

ELECTRIC RAILWAY JOURNAL

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Scullin

New Equipment for Rail

A.E.R.A. Annou

News of the I



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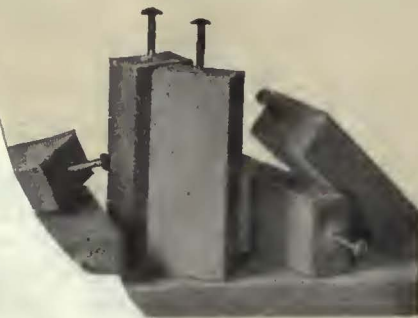
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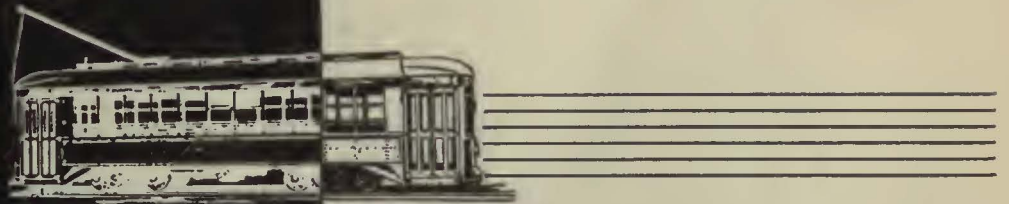
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AGENTS

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AND SO CHRISTCHURCH

Adopts the Trolley Bus



A portion of the overhead trolley bus system at Christchurch showing the wide use of O-B line material. O-B crossovers, insulators, spring-lock hangers, and Marathon Ears figure prominently in the construction.

THE Christchurch (New Zealand) Tramway Board recently was faced with the problem of worn out track on a seven-mile, money-losing line. Investigations led to the conclusion that a trolley bus system would not only cost less to install, but what was equally important, would regain enough lost patronage to make the line pay.

Consequently, seven route miles of overhead were constructed or adapted to trolley bus operation, and six new 70 h.p. buses were ordered. The material for the overhead included O-B mechanical switching frogs, mechanical crossovers, fixed crossovers, insulated approaches, insulated crossovers, spring-lock hangers, and Marathon Ears. The bus equipment included O-B retrievers for all buses, and O-B six-spring trolley bases, together with O-B swivel harps, are being installed for trial.

Three buses are in operation at the present time and their great popularity with the public assures the success of the line with the full schedule in operation. The general public is not slow to appreciate the speed which is maintained by the buses, and enthusiastic comments have been made on their quietness, smooth acceleration, cleanliness, and curb loading.

There is no question about the popularity of the trolley bus with the riding public. Where there has been opportunity to experience its admirable performance and riding qualities, approval has been indicated, not in idle, meaningless words, but in the most convincing of all manners—by an increase in profitable revenue.



These modern trolley buses are equipped with O-B retrievers which protect the overhead in event of dewirements.



The quietness, rapid and smooth acceleration, cleanliness, and curb loading of these trolley buses have led to increased patronage on this line.



YOU GET PAID *for Using this Wheel*

HOW would you like to add the receipts from 758 extra passengers per car to your yearly revenue? A large eastern property has accomplished the equivalent of securing 759,936 extra fares by replacing old style wheels with 20,000-mile O-B Wheels. This means a saving of \$3,799 yearly on one thousand wheels, or \$3.79 per wheel.

If \$3.79 net profit per car seems insignificant, estimate how many passengers it is necessary to haul in order to earn a like amount. On the basis of eight cent fares and 6¼% earnings, you get paid an increase equal to the profit from 758 fares.

Many companies are finding it highly profitable to make an immediate and complete change to O-B Wheels. Others find it no less desirable to make the transition by divisions. In this manner, the charge is made against maintenance, because the old type wheels are replaced as worn out.

Whichever method is best suited to your particular circumstances, any device that will effect savings equal to the profits from 758 extra passengers per car is especially valuable at this time. And, according to the records, O-B Wheels are doing such things on a number of properties.



O-B Wheels eliminate this job and make the man available for other work.



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Now is the Time to prepare buses for winter service

SUMMER is almost over, and you know how soon winter rolls around. Passengers are getting more and more "choosy" about their transportation. It is vitally necessary to make your buses comfortable, and that means warmth and plenty of fresh air. The new Mueller-Evans Heating and Ventilating System does just that. It has these exclusive advantages:

Combining extreme simplicity with perfect heating and ventilating efficiency, this new system is gaining rapid recognition. It is economical. It can be installed by unskilled workmen in a few hours. It provides the same quality of heating and ventilating found in modern office buildings. It has no rotating parts, no electrical connections, and costs nothing to operate!

A Summary of Features

- | | |
|---|--|
| 1.
Perfect ventilation based on modern school and public building standards. | 3.
Eliminates all gas and other odors. |
| 2.
Temperature of 60° easily maintained in zero weather. | 4.
There are no drafts as air is introduced at a temperature close to that of the human body. |

- | | |
|--|---|
| 5.
Cold drafts from window cracks are prevented as the air current is reversed. | 14.
Definite saving in gasoline by reason of normal motor operating temperature. |
| 6.
Aisleways are kept drier. | 15.
Occupies no salable space in the vehicle. |
| 7.
Uniform temperature throughout the vehicle. | 16.
No rotating parts to wear out. |
| 8.
Easy control of heat supply. | 17.
Accessible and quickly removable. |
| 9.
Absolute elimination of gas hazard and fire hazard. | 18.
Interferes in no way with motor operation. |
| 10.
Windows kept free of frost. | 19.
No pipes or joints to corrode or leak. |
| 11.
Drivers are less subject to fatigue under healthful working conditions. | 20.
The system is compact and under easy observation of the mechanic. |
| 12.
Simple to install. | 21.
Warm, odorless buses have a decided revenue producing value. |
| 13.
Low cost and no cost to operate. | |

Install the Mueller-Evans Heating and Ventilating System

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Why Dallas approves N. P. Treadles for One-man operation



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75 miles an hour

in comfort and safety with G-E equipped cars

LAST year, the Cincinnati and Lake Erie Railroad installed ten luxurious high-speed interurban cars equipped with GE-706 (100-hp.) motors, G-E air compressors, G-E magnetic track brakes, and G-E Type PC control. Their success led to the installation of 35 similar equipments by the Indiana Railroad (Indianapolis), including GE-706 motors and G-E magnetic track brakes.

Further evidence that this type of equipment has established a new standard of interurban service is the recent purchase of ten high-speed cars by the Philadelphia and Western Railroad — equipped with GE-706 motors, G-E compressors, and G-E Type PC control.

One of the Philadelphia and Western cars is on exhibit at the A. E. R. A. Convention. Be sure to see it. Then ask our representative for complete information.



*Smoking compartment in
Indiana Railroad car*



*One of ten G-E equipped cars of
Cincinnati and Lake Erie Railroad*

*One of thirty-five G-E equipped cars
of Indiana Railroad*



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GENERAL  ELECTRIC
TRANSPORTATION EQUIPMENT

ELECTRIC RAILWAY JOURNAL

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Consolidation of
Street Railway Journal and Electric Railway Review
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Volume 75
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JOHN A. MILLER, JR., Editor

Belated Opposition at Chicago

WITH developments looking toward the consolidation of the surface railways and the elevated lines in Chicago into a unified system approaching a climax by the removal of the last of the court actions incident to the carrying out of the plan, it is particularly unfortunate that a group of security holders have at last come to the conclusion that they should not participate in the consolidation on a basis that they consider unfair to themselves. It seems unlikely, of course, that this element of discord will receive recognition that will delay final consummation of the plan, but that possibility is always inherent in actions of this kind.

To impute selfish motives to this element is beside the point. Its own attitude is that "even if the legal basis of the proposed plan of consolidation is adjudged sound, the plan should be rejected because of its unfairness and financial defects." Yet the consolidation plan was not declared operative until April 1 last after 90 per cent of the securities had been deposited. Another criticism, leveled by the dissenters, is that after the plan was declared operative, it was found necessary to test its legal basis in the courts. To others it would seem that this was an expedient intended as a safeguard.

Evidently the dissenters have in mind the proceedings to test the validity of the terminable permit, to determine whether or not the Chicago Local Transportation Company, formed to take over the surface and the elevated lines, is, in fact, a corporation, and whether the amendment to the Railroad Act, passed by the Legislature as part of the co-ordination legislation, will permit stockholders of the elevated lines to sell their property to the new company.

A vast amount of work has gone into the Chicago negotiation. Many interests had to be mollified. Enabling legislation had to be secured. Much time necessarily was consumed in arranging all these things. Even if the matter had been one of mere barter and trade between corporations not subject to political considerations and the influence of regulatory bodies, the negotiations for a consolidation such as that at Chicago could not have been concluded quickly. They never are, even where the corporations are going concerns not subject to public influence.

So a display of impatience at the belated move recently recorded is only natural. The transportation program at Chicago has probably come closer to general approval than any other major civic undertaking in the last 40 years of Chicago's advancement. It is unthinkable at this late hour that any development of the kind now under way should be permitted to interfere with the orderly consummation of the consolidation. As a matter of fact, as one of the disinterested advocates of unification said recently, it would, indeed, amount to a municipal calamity if the transportation program should now be unnecessarily delayed.

Reflections of Aroused Civic Consciousness

SOME measure of satisfaction for the electric railways is to be found in the favorable reactions reflected in the recent Winnipeg and Portland reports showing a disposition to a greater acceptance by the representatives of these communities of their obligations to the transportation companies. True, the suggestions have yet to take tangible form, but they show that the efforts which the companies in these cities have been making are beginning to bring results. The calf does not thrive that is fed on skimmed milk, nor does the city thrive that stands aside and permits its mass transportation agency to become undernourished on the fodder of inadequate income.

It seems strange that city officials, callous to the need for preserving the mass transportation agencies, go right ahead spending money lavishly for improvements that benefit the automobile user. Requirements of cities impose a tremendous burden on the mass transportation companies, particularly for equipment for peak riding—equipment far in excess of that required for the off-peak loads. Business men and the members of the municipal governing bodies give little or no thought to the problem thus created. Failing the retention of mass transportation upon a basis that provides for successful operation under private auspices, however, the prospect that confronts the cities is a direct subsidy or municipal ownership and operation. A city of any size without

a public transportation system is something to ponder. But it would be better to ponder it as an eventual possibility than to have to try to cope with it as a fact.

To recapitulate the points made in the Portland and the Winnipeg pronouncements is not necessary. They do, however, show enlightened approach on the part of public bodies to the problems of the railways and recognize the discriminations that are part of the load laid on their backs. The reports reiterate some of the ideas expressed by Mr. Sisson in his recent article in this paper, but they hold out the hope that the point of view stressed in the editorial, "Bringing Order Out of Chaos," in the JOURNAL for August, are gradually coming to be accepted.



Stay-at-Homes Will Miss a \$1,000,000 Display

EXPENDITURES totaling a large amount of money will be made during the next few weeks by the manufacturers of electric railway equipment in preparing the great exhibit of apparatus and appliances to be shown at the fiftieth annual convention of the American Electric Railway Association at Atlantic City. Everything indicates that this will be one of the best exhibits ever presented at an electric railway convention. Holding the annual convention at San Francisco last year resulted in an excellent meeting, but it was impossible for the manufacturers to have an exhibit. The 1931 exhibit, therefore, offers an opportunity for the delegates to view the progress of two years in apparatus and equipment design. Not only will there be an elaborate display in the convention hall, but there will also be a unique outdoor exhibit of various types of vehicles used in a modern system of co-ordinated transport. It will consist of ten individual units including a high-speed interurban car, large city street car, medium-size city street car, two trolley buses, four gasoline buses, all of varying capacities, and a taxicab. This exhibit will be on the Boardwalk throughout the week.

Electric railway executives have a real responsibility to see that full advantage is taken of what the manufacturers are doing in presenting the exhibit this year. The value of the exhibit will be lost if operating men are not in attendance in large numbers. While everyone recognizes the necessity to exercise all reasonable economies in this time of business depression, the money spent to send a substantial quota of operating men to the convention will undoubtedly be more than justified by what they will learn there.

It is of inestimable value to the industry that there be this periodic presentation of equipment and appliances. A similar display cannot be seen in any single manufacturer's show rooms, nor can it be carried around and shown in the various cities where the operating companies are located. It can be seen only at the Atlantic City convention. Men from all departments should be sent to observe and study it. Not only does the effort

of the manufacturers deserve this recognition, but the welfare of the operating companies requires that full advantage be taken of this unique opportunity to see and learn about the latest developments in transportation equipment.



A Tract on Courage

PULSES are quickened by the contents of annual reports such as that just made by the Cincinnati & Lake Erie Railroad. It is a document redolent not only of the work which that road is doing in a field beset with adverse conditions, but indirectly reminiscent of the similar work which the Interstate, the South Shore, the North Shore, the Milwaukee Electric, the Indiana Railroad, and others, have done and are doing.

There is no whining in the report. There might be real justification for complaint even for self-commiseration, but the management is not of that kidney. It is alert. It is alive and the report reflects that attitude. It tells the story of what the new cars are accomplishing, how freight traffic has been built up, how store-door pick-up and delivery service has been developed, how attractive passenger fares have stimulated business, how bus and rail have been effectively co-ordinated, how one-man car operation has been made successful in interurban service. In a sense, it might be said that the report is a tract on successful merchandising. It is also a tract on courage.

The document is significant not only on the score of what it tells, but also on the score of what it implies. It calls to mind the fact that not so long ago the now successful South Shore Line was not much more than a streak of rust in an industrial oasis. And it portends similar success for the Indiana Railroad under progressive management. On the other hand, the encouraging nature of this report emphasizes by contrast the sad fate that has overtaken some other roads similar in character, notably, the interurbans in central New York. To mention them is to lament their passing. That the methods followed by the roads in the Central West and by numerous others would have saved those in New York State may or may not be true, but at least the contrast in spirit and method provokes reflection.

It is begging the question to say that in many instances the effort to preserve roads of this kind is out of proportion to the possible reward that might follow the task of preserving them. Customs change, the state often is remiss in meeting its obligations to its own corporate creatures, there is unfairness everywhere. To deny these things is to evade evident facts. Changed economic conditions have put the interurban to a severe test. There would appear to be little hope for roads of this kind under direction that is not aggressive, progressive and fearless. But where vision and courage have been displayed in the management of these roads they have survived and are doing well.

