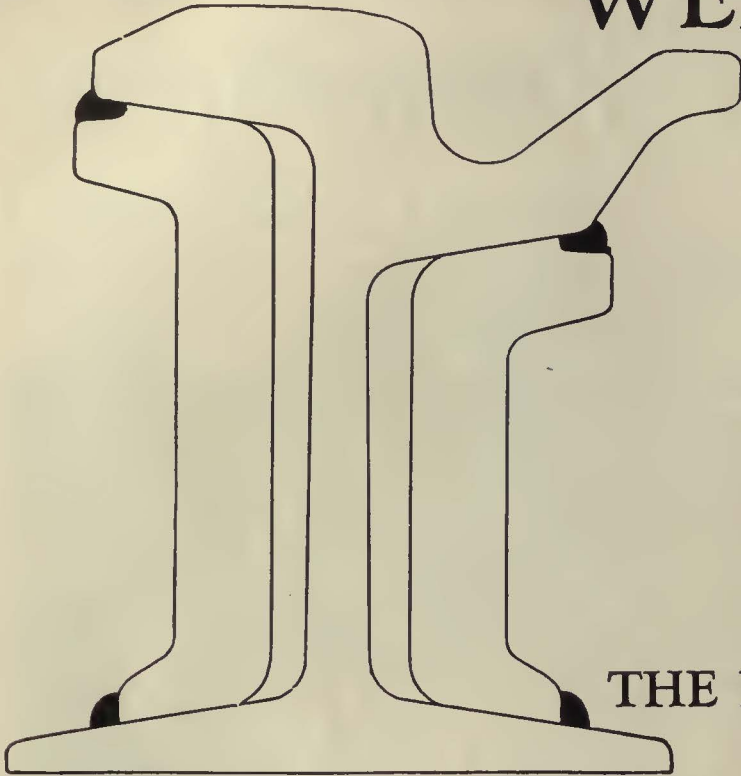
The economy and sound judgment in resurfacing with brick is apparent. The worn concrete—unsatisfactory as a pavement—will make a good base on a subgrade that has received its full settlement. Mastic cushion and bituminous filled brick surface prevent transmission of cracks. Weather and traffic will have no effect on the brick surface. The existing slab has been transformed into a low-maintenance road extraordinarily well suited to all traffic.

Highway engineers, officials and taxpayers will find much of interest in this Illinois work.

Further information on resurfacing with brick may be had by addressing the National Paving Brick Association, 1245 National Press Building, Washington, D. C.

“WELD PLATES”

For EFFICIENT, ECONOMICAL JOINTS



Do you believe in statistics? Rely on performance records? If so, the performance records of the many “Weld Plates” now in use will convince you that they lead the bar-weld joints in efficiency and economy.

“Weld Plates” represent the most modern welding practice. They are the strongest and most up-to-date plates rolled especially for electric welded joints. Note the shape—the grooves for retaining plenty of weld metal along the upper edges—the wide contact areas at top and bottom—the suitability for the use of short bolts.

A trial will convince you of their efficiency and economy.

THE RAIL JOINT COMPANY
165 Broadway, New York

STOP

Car Turns Right





That's the message flashed motorists by the Nachod Turn Right Signal . . . preventing serious side-swiping accidents . . . saving life and property. No law suits filed . . . no damages for the Railway Company to pay. Play safe. Install these ever vigilant automatic watchmen wherever street cars turn unexpectedly. Quotations Gladly Furnished on Request. Nachod & United States Signal Co., Inc., Louisville, Ky., Manufacturers of Block and Highway Crossing Signals.

NACHOD SIGNALS

“Spell Safety”

CHOSEN for PERFORMANCE

TROLLEY wheels are never chosen for looks, never selected because one kind costs a little more or less than another. They're chosen for performance. That's why

KALAMAZOO



trolley wheels and harps are the standard of comparison today. That's why many properties use them exclusively. There's a difference in trolley wheels. May we tell you about it?

THE STAR BRASS WORKS
KALAMAZOO, MICHIGAN



Maintenance awards are earned by a combination of personnel and equipment.

The American Brake Shoe and Foundry Co., and its associated companies extend their congratulations to The Georgia Power Company (Atlanta Division), and to its Officers and personnel—for winning the 1931 Maintenance Award of the Electric Railway Journal.