Time to Burn the Old Books

LACK of progressiveness among the Chinese has been attributable in large measure to the teachings of Confucius, who placed great emphasis on ancestor worship. Any attempt to do something in a new or better way has been considered a reflection on one's forbears. If the old way was good enough for them, no one with a proper feeling of respect for his ancestors would try to change it. Realizing that this stifled progress and development, the Emperor Chin Hwang-Ti once endeavored, by burning all the old books upon which he could lay his hands, to turn the eyes of his people forward. In this he was only partially successful, but at least he deserves credit for making a valiant effort to strike off the shackles of tradition.

Perhaps no industry has suffered more than the electric railways through firm adherence to tradition. Attempts to do things in new ways have met with opposition on the ground that the established practice was good enough in the old days and consequently is good enough now. In reality the reverse is true. A considerable amount of business has been lost to competitive forms of transportation. It will never be regained by running the same old cars in the same old way. It can be regained only by the application of new methods. The industry must find a way to produce a product that appeals to the public, and a way to sell that product. Vigorous efforts to do this are being made on many properties. New methods, however, continue to meet opposition because they are contrary to established practice. It would seem that the time has come for the industry to follow the example of Chin Hwang-Ti in burning the old books.

No Room for Micawbers

FAR too often railway managements, particularly on the smaller properties, take a defeatist attitude, accentuated by the current business depression. New cars, new tracks, are fine, say they, but where will the money come from? Still others await the perfection of new devices before they are ready to recommend the expenditure of large sums. Micawber-like, they are waiting for something to turn up that will stem the tide and swing them from adversity to prosperity. Experience has shown that the purchase of new equipment at considerable cost—planned and executed by an able management—often will make a decided difference in the fortunes of a property. But how can a management, that for years has failed to exhibit more than the most mediocre attainments, prove to its bankers that it will be able to spend wisely and obtain the anticipated results, should it get ample funds?

Plenty of possibilities exist for improvements in service without any capital. Frequently the adoption of a better maintenance policy will do wonders. The poorest

repair usually is the most expensive. Records of many companies prove that. Instead of spreading the maintenance money out thin all over the property, concentration on the most-used track and the most active equipment frequently will prevent failures on the road and eventually put all the property in better repair, as well as saving money. What is more, it will permit the transportation department to improve schedules and give a more reliable service. Here again is a real cash saving. Even in these days of intensive competition, better service will soon bring increased revenue. And finally, the better financial showing that is almost certain to be made is the most convincing argument to the board of directors that there really are possibilities for making money, and that the investment of new capital is justified.

Increasing Interest in the Trolley Bus

WHILE activities in the transportation field have kept abreast of business in general, few startling developments have taken place so far in 1931. On this account, it is particularly worthy of note that interest in the trolley bus, as evidenced by announcements of actual and proposed installations, has definitely increased.

Chicago started the ball rolling early in the year by accepting four trolley buses, received for trial in 1930, and by purchasing 25 additional vehicles. This was followed by reports from six electric railways that new installations will be made definitely this year. Peoria has ordered five vehicles and expects to inaugurate its service in September, while Memphis plans to open its 9.9-mile line with nine trolley buses about the middle of October. Following a trial operation of one vehicle for several months, Shreveport obtained permission to install a permanent system from the citizens who voted five to one in favor of the proposal at a special election. Service will be started early in November with five trolley buses. About the same time, Providencet expects to inaugurate a system with four vehicles. The largest of the new installations will be made in Kenosha, where the entire street car and bus system will be replaced with 22 trolley buses. It is expected that the opening ceremonies for this important changeover will be held near the close of the year. Duluth is the sixth city with definite plans. It has ordered two vehicles for a trial line.

In addition to this activity, it is known that seven other electric railways have decided to install trolley buses and expect to make formal announcements in the near future. A total of 25 other companies are seriously contemplating installations. The twelve railways, now operating 207 vehicles, have proved that the trolley bus has an extensive field of usefulness. As the present systems expand and new installations are made, an even clearer concept of its proper place in the transportation field will be obtained.

Government in Business

Is Disastrous Business

By JOHN SPARGO

Regardless of the degree of technical proficiency that may sometimes be attained, municipal ownership and operation of transportation systems has serious disadvantages

BELIEF in government ownership and operation of industry as a panacea for the social and economic ills of society is widespread and deeply rooted. Having held that belief during many years and turned from it in the conviction that, at its very best, the panacea is the fecund breeder of ills worse than any of the ills it is designed to cure, or than all of them combined, I desire to set forth, in a spirit of cheerful good temper, some of the reasons which led to that radical change of opinion and faith.

During many years I was an ardent advocate of the socialist philosophy and program, including government ownership and operation of industry. That chapter in my life I do not seek to hide, neither do I offer any apology for it. On the whole, I am inclined to approve the cynical observation made by an English philosopher, many years ago: "Not to be a socialist at twenty means that something is wrong with the heart, to be one at fifty means that something is wrong with the head."

My present belief is that every extension of the powers and functions of government is to be feared and should be stoutly resisted by all who believe in real liberty. There is no greater danger than that resulting from the continual expansion of governmental functions and powers. It is better to be free men in an imperfectly organized state, progressing with many a stumble, than to be serfs in a perfectly organized Utopia. Better a crust and herbs with freedom than luxury without it. The tendency of government everywhere is to encroach upon the freedom of the individual man and to narrow the area of his self-expression. That, in the long run, this tendency must have a disastrous effect upon mankind and result in a serious retardation of human progress seems to me to be one of the things concerning which we may feel assured beyond any doubt. Paternalism undermines the competence of its subjects to cope with the inexorable realities of social evolution.

Our Federal and State governments tend, in constantly increasing measure, to stifle the enterprise of their citizens, and that, in my judgment, cannot fail

to retard and limit progress. Quite irrespective of the much controverted question whether government is not by its nature unfitted for the task of conducting industrial enterprises efficiently over any reasonably long period of time, there is a larger and even more serious problem to be considered, namely, the problem of the evil effects upon the body politic and social when the government, through competition with its citizens—competition that is necessarily and inevitably unfair—in the most profitable areas of economic enterprise, discourages the initiative and enterprise of those citizens either individually or collectively in voluntary groups. Precisely as a state which, like the present Soviet State of Russia, controls and directs the press, radio and other major agencies for the dissemination of information and ideas effectually checks independent thinking and so induces intellectual paralysis, so a state which controls and directs the principal economic activities of its people checks independent enterprise and thereby induces a paralysis of initiative and effort. That is the greatest evil of all.

Broadly speaking, there are three quite distinct views of government enterprise in industry. At one extreme there are the communists and socialists, whose ideal comprehends a glorification of the state. That ideal embraces a social economy based upon government ownership and operation of all industry with a corresponding state monopoly of distribution. To this group, however stoutly it may contend that state enterprise is equal to or superior to voluntary enterprise, the question of efficiency is, in the last analysis, irrelevant and inconsequential. No demonstration of the superiority of the voluntary enterprise of individuals would lessen the faith in government enterprise held by every communist and socialist. At the other extreme there are those who believe that the voluntary enterprise of citizens in their private capacity, acting either singly or in groups, because of the social relations which it entails is vastly better than government enterprise, even if and when the latter is as efficient, technically, as the best voluntary enterprise. They hold that government charged with the organization and maintenance of the economic life of the nation in addition to the historic functions of maintaining order must of necessity develop an intolerable despotism. The despotism may be benevolent in its character, a paternalistic system, or it may be severe and brutal like the system in vogue in

Russia today. No amount of benevolent paternalism can reconcile this group to government ownership and operation of any essential industry.

Between the two groups named there stands a third group, much larger than either of the others, and possibly larger than both of them combined, composed of people who are little or not at all interested in the contention of opposing principles. They are little or not at all interested in questions of philosophy. Speculations and arguments concerning the probable or possible effects of opposing principles upon the course of social evolution do not interest them to any extent that matters. They are indifferent to labels and tags, and to the abstract principles which the labels and tags connote. They are interested only in results. What they want to know is whether municipal ownership and operation of important public utilities will give them any immediate advantage, either in lowered rates or improved service. Thus we find many an industrialist, who would be horrified if it were proposed that the municipality to which he belongs should start a factory in opposition to him and drive him out of business, quite illogically and inconsistently favoring municipal ownership and operation of the rapid transit system, electric power and light service, the telephone system, and so on and so forth. However regrettable we may regard this fact, it is a fact and it is the most important and vital fact of all.

Belonging as I now do to the second group, believing fully that the highest level of social well-being and the most satisfactory rate and manner of human progress will result from what I have elsewhere called "socialized individualism," I am not especially concerned here and now with the first of the three groups under discussion. I am concerned with the last-named group, the indifferent group, which by reason of its numerical strength is politically of the greatest importance. For the sake of this discussion, then, I am willing to have the whole matter of social philosophy excluded and to confine myself to the practical utilitarian question, which gives the best results, here and now—government enterprise, municipal state or federal, as the case may be, or voluntary private enterprise subject to proper social regulation. In other words, taking our public utilities one after another and giving due and proper weight to all the available evidence, must we conclude that government enterprise gives better results than voluntary private enterprise? Does it give better service at equal cost or lower leaving a margin of advantage either of greater cheapness or superiority of service? If the answer is in the affirmative then, while personally holding and contending that the principle is wrong, I am quite ready to concede the strength of the case for government enterprise and have no quarrel with those who decide to give it their support.

It is of the utmost importance, however, that all known and pertinent facts must be taken into account and fairly and honestly evaluated. Take, for example, the application of the principle of municipal ownership and operation to electric railway transportation, the subject in which the readers of this magazine are most interested and concerning which they may be presumed to know most. It need hardly be said here that there is nothing in the business of running an electric railway which cannot be successfully carried on by a municipal government. Numerous cities, both in this country and in all parts of the world, own and operate their



John Spargo

WRITER, author and lecturer, John Spargo was born in Cornwall, England, in 1876. He was educated in the English public schools, supplementing this formal training with extension courses in Cambridge and Oxford Universities. He became interested in the socialist cause in England, and for some years after coming to this country, in 1901, he was prominently identified with that movement, but withdrew from the party in 1917. He is the author of many books, particularly on social and economic questions. For that reason his views on the disadvantages of governmental participation in industry are of special interest.

transportation systems, including both surface and sub-way lines. Many of these systems are operated as efficiently, on the technical side, as the best systems operated by voluntary enterprise in cities of similar size and possessing fairly comparable conditions. So much may be freely admitted. On the other hand, it is equally true that none of the innumerable surveys that has yet been made has shown the slightest balance of advantage on the side of government enterprise when the comparison with private enterprise was fairly made.

In the 40 years that this subject has held my interest and attention I have examined hundreds of reports of municipally owned transit systems in many parts of the world. I have observed the actual working of many of them and compared them with the working of privately owned and operated systems in the same countries under conditions as nearly equal as possible. Not only do I not know of a single instance in which there was a definite balance of advantage on the side of the municipally owned system, but I am quite certain that as a whole the municipally owned and operated systems

were inferior, in some important respect, to the privately owned and operated systems of the same class. Differences in the quality of service, the relative merits of technical management, do not appear in financial reports and are not easily discovered by casual observation. A comparison of systems upon this ground would require technical knowledge to which I make no pretense. It is wholly different, however, with financial management. Here the data can be evaluated and judged by one who knows nothing of the technical side of street railway operation. Paradoxically enough, however, it is precisely at this point, where lay understanding is most easily possible, that the greatest confusion and misunderstanding arises. It is the old story of the ease of manipulating statistical data.

A municipally owned local transit system is compared with a privately owned system in another city of approximately equal size and having general conditions as nearly equal as can be. Upon the face of the reports the municipal enterprise appears to be more economically operated than the other. Assuming the actual quality of the service rendered to be equal—cars quite as good, schedules quite as convenient, and all the rest of it—there is an apparent superiority to be credited to the municipal enterprise. Digging below the surface a bit one discovers that there are important items not disclosed on the face of the reports. For example, in the case of the privately owned and operated system the paving, repairing and maintenance of the street between the tracks has to be borne by the operating company, whereas in the case of the municipally owned system that heavy charge may be borne by the street department, the bills being paid by the taxpayer. Or, again, comparison of the two balance sheets reveals that the privately owned system pays a large sum in taxes to the city, while the municipal system is untaxed on the theory that it would be absurd for the municipality to levy a tax upon itself. In some cases the tax paid by the private enterprise amounts to 10 per cent of its revenue, or even more than that.

In either of the two cases cited for purposes of illustration, bringing to light the hidden factor changes the whole complexion of the comparison. Yet it is perfectly obvious that any comparison which omits such vital factors is worthless and misleading. This same factor pervades the entire problem. For example, the light and power companies of the country pay approximately 10 per cent of their income in taxes to our municipalities and states, whereas it is the universal practice to exempt municipal enterprises from taxation. Obviously, if a municipally owned plant makes a better showing than a privately owned plant fairly comparable to it, or gives service at somewhat lower rates, against that apparent superiority there should be set the fact that its exemption from taxation is in fact a subsidy which the taxpayer pays and which must be added to the apparent cost of the service in order to ascertain the true cost.

Incredible as it seems, this phase of the question is generally overlooked in popular discussion of the subject. It is the one phase of the subject upon which the propagandists favoring government ownership are uniformly silent. The "Man in the Street" is confidently regarded as being too careless to give any attention to such matters. It is not only in this country that this indirect subsidizing of government enterprise has assumed formidable proportions. It is equally true in

Great Britain and in Germany, countries which we have had held up for our emulation until we are weary. This evil practice has prevailed in Germany to such an extent that it has become one of the great scandals of German political life. In the opinion of the best economists of the country it is one of the major factors in the financial debacle. I have been profoundly impressed by a discussion of this subject from the pen of the former president of the German Reichsbank, Hjalmar Schacht, a brilliant economist noted for his constructive views.

Herr Schacht points out, in his book, "The End of Reparations," that the state and municipal enterprises of Germany "are tax exempt, while every private business is subject to taxation." He points out, also, that the state and municipal enterprises "are not required to keep public books upon business principles. Their calculation of profit and loss is not subject to adequate public control. For their own purposes they do not need it, for their credit capacity is not based upon good business management and adequate profits, but is given extensive support out of the returns from taxation which is levied to meet the expenses of the state and of municipalities."

PUBLIC DOES NOT BENEFIT FROM MUNICIPAL OWNERSHIP AND OPERATION

The idea that municipal ownership and operation of street railways, lighting systems, and other public utilities, is of immediate benefit to the consumer is wholly fallacious. It is not true of any country in the world. In those countries in which this form of municipal enterprise is most developed the immediate result to the consumer—to say nothing of probable future results to the body politic and social—is demonstrably definitely disadvantageous. Where there is a saving of dimes on bills or of cents on fares, there is an addition of dollars to the tax burden. In connection with the present economic plight of Germany it is pertinent to remember that rather more than 45 per cent of the total national income of Germany went into taxation. The entire nation is groaning under the heavy burden of an immense overgrown bureaucracy. The machinery of the state has become too cumbersome and too expensive, a result long since predicted.

We want less government participation in business, not more. We have gone much too far already in permitting government to usurp the functions and opportunities of private enterprise. We have already far too much paternalism, and the sooner we can liquidate some of it the better it will be for the nation. I make no plea for the savage and unbridled individualism of the last century, with its brutal rule of "every man for himself and the Devil take the hindmost," but I do plead for the maintenance of private initiative and enterprise in industry subject to social regulation, conceived in the fair and generous spirit of a great people striving to make equality of economic opportunity real. It is upon that socialized individualism, and not upon socialism or communism, that enduring prosperity and greatness can be built. The only communism we need, or can tolerate, is the communism of advantage that comes from equality of opportunity and is the foundation of true individualism.

This is the seventh of a series of articles by prominent men outside the electric railway industry expressing their views on transportation subjects. The eighth will appear in an early issue.



Los Angeles Railway garage is well equipped for the maintenance of a fleet of 172 buses

Modernized Maintenance Facilities

Effect Improvement in Bus Performance

By

C. B. LINDSEY

Superintendent of Automotive Equipment
Los Angeles Railway

DURING the past decade many improvements have been made in bus design and construction, giving us the comfortable, smooth-running vehicle of today, and the problems facing the bus operator are vastly different from those of ten years ago, when repairs were continuous and failures frequent. Although maintenance problems are still with us, credit must be given to the manufacturers for making it possible for the modern bus to operate thousands of miles with no repairs or failures. In order to reap the full benefit from the improvements in the bus itself, the Los Angeles Railway has equipped its repair shop with the most modern machinery and facilities. As a result, we are able completely to overhaul a bus in a few hours, instead of spending days on a job as was customary in the past. The enormous saving in labor has more than justified the initial investment in building and facilities.

Proper light and ventilation are two essentials in bus repair shops and garages, ranking in importance with adequate repair facilities. The first question asked by our visitors is: "How do you keep it so clean?" The

answer is: "Don't let it get dirty." Contrary to the popular belief, mechanics do not like to grovel around in grease and dirt, and if floors are mopped daily and pits kept clean and sprinkled with fresh sawdust, the crew of mechanics will keep itself neat and there will be no complaints of grease on the upholstery of the vehicle.

Cleaning buses is one of the most expensive items of maintenance and one of the most essential. As each bus is stored for the day the interior is cleaned by using 100-lb. air pressure from conveniently located hose connections. The windows are then cleaned, and the seats and windowsills dusted. Those buses not deemed clean enough for service are given a thorough washing with a high-pressure spray and warm water from a water

softener. All grease spots are removed with a sponge and soap and water. The tops are cleaned with a long-handled water brush by a man standing on a suspended platform. The use of the water softener has proved very satisfactory and has made it unnecessary to use special soaps and solutions, which we have found tend to shorten the life of paint. Water for filling bus radiators is also obtained from the water-softening machine and has been found to reduce scale.

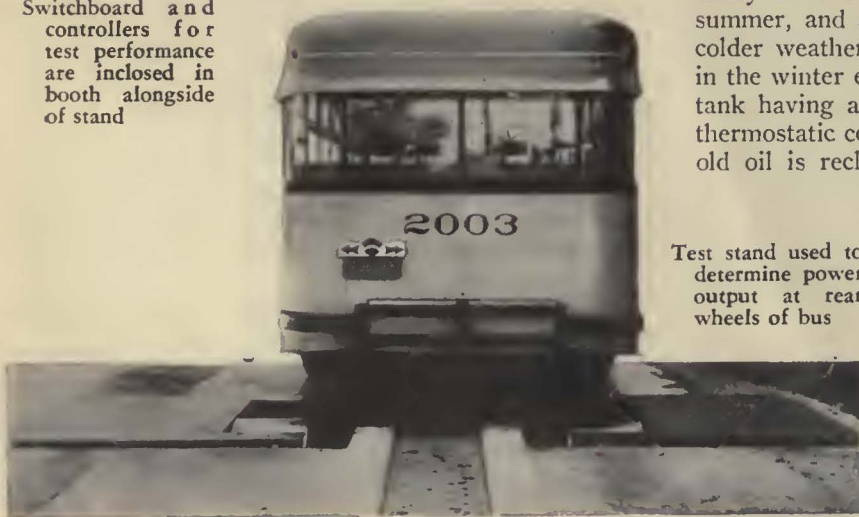
All buses are serviced with gasoline and oil immediately on entering the storage yard. A remote control system, metered to $\frac{1}{10}$ gal., is used for dispensing the gasoline. At present we are using approximately 5,000 gal. of gasoline per day. Many of our



All buses are serviced with gasoline and oil immediately upon entering the storage yard



Switchboard and controllers for test performance are inclosed in booth alongside of stand



Test stand used to determine power output at rear wheels of bus



Plug board used by the dispatcher in assigning buses for the day's run

Individual kits encourage the mechanics to take good care of their tools



buses are equipped with large filling spouts to reduce the time of gassing. The small inlet is being discarded rapidly.

A high-grade paraffin base lubricating oil with a viscosity of 140 Saybolt at 210 deg. is used during the summer, and an oil of 120 Saybolt at 210 deg. during colder weather. To facilitate the handling of heavy oil in the winter each oil dispenser is equipped with a single tank having a standard electric heating element with a thermostatic control. Oil is changed at 2,500 miles. The old oil is reclaimed by contract, approximately 85 per cent being returned. Samples of the reclaimed oil are taken from each shipment and tested. For this work a special machine has been designed by our engineering department. It consists of a rotating shaft immersed in the test oil, which is heated, with calibrated weights placed evenly on the two bearings. When the load limit is reached, the circuit breaker is thrown and the shaft stops rotating. The test factors obtained with this apparatus



Cranes are employed to raise the rear end of a bus undergoing repairs

are taken into consideration in the purchase of oil.

Two traveling cranes of 5-ton capacity have almost completely replaced the jack and a hand-operated lift for the removal of transmissions and differential assemblies, and have paid big returns in eliminating accidents and damage to equipment.

Even when a fleet of buses consists of several types a great deal of delay will be avoided by carrying an adequate number of spare parts. In this manner, the unit requiring repairs can be replaced by a spare unit, without holding up the vehicle. The unit can then be repaired by an expert mechanic and thoroughly tested before being replaced in service. A tag system has been devised to check mileage and cost of repairs on each unit. This information is essential to economical maintenance of large fleets, as considerable difference will be found in the mileage obtained from the various parts of different types of buses. Moreover, the cost of replacement cannot be obtained without accurate mileage data.

This company has adopted the tire mileage contract plan, as have many other bus operators. We feel that this is the most satisfactory way of equipping buses with tires. Damage to tires from accidents, misalignment, etc., is paid for by the operator. Punctures, glass cuts, etc., are accepted by the tire company as road hazards.

When an engine becomes noisy and the consumption of fuel and oil increases noticeably, it is completely dismantled. The crankcase and other parts are thoroughly cleaned in a solution tank, and, if necessary, new main bearings are installed and line-reamed, the cylinder block and pistons are renewed and the valves refaced. The engine is then "run in" for several hours, using ordinary lighting gas as fuel, before it is ready for service.

Great care is taken in setting up new main bearings. The apparatus used for this purpose was made in our own shops and can be used with all types of our engines. By the use of new bearing metals we have been able to

increase our mileage on some buses to more than 100,000 before replacing the main bearings.

Our experience has been that the frequent stops in city service rapidly heat up brake drums and cause distortion and trouble. With the exception of a few light units all our buses are equipped with air brakes. Heavy cast-iron drums, well ribbed and ventilated, are used. Brake blocks have eliminated lining trouble, and a bus can now be relined and returned to service in a few hours. Recently we have been able to obtain oversize brake blocks for use with worn drums. These blocks can be removed when the limit of cam travel has been reached, and are used again on new drums. A machine has been developed for trimming brake blocks that undergo a change in radius. It resembles a hub and is mounted on the axle housing or shaft, and is driven by the bus engine. By the use of a cross feed and a star wheel, the cutter neatly trims the blocks to a proper radius in a few minutes. Buses relined in this manner can be put in service at once without "burning in." This practice avoids injuries to the wheel bearings, tires, clutches and the brakes themselves. Air compressors have been greatly improved by the addition of the unloader head and by replacing the old style poppet valves with disk valves. Special compressor oil has been found necessary on these small compressors in order to eliminate trouble from plugged lines. After compressors have been overhauled they are coupled to a variable speed motor and "run in." They are then connected to an air tank and tested before being returned to service.

Defective carburetion and gas fumes have been the source of much trouble. After having tried a number of measures without result, the addition of a valve in the intake manifold was found satisfactory in reducing the gas fumes. When the valve is used it is necessary for the operator to leave the clutch engaged as long as possible when slowing down, because the valve operates at maximum efficiency when the vacuum in the intake mani-



Tops are washed from a suspended platform with a long-handled water brush

fold is high. Proper carburetion with present-day fuels is a difficult problem. It is necessary to assist vaporization by heating the manifold riser, yet heat in the carburetor bowl or gas line will result in vapor lock. It has been found desirable to have all carburetor repairs and adjustments made by one mechanic. If this mechanic is not available when trouble occurs, the entire carburetor is changed. This practice has resulted in increased fuel mileage and has been found much more satisfactory than the indiscriminate adjustments by the average mechanic. In our fleet there are buses equipped with vacuum tanks, auto pumps or fuel pumps. Up to the present the fuel pump has been found the most satisfactory.

Heavy-duty generators with voltage regulators have done much to reduce failures of the electrical system. We build and repair all of our storage batteries, and where possible have standardized on batteries of two 6-volt cells in series rather than the conventional 12-volt type. These are easier to handle and less costly. Headlights are kept in good condition and focused according to state regulations by an outside contractor who checks them at frequent intervals.

All pull-ins are given a careful safety inspection. All parts of the bus are checked, and any defects noted are indicated on a report card. These cards are collected by the foreman in charge, who assigns the necessary work to the repair men. It has been found desirable to have the repair men specialize on certain types of buses, as the grade of their work rises as they become more familiar with it.

Each mechanic is furnished a complete kit of tools. These are periodically inspected, and any tool lost must be replaced by the mechanic at his own expense. If a hand tool is worn, a new one is furnished by the company. Electric drills, gear pullers, heavy socket wrenches and other heavy tools are available to the mechanics upon presenting a check at the tool room. Machine work is often done at the shop when necessary, although heavy forgings and quantity manufacturing are done at the car shops. All painting, body repairs, and upholstery are also done at the car shops, where more than 1,200 cars are maintained. Overhaul and painting of bus bodies are scheduled on a 24-month basis.

A chassis dynamometer designed and built in our own shops is used as a proving stand. It has been found valuable in determining the actual power output at the rear wheels of buses. Two street car motors equipped with large pulleys and suspended beneath movable iron platforms, which are air controlled, are brought into position. The rear axle is then chained securely to a saddle, also movable and air controlled, and locked in position so that the center of the tires will be exactly on the center of the pulleys. If the bus is to be checked for friction loss or unusual noise in the drive shaft or the body, current is fed to the motors through controllers until sufficient speed has been reached. If on the other hand, the bus is to be tested for power output, the engine is started, opening the throttle gradually until full speed is reached. The motors then become generators and the power output is measured. Test curves have been drawn for all buses when in good running condition so that any loss of power can be detected immediately.

Small generators connected to electric indicators are very useful in checking speedometers. Engines on Twin Coaches can be synchronized accurately in a few moments. Many other instruments are located in the control room. A telephone, with headset, enables the tester

to talk with the mechanic operating the bus. Thermocouples are frequently attached to the various units suspected of excess friction loss and are also used to keep radiators at normal temperatures. To accomplish this, an airplane propeller, motor driven, is mounted on a movable pedestal and a cool breeze directed at the radiator whenever necessary.

Buses are assigned to operators for runs from the garage. The buses are started by mechanics whose duty it is to see that the hood is fastened down and everything ready. The dispatcher who assigns the buses to the runs is assisted in this work by a plug board which has proved very convenient in keeping a close check on all buses. Each plug represents a bus, and as the board is made up for the day the plug is inserted in the board opposite the line and run number. Buses with large gas tanks are assigned to the longer runs.

Road service trucks, fully equipped with spark plugs, light bulbs, tires and tools for making repairs, are located at points near a telephone. The mechanics in charge of these trucks are selected for their expert knowledge in locating trouble. If a driver calls the garage from his run reporting some mechanical defect, the clerk will locate a road service man and direct him to the bus. If a change is necessary, a new bus is despatched from the garage. This work calls for expert knowledge of equipment, location of lines, distance from service truck locations and garage, and many other details. It is not uncommon for our entire fleet to operate through the day with no lost time. This, of course, is largely due to the many mechanical improvements, but credit is due to the dispatcher who can tell the operator reporting the trouble what to do in order to keep it running until the service truck reaches him. Although a number of our own buses have approached the 300,000-mile mark, they are still operating and giving satisfactory service on suburban runs.

Delay in returning buses to service from the repair shops can only be prevented by keeping an adequate supply of parts and materials available. Where several different types of buses are used this involves a considerable outlay, as very few parts are interchangeable. Parts and materials are purchased on a 90-day basis, the previous 90-day consumption being the determining factor when ordering, unless there has been notification of expected increases by the mechanical department. Although more than 7,000 items are carried in stock, representing an investment of more than \$45,000, it was found during a recent inventory that less than \$90 worth of parts and materials are requisitioned from the storeroom by the foreman or his clerk. In most cases discarded parts must be turned in before new ones are issued. If the requisition cannot be filled and the part is needed, an emergency requisition is written by the general foreman and a pick-up man sent to the nearest service station.

Conveniently located above the machine shop is the garage office, where the workman's time and mileage records are kept. These are instantly available to foremen for reference. Numbers of the buses due for greasing or oil changing are posted daily. Records of miles per gallon of gasoline and oil are kept on individual buses and a monthly report is issued for the benefit of foreman and mechanical men. Mechanical unit, tire and body records are posted daily and used in determining the mechanical life of each. Miles per equipment failure is classified by types and units.

MIDWEST ASSOCIATIONS

Have Profitable Convention at Denver

Merchandising, employee relations, traffic and trolley buses among subjects discussed. Claims Association and Equipment Section met with general association in major sessions and also held separate meetings

ASSURANCE of a continued satisfactory life of service for those electric railways that will further modernize their properties, merchandise their facilities and win public approval and sympathy was the optimistic keynote which pervaded all discussions at the joint convention of the Midwest Electric Railway Association and the Midwest Claim Agents' Association in Denver on July 16, 17 and 18, 1931. Statistical analyses of many important problems were presented by the scheduled speakers, and the open periods which followed them were valuable because of the participation by representatives from practically every member company. In the separate meetings of the claims association and the equipment section, questionnaires sent out in advance were answered in detail by every member property, resulting in the development of valuable data on many current problems confronting the various claim agents and master mechanics.