The American Brake Shoe and Foundry Company

230 Park Ave., New York
332 So. Michigan Ave., Chicago

Atlanta Division
Georgia Power Company
wins

MAINTENANCE CONTEST



. . . . and have used

PANTASOTE

and

AGASOTE

as their

STANDARD

for years

Again and again — for 34 years — Pantasote Products have proved their economy in maintenance.

The Georgia Power Company appreciated this fact when they standardized on Pantasote for curtains and Agasote for headlinings, keeping their maintenance costs on these items to zero.

Acceptance of Pantasote Products by this progressive operator, points to the maintenance economy which you, too, may achieve by standardizing on PANTASOTE and AGASOTE for your cars and buses.

THE PANTASOTE COMPANY, Inc.

250 Park Avenue, New York

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**A
Personal
Want—**

can invariably
be filled by
a friend.

The Searchlight Section

of this issue covers the current
business wants of the industries
in which this paper is read.

For Every Business Want
"Think SEARCHLIGHT First"

**A
Business
Want—**

must be satisfied
by someone in
your industry.

Introducing **ROLLER-SMITH**

Automatic Circuit Transfer Equipment ROLLER-SMITH offers a complete line of Air and Oil Circuit Breakers

for automatically transferring the load from the regular to the stand-by circuit in case of failure of the regular circuit—then back to the regular circuit, if desired.

The equipment is available in all ampere capacities, for all voltages and in all styles of trips and combinations.

both Air and Oil

Send us your specifications or, better still, get in touch with the R-S office nearest you. There is one in every principal City in the United States and Canada.

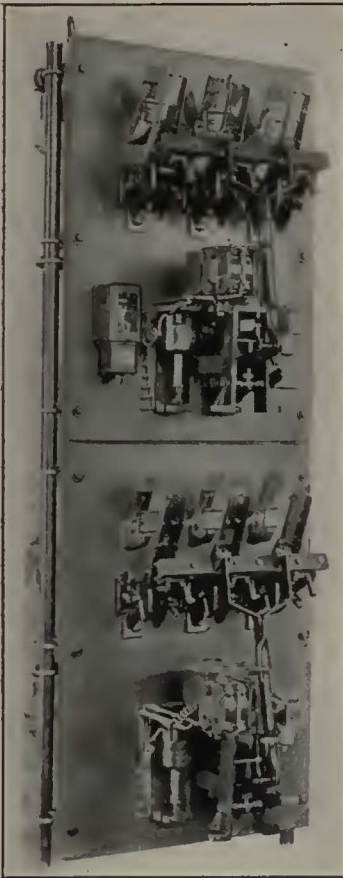
Roller-Smith Products: Instruments, indicating and graphic; Circuit Breakers, air and oil; Relays and Control Panels of all kinds for all purposes.

Forty years' experience is back of

ROLLER-SMITH COMPANY
Electrical Measuring and Protective Apparatus

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2140 Woolworth Bldg., NEW YORK

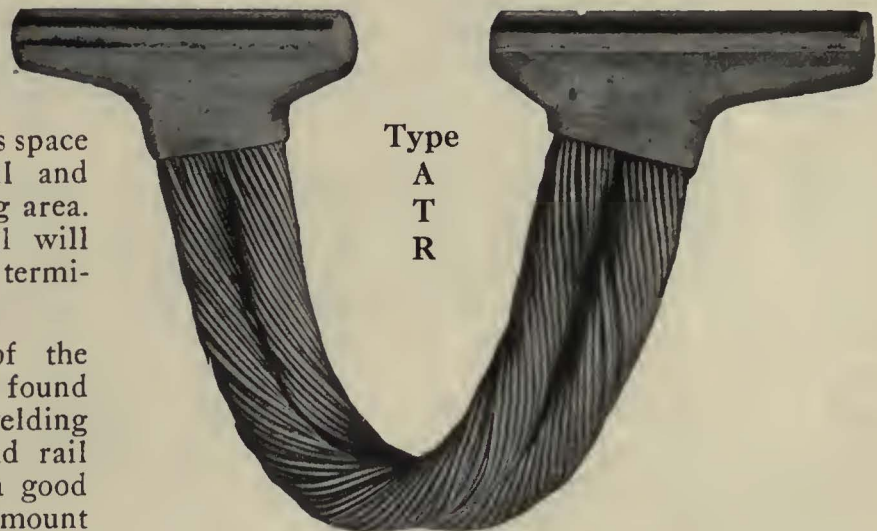
WORKS
Bethlehem, Penna.