President C. A. Semrad opened the first general session on Thursday morning by asking H. S. Robertson, president Denver Tramway, to introduce Mayor George D. Begole. The Mayor welcomed the convention to Denver, complimented the Denver Tramway Corporation on its past accomplishments, and assured the officers of the support of his administration in their future efforts. Mr. Semrad responded to the Mayor's welcome and emphasized the necessity on the part of all railway properties to secure the co-operation of public officials and the molding of public opinion. "The public still visualizes the railways as a monopoly in city transportation," said Mr. Semrad, "as having special privileges and concessions, knowing nothing of our taxes, franchises and imposts which benefit competitive transportation facilities. We must change the public's belief that street railways are becoming obsolete and decadent, and by modernization and merchandising must equip ourselves to give the best type of service and then to sell it to the public."

Charles Gordon, managing director American Electric Railway Association, in discussing what mass transportation means to a city, outlined the trend in social and business activities over the past century and characterized the part transportation has played in the development of our

cities. He stated that no city planning is now done without a basic study of transportation and the economic efficiency of its various agencies. "In the development of these agencies," said Mr. Gordon, "lies the only hope for economic use of city streets." Substantiating his claim, Mr. Gordon quoted statistics from cities having a population greater than 250,000, showing that, on an average, approximately two-thirds of the population are still dependent on mass transportation facilities. He also quoted figures showing the relative efficiency of the various vehicles using the streets from the standpoint of street occupancy and of passenger carrying capacity.

In discussing the small city problem, Mr. Gordon urged a careful study to determine whether the city will support any transportation system. "In the past," said Mr. Gordon, "too many operating companies considered only two factors of responsibility, namely, the car rider and the stockholder. However, there is a third factor, the property owner, who is vitally affected by transportation services. The mass transportation agency is not only responsible to the property owner, but the property owner also has a responsibility in maintaining an adequate transportation system."

An interesting paper on the psychology of employee relations was presented by F. G. Buffe, vice-president in charge of operations, Kansas City Public Service Company. He traced the development of employee relations through the four preliminary stages. He classified them as the Hire-and-Fire Period, the Paternalistic Era, the Efficiency Era and finally the Industrial Psychology Period. Mr. Buffe then explained in detail the various participation and benefit plans which have been put into effect on the Kansas City property since 1919, dealing especially with the latest or participation plan. He quoted figures on the results of this plan for the first six months that it has been in operation and stated emphatically that its success, in all phases of operation, was beyond all measure of that anticipated by the officials of the company. A detailed discussion of this subject by Mr. Buffe was published in the June issue of *ELECTRIC RAILWAY JOURNAL*.

Following the Thursday morning general session, three round-table luncheons were held which carried on



Electric railway men of the Midwest with their families

as separate meetings of the Equipment Section, Claims Association and an executive meeting of the general association. Robert P. Woods, receiver of the Kansas City, Clay County & St. Joseph Railway, presided over the general session and directed open discussion on the kind and character of service, co-ordination of rail and bus services, fares, types of equipment, economies of operation, public and employee relations, legislation and taxation, advertising and freight.

LUNCHEON MEETING OF EQUIPMENT GROUP

The equipment group luncheon was the first annual session of this section. R. W. Bailey, engineer of power and equipment, Kansas City Public Service Company, was chairman of the meeting and submitted comparative costs of maintenance of the member companies of the Midwest Electric Railway Association. The comparative tables submitted in this report included: Costs on bus operation, including fuel and lubrication; costs of street car operation, including maintenance, cleaning and inspection; average miles per bus failure and average miles per car failure. Additional statistics were presented which compared car failure records of 38 railways, showing miles per failure chargeable to maintenance and miles per failure chargeable to operation. In addition to comparing costs chargeable only to maintenance, the Midwest Equipment Section includes in its comparisons the total expenses for which maintenance departments are responsible, namely, those items directly chargeable to maintenance plus inspection and car cleaning which are chargeable to operation. Comparisons on this basis were submitted from more than 30 companies throughout the United States. The remainder of the meeting was devoted to the discussion of a questionnaire which had previously been compiled and sent to member companies and which brought forth discussion on car lighting, flooring, lubricated trolley wire, testing overhauled motors, results in bus operation, noise reduction and many other equipment subjects.

CLAIMS SUBJECTS DISCUSSED

Under President M. B. Bracken, general claim agent St. Louis Public Service Company, the Midwest Claim Agents' Association held two important separate sessions. Their discussions were divided under two topics—"Standardization of Claims Statistics" and "Claims Policies." Charles L. Carr, general solicitor Kansas City Public Service Company, presented a paper on the first topic in explanation of a standard form for the compiling of claim statistics, which he submitted for the association's consideration. The form submitted consists of

seven main subdivisions, namely: Operating statistics, accidents, claims, lawsuits, trials, expenditures, and I&D statistics, compared and equalized. After a thorough discussion of the form itself, Mr. Carr stated: "In summing up, it is our opinion that the percentage of total I&D expenditures to passenger revenue should not be used as a basis for comparing I&D statistics; that as between companies the preferable basis to be used is the I&D cost per passenger per mile, and particularly on equalized figures as shown on the form; that as between departments of various companies handling I&D matters a preferable basis of comparison is the average total cost per public accident equalized with regard to lawsuits as explained in the form." The form was thoroughly considered by the claim agents present at the meeting and suggestions were made for minor changes which will result in a form being submitted to the industry as a first step to a more perfect standardization of injury and damage statistics.

Under the subject of claim policies, a questionnaire on various phases of policy was discussed relating to the attitude of claim agents to law associations, medical fraternities, collections, affidavits, adjustments, potential claimants, witnesses, hospital bills, co-operation of newspapers, secret service, and the like.

On Friday the two general sessions dealt principally with merchandising and traffic problems and the trolley bus. Laurence Wingerter, Des Moines Railway, in discussing merchandising and advertising transportation described the practices of his company in selling its transportation service. He compared the street railway business and its competition with other industries and like competition, showing how effective merchandising and advertising could produce profits. He emphasized four distinct advantages which the street railway's product—street car transportation—holds over its competing product—private automobile transportation. He urged that these advantages be frequently presented to the public in advertising. They are: first, that street cars provide the safest form of transportation on the city streets; second, they are the most economical of all forms of transportation; third, in all cities, they are the most convenient means of getting to and from the congested district, and fourth, street cars offer comfort and absolute freedom from the worry and strain of driving an automobile in heavy traffic. He suggested as means for keeping these advantages before the public, the use of exterior and interior car cards, personal visits to newcomers to a city, newspaper advertising, theater advertising, maps, booklets, direct mail letters and time-tables.

F. C. Lynch, director of the Kansas City Safety Council, in discussing street traffic problems, pointed out



nd friends attending the recent convention at Denver

that from the standpoint of the operator of mass transportation units, street traffic problems largely consisted of increasing speed, reducing accidents and selling service. He emphasized two points. First, co-operation with city and traffic officials in increasing the efficiency of streets by proper operation and not asking for too much in the way of no-parking regulations where such restriction would not benefit street car or private vehicle use of the street. Secondly, he urged the proper training of personnel on cars and buses to assure efficient operation and freedom from accidents. Mr. Lynch believes that one of the most important phases of railway operation is in the study and training of men so that they may be mentally equipped to handle their jobs and to have the respect of other users of the street. His plea above everything else was for a little more courtesy and tolerance on the street between the operators of the different classes of vehicles.

I. E. Cox, transportation engineering department, General Electric Company, St. Louis, presented a paper on field tap control by the use of resistors and its effect upon speed and motors. He discussed the method of reducing field flux of railway motors during the past years and showed the advantage of reduced field over reduced gear ratio to obtain higher free running speed by effecting a saving of energy and the reduction of heating in the motors. "The amount of field reduction," said Mr. Cox, "is approximately 40 per cent, which results in about 20 per cent increase in free running speed. The greatest gain in schedule speeds is realized on routes with a considerable portion of free running, but some gain, amounting to 3 or 4 per cent in schedule, is obtained in service where the stops per mile average seven or eight." Mr. Cox discussed in a technical manner the application of field reduction on new equipment and the more careful application necessary in applying field reduction to existing cars and older equipment.

INTEREST SHOWN IN TROLLEY BUS

Discussion of the trolley bus, which took up the afternoon session, was led by Charles O. Guernsey, chief automotive engineer J. G. Brill Company, Philadelphia, Pa., whose paper appears in abstract elsewhere in this issue. E. A. West, general manager Utah Light & Traction Company, Salt Lake City, discussed operating features and problems of trolley buses by describing the service in Salt Lake City and the problems which have arisen and been solved on his property. He discussed operating and maintenance costs under the headings of way and structures, overhead equipment, conducting transportation, and power, and pointed out specific instances where maintenance costs were higher or lower. Mr. West answered many questions from representatives

about the operation of trolley buses in Salt Lake City, which evidenced much interest in this vehicle by Midwest transportation men.

At the general luncheon on Friday, J. N. Shannahan, president Omaha & Council Bluffs Street Railway, presided. The subject which he introduced was the desirability of encouraging younger men, preferably college graduate engineers, to enter the electric railway industry. He stated that one of the greatest problems confronting the railways today is the necessity for bringing new and younger talent into the business to carry on in years to come. He suggested the appointment of a committee to study this subject and called upon various members in the meeting to present their views. Opinions were unanimous for the desirability of bringing young men into the transportation industries, and many advantages and inducements were suggested which might be used to encourage college courses in transportation engineering.

NEW OFFICERS ELECTED

Officers elected for the coming year for the Midwest Electric Railway Association were as follows: President, Robert P. Woods, receiver, Kansas City, Clay County & St. Joseph Railway; first vice-president, C. W. Gifford, general manager Des Moines Railway; second vice-president, C. D. Porter, vice-president and general manager Omaha & Council Bluffs Street Railway; secretary-treasurer, J. A. Weimer, superintendent of transportation Kansas City, Clay County & St. Joseph Railway.

Officers elected for the Claim Agents' Association were: President, Von L. Baker, claim agent St. Joseph Railway, Light, Heat & Power Company, St. Joseph, Mo.; first vice-president, C. R. Bennett, general counsel Des Moines Railway; second vice-president, W. P. Thomas, claim agent Omaha & Council Bluffs Street Railway; secretary-treasurer, Charles E. Sharkey, claim department St. Louis Public Service Company, St. Louis, Mo.

The entertainment part of the convention was effectively carried out under the direction of James L. Adams, superintendent of transportation Denver Tramway. The ladies were entertained daily, and each evening a special feature was provided for all the delegates in Denver. On Thursday evening a theater party and dancing were arranged for at Elitch's Garden, and on Friday night a general reception, banquet and dance was held at the Lakewood Country Club. The Hon. Benjamin C. Hilliard, Justice of the Supreme Court, State of Colorado, was the guest speaker on Friday evening. On Saturday morning trips into the mountains were arranged and delegates and their families could choose any one of five trips, ranging from 50 to 250 miles.

WHO SHOULD PAY

for *High-Speed Transit?*

EDITOR'S NOTE—More than 25 years' experience in the real estate business in Philadelphia has given Horace Groskin an intimate knowledge of land values. As chairman of the Transit Tax Commission appointed by the Mayor of Philadelphia in 1928, he had an unexcelled opportunity to study the effect of rapid transit on real estate values. In this article he emphasizes the fundamental fairness of the benefit assessment method of financing, supporting his argument with many pertinent facts and figures.

\$437,000,000, a sum of money greater than the entire cost of building the Panama Canal, was paid out in 1926 and 1927, by property owners in cities of more than 30,000 population, in special assessments for street paving, street widenings, street openings, sewers, water pipe and many other types of local improvements, that were directly beneficial to the properties in the district of the improvement. A sum even greater than the amount paid out in special assessments has also been spent for another type of improvement, the construction of rapid transit railways, such as elevated and subways, without special assessments being made against the property owner, although this type of improvement has had an even greater beneficial effect on property values, than some of the other improvements already mentioned.

In a number of the big cities throughout the country a large part of the burden of paying for these elevated and subway lines now rests on the back of the general taxpayer, although the great majority of the taxpayers of the community receive only an indirect benefit, while certain particular property owners in the elevated or subway territory receive enormous special benefits through securing greatly increased property values.

Modern cities must have high-speed transportation to develop their outlying territory and to maintain rentals and property values in built-up sections, as well as to relieve congestion in their central business districts. Transportation companies have been unable to secure the capital required to build expensive subways or other high-speed railways, making it necessary for municipalities to construct these lines by raising the money on their credit, and paying a large part of the cost and carrying charges out of the funds supplied by the general taxpayer.

This situation is now raising these important questions: "How long can the larger cities of the country continue this policy of municipal construction, in view of the fact that many of them have already reached the limit of their borrowing capacity, and in view of the further fact that the burden on the general taxpayers has almost reached the breaking point?" "How much longer can the cities of the country continue to use credit for rapid transit construction and fail to meet their other obligations to

make other improvements which are also vital and necessary to the progress of the community?"

There is only one logical answer: The time is rapidly approaching when all cities desiring to build rapid transit lines must either adopt the policy of special assessments for a portion of the cost, or they will be compelled to stop building these lines, for the reason that they will no longer have the necessary credit to use for this purpose, and for the additional reason that the general taxpayer will no longer be able to carry the load.

By adopting the plan of special assessments for special benefits, the municipalities will not only have the opportunity to apportion the cost and carrying charges of the high-speed railway construction between the general taxpayer, the car-rider and those property owners who receive special benefits from the railway, but they will also have the opportunity to increase the amount of high-speed construction which is so absolutely necessary in all the larger cities throughout the country.

A high-speed rapid transit railway produces a direct special benefit to property owners in the high-speed territory, as well as a general benefit to the community as a whole. The general benefit, however, is remote and incidental, while the local benefit is special and direct.

One of the general benefits received by the community as a whole from a rapid transit railway results from the fact that the high-speed line being in existence gives everyone in the community an opportunity to use an additional means of rapid transportation in a particular section. If such a line were not available, it would mean that thousands of people would be compelled to use other means of transportation, such as automobiles, taxis, buses, etc., resulting in increased traffic congestion, additional wear and tear of the highways, and added expense to the general taxpayer. Another general benefit from a high-speed line received by the community, as a whole, is due to the great amount of time saved by its people, which not only benefits actual riders on the rapid transit line, but benefits thousands of other people whose interests are joined with the users of the line, so that the benefit is spread to a large part of the community, making it of city-wide importance and, therefore, a general benefit.

Still another general benefit received by the entire community from the rapid transit railway is the increased revenue secured by the municipality by reason of the higher real estate values created by the rapid transit railway, which adds income, as well as increased borrowing capacity, making it possible to enlarge the program for other improvements in other sections of the city.

Should the Taxpayers Alone Pay the Cost, or Should the Owners of Benefited Property Contribute Their Share?

By

HORACE GROSKIN

Realtor
Philadelphia, Pa.



Crowds using 69th Street Terminal in Philadelphia reflect growth of population in that area since inauguration of rapid transit service

These general benefits, however, are incidental, remote and limited, when contrasted with the direct special local benefits secured by certain particular property owners in the rapid transit area. The direct special local benefit resulting from a high-speed railway is due to the fact that it promotes greater accessibility to and from the district in which it is located, stimulates the riding habit, helps to maintain the established advantages of the section, and either stabilizes or increases real estate values within the sphere of its influence.

Many people who have not investigated this subject seem to be under the impression that a rapid transit railway is mainly beneficial to land in outlying sections, and at station and terminal points; but, as a matter of fact, the benefits are also very great to property owners in the built-up sections of a community. The benefit received by property owners in built-up sections does not always result in increased real estate values, but it does result in retaining and stabilizing real estate values, and, in many sections, it helps to hold up rentals, as well as property values, where they would decline if they did not have the advantage of a rapid transit railway.

EFFECT OF RAPID TRANSIT ON LAND VALUES IN PHILADELPHIA

We have an illustration of the influence of a rapid transit railway in preventing a great loss in real estate values in the experience of the old central business district in Philadelphia. About 30 to 35 years ago, the main business center was located in the east part of the city, in the neighborhood of Eighth, Arch, Market, and Chestnut Streets. The city's trend of development was north and west, and the business district in the eastern section began to move toward the west. In 1907, the Market Street Subway-Elevated began operation through the old business center, and every real estate man acquainted with this district knows that the bottom would have dropped out of the real estate values in this old business section if it had not been for the operation of this high-speed line.

What actually happened was that during a twenty-year period between 1907 and 1927, there was an increase in assessments of 94 per cent in the Sixth and Ninth Wards,

wherein the old business district is located, as compared with an increase of 141 per cent throughout the entire city. This shows how well values in the old section were maintained, despite the tendency of business to move westward. While it is true that there were some declines in certain particular properties in this area, yet whatever declines took place were very gradual, and very much retarded, whereas, if no subway had been built, there can be no question but that the existing real estate values would have melted away rapidly all over the entire district.

Residential sections as well as business sections also receive a direct special benefit from a high-speed line. A rapid transit railway generally stabilizes a residential district, so that rentals, as well as real estate values are held up, whereas, they might recede if the line were not there. A subway or an elevated helps a section to meet the competition of other sections, especially when the trend of development is in another direction.

In a business district, a rapid transit railway often retards the outward spread of its business section to adjacent or other outside areas, and concentrates building development within its own area, bringing into demand the vacant or unimproved property and stimulating the potential possibilities of increased real estate values. A high-speed line also promotes the improvement of underdeveloped property in a business district, and creates an opportunity for the fully improved property to be used to its maximum capacity and usefulness.

A subway or an elevated relieves a certain amount of street traffic congestion which is particularly beneficial in central business districts where accessibility is restricted and where real estate values often remain dormant, or begin to sag on account of the restricted accessibility. All of these benefits are direct special local benefits secured in the territory within the sphere of influence of the high-speed line.

The relief of a certain amount of congestion in a subway area, is, in itself, a very important special benefit. As an example of the effect of high-speed lines on street traffic congestion, the experience of the Philadelphia Rapid Transit Company is interesting. The company has established several automobile parking spaces at three of its outside high-speed terminals. It offers a parking space for an automobile and a round-trip ticket on the elevated or subway for 25 cents; 10 cents for the parking

space and 15 cents for the round-trip fare. During the year 1930, more than 43,000 cars parked in the space provided by the company at the northern terminal of the Broad Street Subway; 90,000 cars parked at the Bridge Street terminal of the Frankford Elevated, and 141,000 cars parked at the 69th Street terminal of the Market Street Subway-Elevated. In other words, 274,000 cars were parked in the spaces provided by the company as well as tens of thousands of others parked elsewhere around the terminals.

Is it not fair to assume that had there been no subway or elevated available, a very large percentage of these 274,000 automobiles—enough cars to make a continuous row between Philadelphia and Detroit—would have been taken into the high-speed area and very materially increased street traffic congestion? This relief from a certain amount of street traffic congestion is, without question, a special local benefit to properties in the area served by rapid transit.

These direct special local benefits from a high-speed railway are important major benefits to property owners in a high-speed area, and are superior to the general indirect benefits to the community as a whole.

RAPID TRANSIT IS PRIMARILY A LOCAL IMPROVEMENT

A subway or an elevated is not a metropolitan improvement, such as a main through highway, or a great bridge or tunnel connecting states or cities, or large shipping docks that improve port facilities, or an extensive park system, that is available to the entire population. These municipal improvements of metropolitan importance produce a general benefit in a major degree to the community as a whole, although they also produce a certain amount of special local benefit, but the principal benefit of the metropolitan improvement is general to the entire city, while the principal benefit from a subway or other high-speed lines is local to a particular section.

One of the most convincing demonstrations that the benefit from an elevated or a subway is not general to the entire city, but is a direct special local benefit, is the fact that its very existence sometimes proves detrimental to other sections of a city which are not within the sphere of its influence. Some of these adjacent or outside districts are in direct competition with the elevated or subway territory, and, by reason of the high-speed territory having greater accessibility, the adjacent district suffers from a decrease in the normal demand for its location, and has its trade and other activities retarded, so that its rentals from real estate begin to recede and its real estate values either remain dormant or decline.

In fact, real estate values are often practically extracted from adjacent territory and carried to the rapid transit area, where general activity and trade is accelerated and rentals and real estate values are increased at the expense of the adjacent territory. The demand for property naturally gravitates towards the rapid transit area.

The experience in Philadelphia with the West Philadelphia Subway-Elevated illustrates this fact. Back in 1900, the trend of building development was moving in a northerly direction where the city had thousands of acres of undeveloped land. When the new high-speed line in West Philadelphia was put into operation in 1907, it began to take away thousands of people from other sections. This benefited West Philadelphia, but was

injurious and detrimental to other districts. According to the statement of the transit department, during the first ten years of the operation of the West Philadelphia Subway-Elevated, the passengers carried on the line increased from 26,395,000 the first year, to 74,570,000 the tenth year, or an increase of about 182 per cent.

When the construction of the new Market Street Subway-Elevated started in the western part of the city, builders from the northern section bought land in the new high-speed territory, so that, when the new line began operation in 1907, there was a concentration of building in that part of the city, with a very definite check to the development of the north and northeast sections.

According to the records of the Bureau of Building Inspection in Philadelphia, during the first ten years of operation of the high-speed line in West Philadelphia, from 1907 to 1917, there were 22,884 dwelling houses built in the 34th, 40th, and 46th Wards, comprising the principal undeveloped districts of West Philadelphia, while during the same ten-year period, there were only 14,096 houses built in the 22nd and 42nd Wards, comprising the principal district of North Philadelphia, although the northern wards contained almost 30 per cent more land than the West Philadelphia wards. In other words, the West Philadelphia wards, with about a third less acreage, built 62 per cent more houses than the North Philadelphia wards because it had a high-speed line.

In 1912, five years after the Subway-Elevated began operation in West Philadelphia, land and buildings in the 34th Ward of West Philadelphia had a value for taxation purposes of \$18,813 per acre, while land and buildings in the 42nd Ward of North Philadelphia had a value of \$5,996 per acre—only 32 per cent of the West Philadelphia figure. Land and buildings in the 46th Ward of West Philadelphia had a value for taxation of \$31,969 per acre, while land and buildings in the 22d Ward of North Philadelphia had a value of \$12,471 per acre—about 40 per cent of the West Philadelphia value. It can be readily seen from the city records of the assessment and building permit bureaus that land in the northern section of the city had suffered a reduction in demand, and, consequently, did not secure the increase in building construction and land values it would have received had there been no West Philadelphia high-speed line competition.

SIMILAR GROWTH FOLLOWED BUILDING OF FRANKFORD ELEVATED

When a new high-speed line was built and began operating in the Northeast section of the city in 1922, a tremendous building development started in that section, which almost equaled the development in West Philadelphia. According to figures from the Bureau of Building Inspection, from 1914 to 1922, the eight-year period prior to the opening of the Frankford Elevated, there were 2,912 houses built in the 23rd, 41st, and 35th Wards, comprising the principal wards in the northeast section of the city, while during the eight-year period following the opening of the rapid transit line, from 1922 to 1930, there were 21,078 houses built in these same wards. In other words, the number of dwellings built during the eight-year period after the beginning of operation of the high-speed line was more than 600 per cent greater than the number of houses built during the eight-year period prior to the operation of that line. While, of course, this tremendous gain in building con-

struction happened to coincide with the period of general prosperity and building activity throughout the entire country, and must, therefore, be discounted to some extent, yet it is evident that the northeast section had the potential possibilities for building development, and would have been built up years ago if it had not been for the high-speed competition of West Philadelphia.

The general benefit, therefore, derived by the entire city from the West Philadelphia Subway-Elevated was limited, while the benefit secured by the property owners in the high-speed territory was a major benefit, special and direct.

The special direct local benefit resulting from the West Philadelphia Subway-Elevated is clearly illustrated, by the experience of property owners in the 69th Street terminal area. In a territory comprising about 7 square miles surrounding this terminal, the population in 1910 was 5,385 people, but by 1929, this had increased to 65,000 people. Real estate assessments in this territory totaled \$4,725,210 in 1910, but by 1929 they had grown to \$48,369,490, an increase of more than 900 per cent. This shows that the entire district had derived a gigantic special direct benefit from the operation of the high-speed line.

INDIVIDUAL PROPERTY OWNERS PROFIT BY SHARP INCREASES IN LAND VALUES

As an example of the direct local benefits to some of the individual property owners in this territory, and as an illustration of what occurred in the way of local benefit to hundreds of other property owners in this district, I would direct attention to a sale made of a 17 $\frac{1}{4}$ -acre tract of land in this section, which was originally purchased by Howard Sellers in 1908 for \$100,000, about a year after the West Philadelphia Subway-Elevated started operation, and sold in 1928 for \$1,000,000, showing an increase from about \$5,700 per acre to about \$57,000 an acre. Another 18-acre tract of land in this territory, along Cobbs' Creek, belonging to Wolfenden Shore & Company and Cardington Land Company was sold to the city of Philadelphia in 1928 for \$1,000,000, or at the rate of about \$55,000 per acre. This same high percentage of increase in value has been duplicated in hundreds and thousands of instances all over the country, where high-speed lines have been put into operation.

The direct special benefit received by the property owners is also illustrated in the northeast section resulting from the Frankford Elevated. The figures of the Board of Revision of Taxes show that in 1922, when the Frankford Elevated began operation, the three principal wards, the 23rd, 35th and 41st, had a total assessed valuation of \$70,829,930, and in 1931, nine years after the Frankford Elevated had been in operation, the total valuation had increased to \$230,580,425, or an increase of \$159,750,495. During this period of nine years, the assessments of real estate throughout the entire city had increased 60 per cent, while the percentage of increase in the three northeast wards was 225 per cent.

One of the most interesting disclosures of special local benefit to property owners resulting from a subway was made in a report in Philadelphia, in the year of 1928. The Mayor of Philadelphia, desiring to know the effect of the new Broad Street Subway on real estate assessments, real estate values, and the amount of tax return on the increased values to the city, appointed a commission of four real estate men to make an investigation and report. This commission, of which the writer was chairman, divided the Broad Street Subway route into

sixteen zones of four blocks each, and made a separate investigation in each zone. The commission found that during the fourteen-year period of projection and construction from 1914 to 1928, real estate assessments in the entire area influenced by the subway had increased from \$445,638,629 in 1914, to \$815,893,296 in 1927 a gain of \$370,254,667, and out of this total gain, more than \$68,000,000 in assessments were due to the direct influence of the Broad Street Subway. The commission reported that during the fourteen-year period, the city had collected \$14,617,204 in additional taxes resulting from the increased values created by the subway, and that the property owners had received increased real estate values amounting to \$134,000,000, or about \$15,000,000 more than the entire cost of the subway.

The city of Philadelphia had spent about \$120,000,000 on the subway, and the specially benefited property owners in the subway area received \$134,000,000 of increased property values, so if we deduct the \$14,000,000 paid by the benefited property owners in additional taxes from the \$134,000,000 of increased values, the benefited property owners still gained \$120,000,000 at almost the entire expense of the general taxpayer. The general taxpayer is now paying practically the entire cost, and carrying charges on the \$120,000,000 subway, while certain property owners, who have secured these tremendously increased property values, do not pay any more towards the cost of the improvement than any other taxpayer. Is that fair to the large number of other property owners?

A high-speed transit facility, from the very day of its projection and down through construction and operation, starts to build up certain definite advantages in the district through which it operates, and continues to add to these advantages indefinitely, increasing the beneficial effect to the property owners and others in the district. These advantages built up in a district by a high-speed railway are vital and important to trade, rentals and property values, and, if for no other reason than a matter of good business, one would think that property owners, looking at it even from a purely selfish viewpoint, would sooner make a contribution towards a portion of the cost of a high-speed line than not have such a line available, or at best have only a very limited opportunity to secure high-speed transit.

BENEFITED OWNERS WOULD PAY THEIR SHARE

Also, considering it from the standpoint of simple justice, the property owners who receive direct special benefit should, in all fairness, pay something more towards the cost of the line than other property owners who receive no special benefits. I believe that if the benefited property owners fully realize the situation that thousands of other property owners are forced to pay higher taxes than they should pay on account of an improvement from which they are getting no benefit, the benefited property owners would assume their honest and fair share of the burden and relieve the general taxpayer to that extent.

Property owners as a class have proved many times in the past that they do not shirk their responsibilities when they realize them, and judging by past experiences, I feel certain that most owners of property, who actually secure benefits by reason of a high-speed line, would not only be willing to pay a portion of their gain in a special assessment, but would also regard it as a fair and just method to provide the proper transportation necessary for a modern city.