INVESTIGATE the type ATR Steel Arc Weld bond. The round steel terminal occupies less space on the ball of the rail and still leaves ample welding area. Thus a badly worn rail will easily accommodate the terminals of this bond.

A further advantage of the round terminal design is found in application. The welding vee between terminal and rail makes it easy to secure a good sound weld with a small amount of weld metal. The short current path thru the weld metal to the rail introduces a minimum of weld metal resistance.

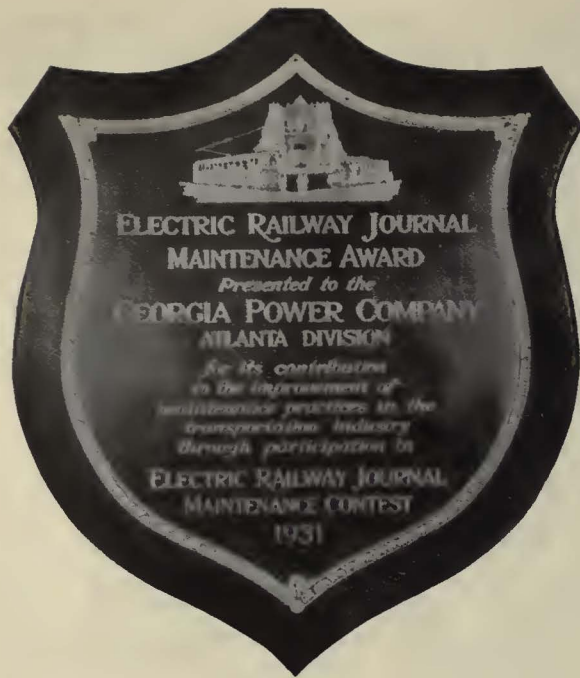
It costs less to bond than not to bond. Let us quote on your bonding requirements now. Address—



*If Your Rail is
Badly Worn*

The Electric Railway Improvement Co.

2070 E. 61st Place, Cleveland, Ohio



Winners of Maintenance Awards Use OAKITE

THE winner of this year's Electric Railway Journal Award . . . four out of five of the Bus Transportation Award Winners in 1930 . . . a majority of the winners of Bus Transportation Awards this year . . . use Oakite for maintenance cleaning.

All leaders in their respective fields, these winners . . . whose efficiency in maintenance work is generally recognized . . . have found that whether it is washing street cars or buses, cleaning motors, chassis, or repair parts, washing oil-soaked floors, Oakite materials offer the most dependable means of doing the work economically.

Have our nearby Service Man go over your cleaning operations with you. His suggestions should help you save money, time and effort wherever cleaning is concerned. You incur no obligation in availing yourself of his help. Write us today and we will have him call.

Oakite Service Men, cleaning specialists, are located in the leading industrial centers of the U. S. and Canada

Manufactured only by
OAKITE PRODUCTS, INC., 28B Thames Street, NEW YORK, N. Y.

OAKITE

TRADE MARK REG. U. S. PAT. OFF.

Industrial Cleaning Materials and Methods

ALPHABETICAL INDEX

This index is published as a convenience to the reader. Every care is taken to make it accurate, but *Electric Railway Journal* assumes no responsibility for errors or omissions.