Indiana Railroad

SPENDS \$980,000

for New Cars



One of 35 new high-speed interurban cars recently placed in service between Indianapolis, Fort Wayne and Louisville

Faster schedules will result from complete equipment of two interurban routes with 35 new high-speed cars. Rehabilitation program included expenditure of \$500,000 for improved power facilities

COMpletely modernized interurban services on its routes between Indianapolis and Fort Wayne, Ind., and Indianapolis and Louisville, Ky., were inaugurated during August, 1931, by the Indiana Railroad System, with the installation of 35 new high-speed cars. In addition, approximately \$500,000 was spent in improving and increasing power facilities between Indianapolis and Fort Wayne to permit faster schedules.

The new cars are an innovation in electric railway service in Indiana, incorporating the most advanced features of high-speed interurban car construction. Each is equipped with four GE-706 100-hp. motors. They are capable of a speed of more than 80 m.p.h., and their use is expected to effect a reduction of from 30 to 45 minutes in running time between Fort Wayne and Indianapolis and Louisville. The total cost of the 21 new coaches ordered from the Pullman Car & Manufacturing Company and the fourteen de luxe cars from the

American Car & Foundry Company was approximately \$980,000, or \$28,000 per car.

Outstanding features of the new cars are the low, streamline bodies, high speed and quick-accelerating motors, auxiliary magnetic brakes, automatic electric heating, and battery lighting system providing steady interior illumination independent of the trolley voltage. High body sides and wide windows add to the attractive appearance. The bodies are constructed of light aluminum alloys of great tensile strength, resulting in a sturdier car than the older equipment, but which weighs approximately 50,000 lb. as compared with 90,000 lb. for the equipment now in service. The design of the car gives it an extremely low center of gravity. Wind resistance is reduced by the streamline and round contours of the body and the low arch-type roof.

Placing the motors close to the ground between specially constructed trucks eliminates most of the side sway as the car travels and makes it readily responsive to the

controls. The trucks, manufactured by the Commonwealth division of the General Steel Castings Corporation, are of the light-weight, equalized swing motion type, having a one-piece frame with integral pedestals and cast-steel bolsters.

Operation of the cars at the high speed of which the motors are capable is made safe through the use of the most modern double clasp brakes, two brake-shoes to each wheel. These brakes were designed and furnished by the American Steel Foundries. A system of electromagnetic brakes for auxiliary service is also installed. Another safety device is the automatic control with a deadman handle which automatically shuts off the current and applies the brake if the motorman releases the pressure of his hand.

Railway utility automatic electric heating equipment with thermostatic control will maintain comfortable temperatures in winter. In summer, electric fans will furnish cooling breezes. Illumination of the cars is by means of a double row of scientifically designed ceiling lights of high intensity—one above each double seat—which will permit reading without eyestrain. Each car is equipped with a motor-generator set and storage battery to insure continuous and steady lighting.

The interior decorations and appointments, including seats, carpets, draperies and painting were considered together, with the result that the effect is extremely pleasing, resulting in the utmost convenience and comfort. The standard coaches are equipped with Karpen chairs of the semi-individual type, upholstered in green and brown leather with head and arm rests. Wide, high windows and narrow posts on all sides of the car afford a maximum of glass area, and make the interior bright and cheerful.

OBSERVATION-LOUNGE A POPULAR FEATURE

In the fourteen de luxe cars there is an observation-lounge compartment, occupying the rear third of the car. These compartments, designed in detail by S. Karpen & Brothers, are decorated in two-tone shadings on walls and ceiling and are furnished with thick carpeting, deep upholstered chairs, solid walnut tables, parchment shades on reading lamps and a pair of tapestry settees. These compartments are available to all passengers without

Deep air-cushioned individual seats, attractive lighting and good ventilation make for the comfort of the passengers



An observation-lounge is available to all passengers without extra charge



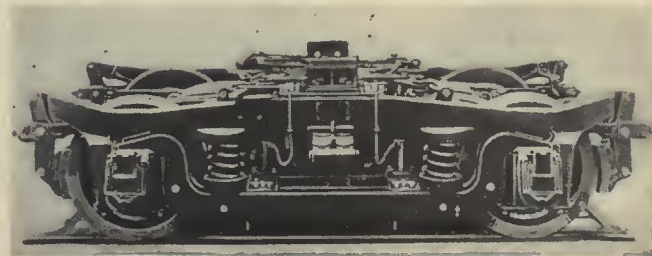
extra charge. The observation-lounge compartments accommodate ten passengers, and the coach compartments in the same cars seat 28. The standard type coaches have a capacity of 41. Each standard coach has at the rear a baggage compartment ap-

proximately 6 ft. in length. Access to this compartment from the outside is through a sliding door which is operated by pneumatic control from the front platform. A special washroom equipped with the most modern fixtures is located near the center of each car. The new cars are built for single-end one-man operation. Passengers will enter and leave at the front.

CARS EXHIBITED ALONG THE ROUTE

Previous to putting these cars into operation, the railroad system exhibited them to the public along the two routes during the week of July 18 to 25. The equipment placed on exhibition consisted of three two-car trains, each made up of one of the new standard coaches and one of the new de luxe cars with observation-lounge compartment. Just prior to the exhibition tours, a number of short inspection trips were run over the lines with representatives of newspapers, civic clubs and city officials as guests of the company.

The new time schedules under which the trains will operate between Indianapolis and Fort Wayne and between Indianapolis and Louisville, in approximately three hours, will not be made effective until several weeks after the cars have been in regular service and operators are thoroughly familiar with their control.



One-piece cast truck frame and completed truck used in Indiana Railroad's new cars

Analysis of the FINANCIAL

Prominent officials of the electric railway industry make pertinent comments on the article by Francis H. Sisson which appeared in the August issue of *Electric Railway Journal*

The analysis of the status of the industry and its present difficulties based on the United States Census data is very illuminating. I agree with Mr. Sisson that the education of the public as to the essential nature of mass transportation and the actual conditions under which it is now furnished is most important, and believe that in many instances some form of definite assistance, whether it is called a subsidy or not, must be substituted for the present practice of using mass carriers as tax collectors.

J. H. HANNA

*President Capital Traction Company
President A.E.R.A.*



I have rarely, if ever, read an article which so accurately diagnoses the troubles of the electric railways, and the underlying causes. I think we are indebted to Mr. Sisson for turning the searchlight of analysis on the electric railway situation, and setting forth the difficulties, and what may be done to meet them.

J. N. SHANNAHAN

*President Omaha & Council Bluffs
Street Railway
Chairman, Advisory Council A.E.R.A.*



Mr. Sisson not only makes an analysis of the situation but also presents some genuinely constructive thoughts and suggestions. He recognizes three important factors:

Proper public relations—not political—an understanding by the masses that good transportation is a necessity and an asset to the community. Such a conception should ultimately bring about satisfactory working agreements.

Good service on an economical basis. In order to do this, changes may have to be made in rail routes, and buses and trolley coach operations co-ordinated.

Reasonable rates, yet as low as the service will stand. This is one of the most difficult problems we have. The industry, and rightly, has broken

away from the 5-cent fare, but fare structures, particularly in the smaller cities, are not satisfactory either to the public or to the companies. The public, while conceding the fares are not too high, look upon them as somewhat too expensive and curtail riding, while the companies still are unable to secure the additional revenue necessary to operate the properties properly.

The industry has made progress in many respects, particularly in curtailing expenditures, but increased gross must ultimately be obtained if tractions are to be placed on a sound basis.

H. S. ROBERTSON

President Denver Tramway



I have been much interested in reading the article "Mass Transportation," by Francis H. Sisson, vice-president Guaranty Trust Company, in the *ELECTRIC RAILWAY JOURNAL* for August, 1931. This article is a very clear and understanding presentation of the necessity, as well as the difficulties, of street railways, but to my mind the most significant thing about it is that a man of the personal and official standing and importance of Mr. Sisson should take the time and trouble to consider and analyze the situation and write such an article. It should make a deep impression upon all of those in places of public authority to whom the problems of the street railway and local transportation system have to come for consideration.

WALTER A. DRAPER

President Cincinnati Street Railway



I have reviewed Mr. Sisson's paper with much interest and found it an excellent treatise on a matter which is causing much concern to the

electric railway companies at this time.

It not only mentions the difficulties that beset the industry and the handicaps imposed that prevent economies in operation to an extent enjoyed by non-regulated corporations, but it also offers many good suggestions for remedying the situation. Foremost among these is the thought that the public must be impressed with the fact that transportation service, like every other service, must be paid for. When this fact is realized, then only will the industry eventually emerge from its present plight.

I believe that articles of this nature play no small part in creating and fostering public good will in behalf of the industry, and to that extent should be encouraged wherever possible.

F. R. PHILLIPS

President Pittsburgh Railways



Mr. Sisson's article sums up the street railway situation in a very intelligent and comprehensive way. I think it is very true, and at the same time unfortunate, that so few leaders of business and industry and also organs of public opinion have interested themselves in this important problem with a view toward ascertaining the facts.

In our own cause, for instance, the Municipal and Public Utility Board, which would commonly be referred to as Public Utility Commission, recently completed an exhaustive and very complete investigation into our whole situation, but, strange to say, no car riders nor any of the citizens attended any of the hearings nor made any representations in any manner. There were present, of course, the usual solicitors for the various municipalities interested, but

SITUATION

Found Helpful

other than this there were no appearances.

We have endeavored to enlighten the public relative to our problems in various ways, including, among other things, radio talks, talks by members of the organization to various service clubs, and, of course, we have included a lot of articles in our *Public Service News* which is issued twice a month through the "Take One" boxes on the street cars, but it appears very difficult to register any impression. Personally, I have the feeling that a large group of the public do not really take us seriously and figure that what we say or write is propaganda, which perhaps, it is in one sense, but we are in fact telling the truth, and I am inclined to think too many of the citizens think we are "stringing" them, so to speak. How to overcome this is a puzzling question which I personally should very much like to have an answer to.

C. H. DAHL
Vice-President
Winnipeg Electric Company

Mr. Sisson has given us something really constructive. Some may say that he has told us nothing new, but to my mind he has given us a critical analysis which merits our careful attention, coming as it does in a friendly, inspiring way from one particularly versed in public relations and public reactions. I want to emphasize what seems to me to be the underlying thought in Mr. Sisson's conclusion, namely, that our problem "should not be insurmountable if the public thoroughly understands the situation." He had previously pointed out that "the general attitude of business men and the public had been one of indifference" but that "intelligent co-operation between public officials and company managers" was most essential so that the public might be brought "to a realization that transportation service, like every other service, must be paid for."

We are today attempting to do what Mr. Sisson tells us must be done, but we have not yet found the solution. This means that, if we are right in our thought, and Mr. Sisson tells us we are, we must just keep everlastingly at it. This problem must be solved. It is an obligation which we owe our communities. We have every right to be discouraged if we are looking for excuses, but we must not—we cannot—lay down. Public transportation is a public necessity and, as such, must be paid for. If we cannot sell this thought to public officials, the fault must be at least partially ours. Let us take another look at ourselves and see whether it is true, as we have so often thought before, that we have already done everything possible. Let us take a fresh hold and a firmer grip—it is our job.

W. H. SAWYER
Executive Engineer
New York

Mr. Sisson's article is a very interesting one, and a very complete one from a banker's viewpoint. The final sentence, "The public must be brought to the realization that transportation service, like every other service, must be paid for, and that unprofitable service is necessarily bad service," is a problem which is facing practically all of the street railway companies, but so far no successful solution has been offered. The raising of street railway fares in a city like New York would undoubtedly be the solution, but the raising of street railway fares in most other cities is not the solution, although it may be essential to carry the company over a gap, with the hope that conditions are going to change.

A large part of the decrease which all street railways are suffering in passenger traffic is during the midday and night. Our peak requirements, which involve carrying the wage earners to and from work, have remained approximately constant over

a period of years. All of our checks continue to show that we are hauling the majority of shoppers, the last one in St. Paul averaging 70 per cent, with 55 per cent as a minimum and 87 per cent maximum. We are not hauling people who are pleasure bent at any time during the day or night, and the automobile has proved itself to be more convenient for a great many, who, in their profession or business must call in different locations. We of course have also lost large numbers, who, regardless of expense or convenience, are riding to work in their own automobiles, and are taking with them or picking up street car riders. These are some of the causes that have reduced the street car patronage to a point where street railway properties cannot earn a fair return on their investment.

Cities of several hundred thousand inhabitants and larger all have the same problem, as office buildings, retail stores, hotels and business headquarters are located in a small business district, and the only known way to get the people to and from that district is with street cars. If street car transportation fails, then downtown property values will be reduced to a minimum. This in turn will reduce taxes collected by the city to such an extent that an excessive burden will have to be placed on all other property. It is, therefore, my judgment that if the street railway companies cannot serve the masses on account of lack of revenues, then the cities will have to subsidize the street railway properties.

The city cannot stand aside and allow its mass transportation to become dilapidated, as it is very doubtful if sufficient capital could afterward be attracted to rehabilitate the system.

This problem is now being minimized in the minds of the city authorities by a lot of loose talk concerning the over-capitalization of the street railways, the hiding of earnings, and the substitution of buses, the latter on the general theory that track transportation is obsolete. The automobile industry and the automobile user, by concerted action throughout the country, have gotten all cities convinced of the essentiality of spending tremendous amounts for

Trolley, Bus Riders Gain
But High Taxes Are Said to Be Victimizing the Railways

NEW YORK, Aug. 13.—Passenger travel on electric railway lines and affiliated bus systems in the United States is on the increase, despite competition from the private motor car, according to a report issued by the Interstate Commerce Commission today.

TROLLEY, BUS TRAFFIC RISES

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URGES TAX RELIEF FOR ELECTRIC ROADS

F. H. Sisson Also Favors Assessing Beneficial Property for Part of Facilities' Cost.

SEES BIG AID IN PUBLICITY

He Declares an Aggressive Effort to Put "True Situation Before the People" is Needed.

The best solution of the problem of the electric railway industry probably will be found to vary with local conditions, according to Francis H.

ELECTRIC RAILWAY PASSENGERS GAIN

Lines Continue, However, to Suffer From Politics, Taxes and Thin Profits.

Special Dispatch to The Electric Railway Journal, August 14.—Passenger travel on electric railway lines and affiliated bus systems in the United States is on the increase, despite competition from the private motor car, according to a report issued by the Interstate Commerce Commission today.

Trolley and Bus Riders Increase

Despite Private Car Competition—But Politics and High Taxes Fetter Operations

NEW YORK, Aug. 13.—Passenger travel on electric railway lines and affiliated bus systems in the United States is on the increase, despite competition from the private motor car, according to a report issued by the Interstate Commerce Commission today.