	Page
Aluminum Co., of America	27
American Brake Shoe & Foundry Co.	47
American Car Co.	Third Cover
American Steel & Wire Co.	10
American Steel Foundries	15
Beeler Organization	48
Bibbins, J. Roland	48
Brill Co., The J. G.	Third Cover
Buchanan & Laying Corp.	48
Byllesby Eng. Manag. Corp.	48
Carnegie Steel Company	22
Collier, Inc., Barron G.	23
Consolidated Car Heating Co.	37
De Vilbiss Company, The	16
Electric Railway Improvement Co.	49
Electric Service Supplies Co.	7
Electric Storage Battery Co.	25
Fargo Motor Corp.	Front Cover
General Electric Co.	8-36
General Motors Truck Co.	Insert 17-20
Globe Ticket Co.	39
Goodyear Tire & Rubber Co.	11
Haskelite Mfg. Co.	41
Hemphill & Wells	48
Jackson Lumber Co.	42
Jackson, Walter	48
Johns-Manville	26
Kelker, Jr., R. F.	48
Kuhlman Car Co.	Third Cover
McGraw-Hill Book Co., Inc.	42
Metal & Thermit Corp.	34-35
Nachod and U. S. Signal Co.	46
National Bearing Metals Corp.	45
National Brake Co., Inc.	9
National Paving Brick Ass'n	45
National Pneumatic Co.	5
Ohio Brass Co.	6
Oakite Products, Inc.	50
Pantasote Co., Inc., The	47
Rail Joint Company, The	46
Railway Track-work Co.	14
Railway Utility Co.	44
Reo Motor Car Co.	30
Richey, Albert	48
Roller-Smith Company	49
Russell, Burdsall & Ward Bolt & Nut Co.	33
Safety Car Devices Co.	40
Searchlight Section	51
SKF Industries, Inc.	24
Standard Oil Co., (Indiana)	21-31
Standard Oil Co. of New York	52
Standard Steel Works Co.	13
Star Brass Works, The	46
Texas Co., The	12
Timken Detroit Axle Co.	Back Cover
Tool Steel Gear & Pinion Co.	43
Tuco Products Corp.	44
Union Metal Mfg. Co., The	32
Union Switch & Signal Co.	44
Wason Mfg. Corp.	Third Cover
Westinghouse Elec. & Mfg. Co.	Second Cover
Westinghouse Traction Brake Co.	4
Wish Service, The P. Edw.	48
Yellow Coach	Insert 17-20

Searchlight Section—Classified Advertising

EQUIPMENT (Used, etc.)	
Perry, Buxton, Doane Co.	51

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 Positions Wanted, 5 cents a word, minimum \$1.00 an insertion, payables in advance.
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Let us handle this for you. We specialize in buying and dismantling entire railroads, street railways, industrial and public service properties which have ceased operation. We furnish expert appraisals on all such properties.

Consult us also about New and Relaying Rails—all weights and sections. You will like our service.

The Perry, Buxton, Doane Company

(Capital \$1,000,000.00)

Boston Office, P. O. Box 5253, Boston, Mass.
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EQUIPMENT of the latest type is frequently advertised for resale in the *Searchlight Section*. Don't let a limited budget stop you from buying modern cars, or equipment that will cut costs or improve your service. Modernize your lines throughout *now* by buying wisely from these equipment bargains.

Stretch your Budget
 To Speed Production

LEGAL NOTICE

STATEMENT OF THE OWNERSHIP, MANAOEMENT, CIRCULATION, ETC., REQUIRED BY THE ACT OF CONGRESS OF AUGUST 24, 1912

Of Electric Railway Journal, published monthly at New York, N. Y., for October 1, 1931.

County of New York } ss.
 State of New York }

Before me, a Notary Public in and for the State and county aforesaid, personally appeared C. H. Thompson, who, having been duly sworn according to law, deposea and says that he is the Secretary of the McGraw-Hill Publishing Company, Inc., publishers of Electric Railway Journal, and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management (and if a daily paper, the circulation), etc., of the aforesaid publication for the date shown in the above caption, required by the Act of August 24, 1912, embodied in section 411, Postal Laws and Regulations, printed on the reverse of this form, to wit:

1. That the names and addresses of the publisher, editor, managing editor, and business managers are: Publisher, McGraw-Hill Publishing Company, Inc., 10th Ave. & 36th St., N. Y. C. Editor, John A. Miller, 10th Ave. & 36th St., N. Y. C. Managing Editor, None. Business Manager, Louis F. Stoll, 10th Ave. & 36th St., N. Y. C.

2. That the owner is: (If owned by a corporation, its name and address must be stated and also immediately thereunder the names and addresses of stockholders owning or holding one per cent or more of total amount of stock. If not owned by a corporation, the names and addresses of the individual owners must be given. If owned by a firm, company, or other unincorporated concern, its name and address, as well as those of each individual member, must be given.) McGraw-Hill Publishing Company, Inc., 10th Ave. & 36th St., N. Y. C. Stockholders of which are: James H. McGraw, 10th Ave. & 36th St., N. Y. C. James H. McGraw, Jr., 10th Ave. & 36th St., N. Y. C. James H. McGraw, James H. McGraw, Jr and Malcolm Muir, 10th Ave. & 36th St., N. Y. C., Trustees for: Harold W. McGraw, James H. McGraw, Jr., Donald C. McGraw, Curtis W. McGraw, Curtis W. McGraw, 379 Seventh Ave., N. Y. C. Donald C. McGraw, 10th Ave. & 36th St., N. Y. C. Harold W. McGraw, 285 Madison Avenue, N. Y. C. Anne Hugua Britton, 10th Ave. & 36th St., N. Y. C. Mason Britton, 10th Ave. & 36th St., N. Y. C. Edgar Kobak, 10th Ave. & 36th St., N. Y. C. Grace W. Mehren, 2440 Lakeview Ave., Chicago, Ill. J. Malcolm Muir & Guaranty Trust Co. of New York, Trustees for Lida Kelly Muir, 524 Fifth Ave., N. Y. C. F. S. Weatherly, 271 Clinton Road, Brookline, Mass. Midwood Corporation, Madison, N. J., Stockholders of which are: Edwin S. Wilsey, Madison, N. J. Elsa M. Wilsey, Madison, N. J.