Newspaper comment on Mr. Sisson's article

widening streets, and offering every other facility for the convenient use of the automobile. The street railway industry in a similar manner must convince all of the cities of the necessity of spending sufficient money so that the great majority of their inhabitants can continue to have adequate service to and from work and for shopping.

T. JULIAN MCGILL
Vice-President
Twin City Rapid Transit Company

I have read with keen interest the article in the August issue of **ELECTRIC RAILWAY JOURNAL** entitled "Mass Transportation Must Be Placed on a Firm Financial Basis," by F. H. Sisson, vice-president of the Guaranty Trust Company, New York City. We all agree, of course, with Mr. Sisson that it is desirable and essential, both from the standpoints of the managements and of the public, that a fair return be earned by those supplying the public necessity of transportation. There is no cure-all or single theory that can be applied universally to meet the existing conditions in the various cities throughout the nation. Managements must apply the corrective measure that is best suited to meet the individual conditions which they encounter.

Mr. Sisson outlines several theories which are worthy of serious consideration, and undoubtedly some of his suggestions can be applied profitably, either in whole or in part, by many managements.

Whatever the plan decided upon by those in charge of electric railway properties to relieve them of their pressing financial dilemma, I believe a successful conclusion depends largely upon education. Our previous endeavors to inform the public have been more or less along hit-and-

miss lines. We have not concentrated these efforts sufficiently where the most is to be accomplished—that is, among business men and governing political bodies.

Despite all that has been said and written, the more influential citizens do not yet fully appreciate the real value or significance of public transportation. They have become so accustomed to using their private means of transportation that they lose sight of the fact that the large masses are dependent upon public transportation and that it is in the public interest that those supplying this service be permitted to earn a fair return. Once the railways receive the full benefit of a complete understanding by business men, and governing bodies fully appreciate the problems of electric railways, the way will be paved for applying the corrective measures best suited for relief.

D. W. PONTIUS
President Pacific Electric Railway

Mr. Sisson has laid his finger upon one of the most serious phases of the current situation in the urban mass transportation business. The practical absence of credit in this industry makes exceedingly difficult, if it does not prevent, constructive measures for the improvement of the essential service which it renders to the public.

There can be no dispute that the surface electric railways must continue to be the backbone of the local transportation systems in our larger cities where the mass transportation problem is involved. It is high time that the serious situation, which has confronted this industry since the outbreak of the European war, should be realized by the business community at large, and constructive and adequate steps taken to restore

this essential industry to a firm financial basis. The recent action of the United States Chamber of Commerce, recommending that such a study be made under the auspices of the Chamber, is encouraging evidence of the growing realization by the financial and business leaders of our larger cities, and of the country as a whole, that the electric railway industry must have help in working out a constructive solution of its problems, and that the entire community has a vital interest in the attainment of this end.

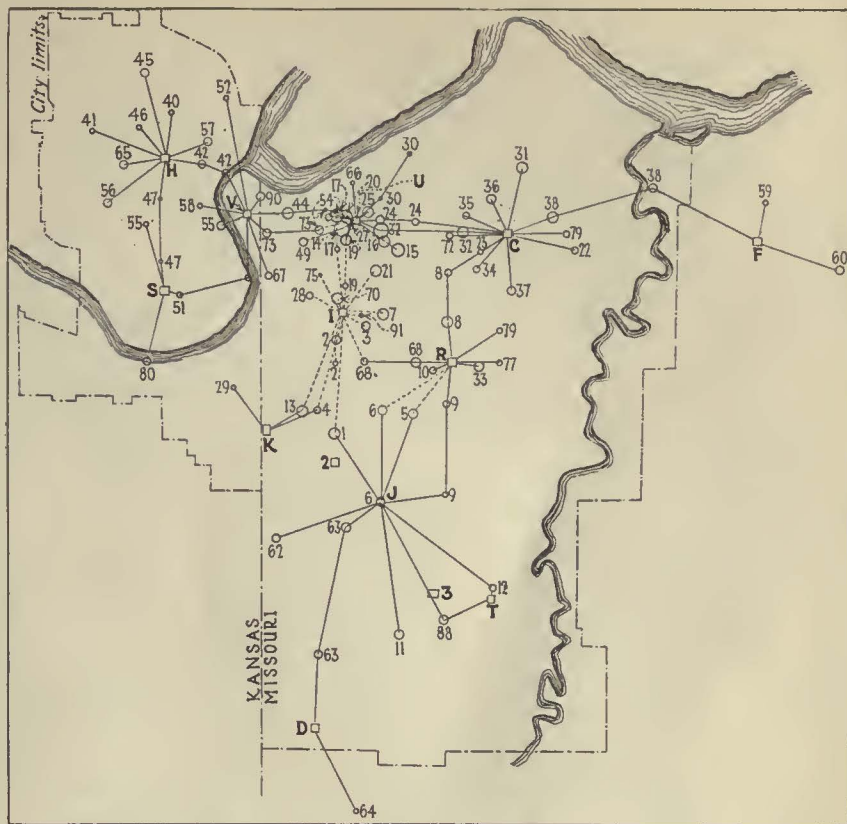
I do not believe the problem can be solved through the individual efforts of the companies engaged in mass transportation. Some concerted collective action by all of the companies in this industry, acting in cooperation with such organizations as the United States Chamber of Commerce, is required. It is imperative that a constructive solution be found, for the orderly and progressive development of our large cities is being hampered by the limited credit—or the entire absence of credit—of the local transportation companies, which makes it impossible for these companies to keep pace with the march of progress and to aid in the orderly development of the communities which they serve.

THOMAS CONWAY, JR.
President Cincinnati & Lake Erie Railroad

This article is a real message to the industry and might very well be passed on in some fashion to the public citizen. Mr. Sisson presents his case in a clear and comprehensive manner and proves conclusively that the electric railway is absolutely essential to urban life, but for political reasons the investor in its securities is barred from a legitimate return on his money. In the last three paragraphs on page 398, Mr Sisson suggests a solution. In my opinion, this is the gist of the article, and it seems too bad that we cannot get this type of information across to "the fellow on the street," the lad who elects city and county officials, just to combat the political "hokey" he gets through the average newspaper. We talk to ourselves at convention meetings and we produce splendid articles in our journals, but we do not get beyond this often enough and get the attention of the public.

T. W. CASEY
President National Pneumatic Company

Kansas City Reorganizes Distribution System



The layout of the Kansas City distribution system showing the first stage in the reorganization plan

Plans have been adopted for ultimate construction of three new substations, increased capacity at two more and abandonment of five others. Better car operation and many economies will result

WORK has begun on the first stage of a plan which ultimately will reorganize the power distribution system of the Kansas City Public Service Company. This change has been decided on because of the expansion of Kansas City to the south, rather than to the southwest and southeast, as was anticipated in 1916, when the present system was laid out.

The work now in progress consists of the construction of a new 4,250-kw. substation at 25th and Oak Streets, the abandonment of two other substations, those at Fifteenth and Walnut Streets and 31st and Holmes Streets, with a total capacity of 6,500 kw., and the transfer of equipment released to the substations at 1017 Oak Street and 31st and Montgall Streets to increase their capacity by a total of 2,500 kw. In addition to this substation work, automatic feeder breakers will be installed at 37 important stub ends and crossings, and direct-current feeders will be placed in underground ducts at the 1017 Oak Street station.

While this work was necessitated by the condemnation, due to the widening of Fifteenth Street, of the railway's present office quarters, in which a substation was located,

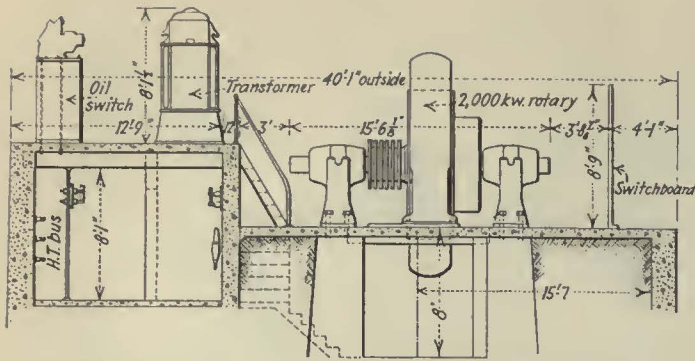
it is a part of a general plan to modernize the entire power system to improve its characteristics materially. Construction of the 25th Street substation and the elimination of those at 31st Street and Fifteenth Street are expected to reduce the power operating expenses by approximately \$7,000 per year.

Before the present construction program was started, the Kansas City Public Service Company had a converter capacity of 32,500 kw., distributed among thirteen substations, with a 500-kw. portable station at Merriam, Kan. Table I gives the location, name, and machine capacity of each station:

Table I—Locations and Ratings of Kansas City Substations

Location	Converters		Station Capacity Kw.
	Number	Rating, Kw.	
A 31st and Holmes.....	4	750	3,000
B 15th and Walnut.....	1	1,500	3,500
C 12th and Cleveland.....	1	2,000	7,000
D 75th and Wornall (Automatic).....	2	1,000	750
F Van Horne and Blue (Automatic).....	1	3,000	1,000
H 10th and State, K. C., Kan.....	2	750	2,000
J 48th and Troost.....	3	1,000	3,000
K 40th and State Line.....	1	1,000	1,000
R 31st and Montgall.....	1	1,500	1,500
S 10th and Scott, K. C., Kan.....	1	1,000	1,000
T 39th and Swope Parkway (Automatic).....	1	750	750
U 1017 Oak St.....	2	3,000	6,000
V Central and James, K. C., Kan.....	1	2,000	2,000

A system load study revealed unequal loading of the various stations. Five substations are near their load centers and carry full load during maximum peak demand. One substation, Twelfth and Cleveland, while near its load center, has fair capacity and is capable of carrying greater loads. The substation at Fifteenth and Walnut, while heavily loaded, has its load center near



The new substation at 25th and Oak Streets was designed for economies in construction. Costly excavation work was held at a minimum

Eighteenth and Grand. The substation at 48th and Troost has spare capacity, is feeding long distances and has its load center near 55th and Troost. The substation at 31st and Holmes, while carrying a full load, transfers the bulk of its output to Main Street, or into territory which should be supplied by the station at 31st and Montgall. The latter station is found to be at its load center, is operating at reduced voltage and has need for more machine capacity. The substations at 59th and Swope Parkway and at 40th and State Line are found to be so far from their load centers that they cannot be used to advantage.

The ultimate plan for the power distribution system will effectively improve the load factor of each substation, permit better car operating conditions and materially reduce power costs. In addition to the work now being done, as mentioned above, two more substations will be built. One, with a capacity of 3,000 kw., will be located at 43rd and Main, and another with a total capacity of 1,500 kw., at 59th and Prospect. The three substations located respectively at 40th and State Line, 48th and Troost, and at 59th and Swope Parkway will then be discontinued. Automatic equipment will be installed at Tenth and Scott Street, Kansas City, Kan., replacing that in the substation eliminated at 59th Street and Swope Parkway.

The approximate cost of the above changes, including land, buildings, disconnecting machines, drayage, installing machines at new locations, feeder and transmission changes and necessary new equipment is estimated at nearly \$157,000. The work which is now in progress, which will be completed within a short time, will cost approximately \$85,000. It is hoped that the ultimate plan will be completed before the end of 1932.

The advantages of the ultimate plans are:

1. There will be better car operating conditions. Reduced voltage will be furnished in the downtown area,

Table II—Estimate of Annual Saving Under Ultimate Power Distribution Plan

	Present	Ultimate
New equipment, 10 per cent.....	0	\$1,769
Buildings, 10 per cent.....	\$3,574	3,300
Attendance.....	19,500	11,400
Additional a.c. cables and ducts, 9 per cent.....	.....	4,328
Additional d-c. feeders, 9 1/2 per cent.....	.....	1,143
Feeder losses.....	7,972	4,632
	\$31,046	\$26,572
Annual savings.....	\$4,474	

Table III—Estimate of Annual Saving Under First Step of Power Distribution Plan

	Present	First Step
New equipment, 10 per cent.....	0	\$1,440
Buildings, 10 per cent.....	\$1,316	.....
Attendance.....	10,000	.....
A-c. cable and ducts, 9 per cent.....	.....	.....
D-c. feeders, 9 1/2 per cent.....	.....	.....
Feeder losses.....	4,108	2,671
	\$15,424	\$12,069
Annual savings.....	\$3,355	

so that the current demand per car will decrease, resulting in smoother acceleration and less car resistance loss. In the important outlying districts there will be higher line voltage, which will give faster accelerating rates and higher possible schedule speeds.

2. With automatic feeder breakers tied in to the important trolley sections the copper losses will be reduced from one-half to three quarters of their present values. The voltage drop curve along the trolley will be similar to a catenary instead of a straight line.

3. With the substations transferring current through the automatic feeder breakers, the peak loads of short duration that occur as the load moves past a station will be smoothed out, giving lower maximum currents extended over longer periods, thereby giving more uniform load factors and more reserve capacity in the major stations.

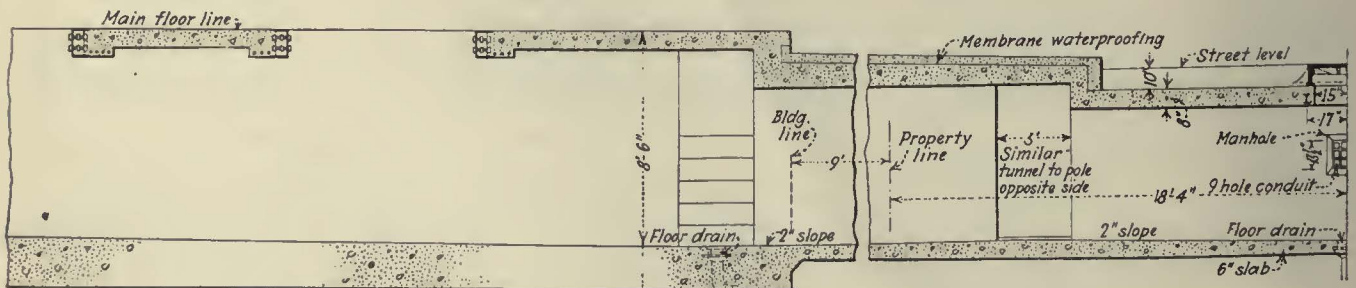
4. Building maintenance will be materially reduced with two less stations.

5. The number of operators required will be reduced by four.

An estimate of the annual charges on the affected stations under the ultimate plan indicates a saving of \$4,474. This is derived as shown in Table II.

The energy savings are only those which will accrue in the feeders due to shorter feeding distances, to heavy loads and the installation of automatic feeder breakers. Intangible savings, such as those due to reduced voltage in the downtown area and more uniform station loading, are not shown.