3. That the known bondholders, mortgagees, and other security holders owning or holding 1 per cent or more of total amount of bonds, mortgages, or other securities are: (If there are none, so state.) None.

4. That the two paragraphs next above, giving the names of the owners, stockholders, and security holders, if any, contain not only the list of stockholders and security holders as they appear upon the books of the company but also, in cases where the stockholder or security holder appears upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting, is given; also that the said two paragraphs contain statements embracing affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner; and this affiant has no reason to believe that any other person, association, or corporation has any interest direct or indirect in the said stock, bonds, or other securities than as so stated by him.

5. That the average number of copies of each issue of this publication sold or distributed, through the mails or otherwise, to paid subscribers during the six months preceding the date shown above is (This information is required from daily publications only.)

C. H. THOMPSON, Secretary.

McGRAW-HILL PUBLISHING COMPANY, INC.
 Sworn to and subscribed before me this 28th day of September, 1931.

[SEAL]

H. E. BEIRNE,

Notary Public N. Y. Co. Clk's No. 203, Reg. No. 3B102. Kings Co. Clk's No. 636, Reg. No. 3129.

(My Commission expires March 30, 1933)

“Winter-Proof” your bus fleet...

with the new SOCONY 7-POINT SERVICE



What the NEW
Socony 7-Point
Service is and how it win-
ter-proofs your bus fleet

1. **Socony Auto Radiator Cleaner**—To get full protection from anti-freeze, first you need a proved radiator cleaner, such as Socony, to remove rust and scale from cooling system. It's WINTER-PROOF.
2. **Socony Upperlub Oil**—Four ounces of prevention against WEAR, NOISE, CARBON and STICKY VALVES. Added to gasoline, it aids quick starting—lubricates parts difficult to reach by motor oil. It's WINTER-PROOF.
3. **Socony Winter Gear Lubricants**—For easy gear shifting in cold weather you must have a lighter-grade gear lubricant. Socony has a complete new line of lubricants for winter use. They're WINTER-PROOF.
4. **Socony Quick-starting Gasolines**—For quickest starting, choose either of Socony's two great gasolines: Special plus Ethyl, best premium gasoline; or Banner, best popular-priced gasoline. Both are WINTER-PROOF.
5. **Socony De-waxed Motor Oil**—A completely de-waxed motor oil! Lubricates instantly—in sub-zero weather! It's WINTER-PROOF.
6. **Socony Lubrication**—To withstand the brunt of winter, your buses must be lubricated *correctly* at every point. The Socony man doesn't miss—doesn't guess! He covers every point with the right lubricant.
7. **Anti-Freeze Protection**—And don't forget the winter preparation of your bus fleet is not complete without anti-freeze. Your Socony man supplies this "winter-proof" protection. Get it today!

Winter will get you IF YOU DON'T LOOK OUT! So groom up your buses TODAY...and feel sure—BE sure—of “summer performance” all the cold winter long! Socony offers a brand-new, thorough winter-maintenance service that makes your buses *fit* for the toughest, roughest cold-weather driving conditions. It's called “SOCONY 7-POINT SERVICE.” It *winter-proofs* a bus from stem to stern. • Study the seven points outlined in the left-hand column. These are the things a bus needs if you want to get better performance this winter. A Socony man can give the complete 7-Point Service in just a few minutes' time. • Stop in—TODAY—at any convenient Socony dealer, garage or service station. Get this new and thorough SOCONY 7-POINT SERVICE. Winter-proof your bus fleet NOW...and save money!

STANDARD OIL COMPANY OF NEW YORK, INC.