Under the first step of the ultimate plan, the annual charges on the affected stations will be \$3,355. Details of the estimate are given in Table III.



Power transmission leads will be carried under the street surface at the new substation

Broad FIELD OF USE

for the Trolley Bus

To show the field for the trolley bus the author has analyzed figures on costs in a paper, presented before the Midwest Electric Railway Association

By
CHARLES GUERNSEY
Chief Automotive Engineer
J. G. Brill Company

PERHAPS no American industry has been forced to make such a rapid change of conditions as transportation has in the past fifteen years. The general use of the private automobile, with the concurrent building of improved streets and highways, and the resultant increase in speed and density of street traffic, has had a serious effect on public transportation. And apparently this transition is not yet complete. To meet these changing conditions, it is necessary that the electric railways make the best possible use of the various means of transportation which are available, including rapid transit, the surface car, trolley bus and gasoline bus, each in its proper field.

The trolley bus of current type is a comparatively recent development, which seems to have a distinct and broad field between the trolley car and the gasoline bus. In its proper sphere it can serve the needs of a community better and at less cost to the operating company than any other vehicle.

Various authorities have defined the field for the trolley bus as being limited to a minimum of about one-minute headway during rush hours and a maximum of about a twenty-minute headway in off-peak hours. With the 40-passenger type now generally used, this means

Table I—Direct Operating Costs, in Cents Per Mile

	40-Pass. Trolley Bus	40-Pass. Gasoline Bus	30-Pass. Trolley Bus	30-Pass. Gasoline Bus
Wages of operator.....	5.70	6.55	5.70	6.55
Power or fuel, including gaso- line tax and engine oil.....	2.40	4.70	1.80	3.60
Maintenance of way.....	.70		.70	
Maintenance of equipment....	5.60	6.80	4.40	6.20
Garage.....	1.20	1.60	1.10	1.50
Other transportation.....	1.20	1.20	1.20	1.20
General and miscellaneous, in- cluding taxes.....	3.90	4.20	3.70	4.00
Total.....	20.70	25.05	18.60	23.05

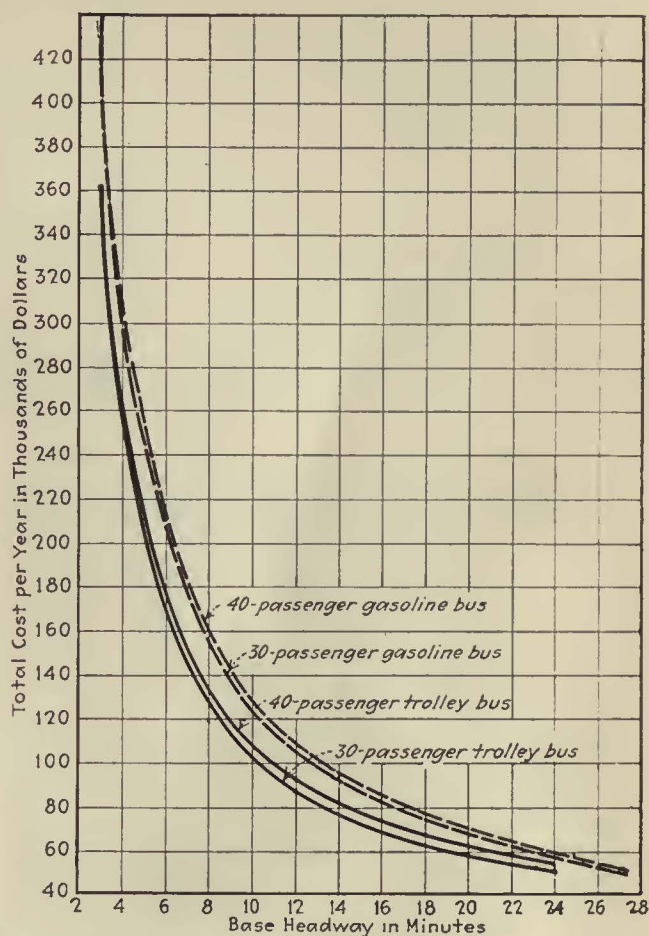


Fig. 1—Comparative total operating costs per year for 30 and 40-passenger trolley and gasoline buses, for various headways

a maximum of 4,500 passengers per hour and a minimum of about 100 passengers per hour on base schedules. With the 30-passenger vehicles the same headway can be maintained at lower cost, and if a larger vehicle could be developed a higher peak load could be handled on the same headway.

To show the cost for operating trolley and gasoline buses under varying conditions, two tables and three sets of curves are presented. Table I gives the direct operating costs in cents per mile for trolley and gasoline buses of the 40 and 30-passenger types. These figures show that the larger size trolley bus can be operated for 4.35 cents per mile less than the gasoline bus, while the smaller capacity trolley bus can be operated for 4.45 cents less than the gasoline bus of corresponding size.

Table II analyzes all the costs in operating a typical 10-mile line (round trip) with the four mentioned types of vehicles. The light traffic figures, for a peak load of 600 passengers, are based on the assumption that peak service is not appreciably greater than base service. The figures for heavy traffic, on the other hand, are for a peak service which, in proportion to the base service, is comparatively heavy. For the light traffic conditions, the trolley buses have a considerably less cost per mile and per seat-mile than the corresponding sizes of gasoline buses. For the heavy traffic service the trolley bus figures are even more favorable.

Table II—Operating Costs, 10-Mile Line (Round Trip) with 30 and 40-Passenger Trolley Buses and Gas Buses

(Figures based on four peak and fourteen base hours for 300 days and eighteen base hours for 65 days. Also eight stops per mile on peak schedule and six on base.)

	Light Traffic, Peak Load of 600 Passengers—				Heavy Traffic, Peak Load of 2,400 Passengers—			
	40-Pass. Trolley Bus	40-Pass. Gasoline Bus	30-Pass. Trolley Bus	30-Pass. Gasoline Bus	40-Pass. Trolley Bus	40-Pass. Gasoline Bus	30-Pass. Trolley Bus	30-Pass. Gasoline Bus
Maximum passenger capacity per vehicle.....	80	80	60	60	80	80	60	60
Peak headway, in minutes.....	7.50	7.80	5.70	5.67	2.02	2.01	1.50	1.48
Peak schedule time, in minutes.....	52.5	62.5	57.0	62.5	52.5	62.5	57.0	62.5
Vehicles required during peak hours.....	7	8	10	11	26	31	38	42
Base headway, in minutes.....	12.0	13.5	12.0	13.5	4.8	4.9	4.8	4.9
Base schedule time, in minutes.....	48	54	48	54	48	54	48	54
Vehicles required during base hours.....	4	4	4	4	10	11	10	11
Vehicle-miles per year—Peak.....	100,500	96,000	132,000	132,000	375,000	372,000	501,500	505,000
—Base.....	250,800	214,800	236,000	214,800	697,000	680,000	697,000	680,000
—Total.....	351,300	310,800	368,000	346,800	1,072,000	1,052,000	1,198,500	1,185,000
Operating cost per mile, in cents.....	20.70	25.05	18.60	23.05	20.70	25.05	18.60	23.05
Annual operating cost.....	\$72,500	\$77,700	\$68,400	\$80,000	\$218,500	\$264,000	\$222,000	\$272,500
Investment—Line.....	70,000	70,000	70,000	70,000	70,000	70,000	70,000	70,000
—Substation.....	12,250	12,250	12,500	12,500	45,500	47,500	47,500	47,500
—Vehicles (10 per cent apares).....	100,000	99,000	99,000	102,000	350,000	374,000	378,000	382,500
—Total.....	\$182,250	\$99,000	\$181,500	\$102,000	\$465,500	\$374,000	\$495,500	\$382,500
Depreciation—Line and substation (20 years).....	4,112	4,112	4,125	4,125	5,775	5,775	5,875	5,875
—Trolley bus (10 years).....	10,000	10,000	9,900	9,900	35,000	35,000	37,800	37,800
—Gasoline bus (7 years).....	14,150	14,150	14,580	14,580	53,430	53,430	54,640	54,640
—Total.....	\$14,112	\$14,150	\$14,025	\$14,580	\$40,775	\$53,430	\$43,675	\$54,640
Interest on half amount, at 6 per cent.....	5,467	2,970	5,445	3,060	13,965	11,220	14,880	11,460
Fixed charges.....	19,579	17,120	19,470	17,640	54,740	64,650	58,555	66,100
Total annual costs.....	92,079	94,820	87,870	97,640	273,240	328,650	280,555	338,600
Total cost per mile, in cents.....	26.2	30.5	23.9	28.3	25.4	31.2	23.5	28.6
Total cost per seat-mile, in cents.....	0.658	0.764	0.797	0.945	0.637	0.780	0.785	0.955

The curves in Fig. 1 show total annual operating costs, plotted against various base headways. They indicate that the cost of operating the 30 and 40-passenger trolley buses in this service over a wide range of headways, varies only slightly, with a small advantage in favor of the larger vehicle. By using enough 30-passenger vehicles to maintain the desired minimum headway and larger vehicles for additional service during peak hours, the operating costs can be still further

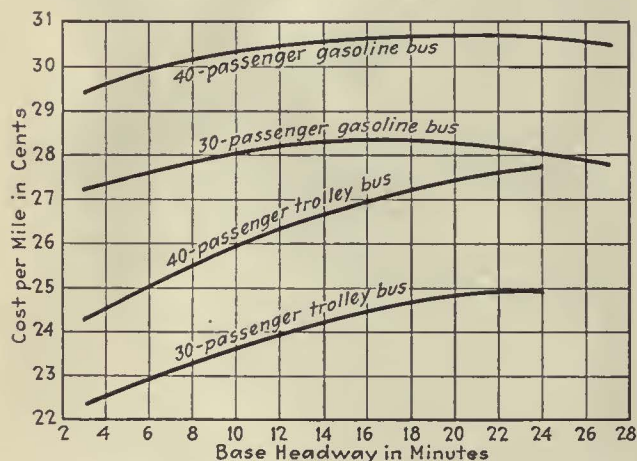


Fig. 2—On base headways of 3 to 27 minutes the costs per mile for trolley buses are lower than those for gasoline buses

reduced. While the gasoline bus is cheaper on over-all costs on the longest headway taken, the comparison is made with a definite minimum number of vehicles, rather than with a definite headway or mileage, and where the gasoline bus operates the same number of miles per year as the trolley bus, the cost would then be higher. This is brought out in the curves of Fig. 2, showing the cost per mile for various headways. If the curves showing cost per mile of 40-passenger gasoline buses and trolley buses are projected until they meet, it indicates that under these conditions the trolley bus can operate at a lesser cost per mile on a base headway of about 40 minutes or less.

Line and substation costs are included at replacement values in the figures used for the curve. If substations are already in service, or if installation involves only the adding of a second wire to an existing trolley car overhead, then the cost for installation of line would

be materially reduced, reacting to the benefit of the trolley bus. The curves in Fig. 3 show the cost per seat-mile for headways varying from 3 to 24 minutes. Throughout this range the trolley bus costs are considerably under those for the gasoline bus.

On lines which maintain a base service which is not a great deal under the peak service, the 30-passenger trolley bus would have several advantages. It can be operated at a lower cost than the other vehicle and in addition maintain a shorter headway during peak hours. However, on a longer headway the 30-passenger gasoline bus becomes cheaper per year although still costing more per mile than the trolley bus. Under these conditions the trolley bus seems to be cheaper until the base headway of approximately 34 to 35 minutes is reached. Again, due to peak service, the average headway at the critical point is less.

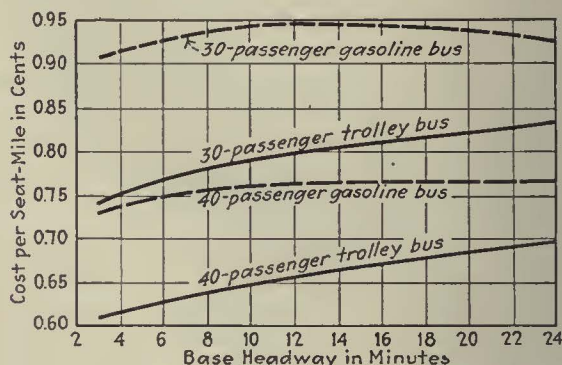


Fig. 3—Unless service is quite infrequent, the cost per seat-mile for trolley buses is less than for gasoline buses

These costs are based on frequent stop service. Where the distance between stops is greater, allowing the gasoline bus to take advantage of its higher free running speed, conditions undoubtedly would be more in favor of the gasoline bus. In general, the trolley bus seems to be cheaper than the gasoline bus for frequent stop service for mean headways less than 20 to 30 minutes, depending on conditions. Much greater frequency than 20 to 30 minutes headway must be maintained to hold city service traffic, so the gasoline bus seems to be limited to the boulevard, suburban and interurban operation. On close headways, the rail car can undoubtedly handle traffic at lower cost than the trolley bus, if the track and other facilities are in existence.

Riding Increased

in Milwaukee by

WEEKLY PASS and FARE

EXPERIMENT

FAVORABLE reception of the weekly pass by Milwaukee's riding public is attested by an increased volume of riding. The new fare structure, inaugurated by the Milwaukee Electric Railway & Light Company on May 4, 1930, which provides for a 10-cent cash fare, six tickets for 50 cents (8½-cent rate) and a \$1 weekly pass, has been beneficial to revenue, stimulated short-haul riding and improved the system load factor. In addition to this new basic fare structure, various special pass rates tried for limited periods, usually seasonal in character, have attracted new riders and more revenue.

Prior to the installation of the present fares, the rates were 7 cents cash and eight tickets for 50 cents within the "single-fare" area, having a radius of approximately 4 miles of downtown Milwaukee. In the outlying districts, a zone system prevailed, the zones being approximately 1 mile, with a cash fare of 3 cents per zone and 25 tickets for 50 cents. A person riding from the single-fare area into the suburban or zone area would pay the basic fare, plus a fare for each zone through which he rode.

The railroad commission's order changing the fare structure at the same time extended the radius of the single-fare area to approximately 5½ miles from downtown Milwaukee, and set the zone rate at 3 cents cash, or twenty tickets for 50 cents. There was a weekly pass selling at \$1.75, good in the single-fare and suburban area. As a consequence, although there was some increase in the zone ticket rate, a very large part of the suburban or zone revenue was wiped out by the enlargement of the single-fare area. This lost revenue, amounting to something in excess of \$300,000 annually, must be made up by the new rates before the company breaks even in total operating revenues.

The commission's order made public on the evening of May 1, 1930, said that all tickets sold at the old rate until the order became effective Sunday morning, May 4, would be valid for transportation. Obviously, during Friday and Saturday preceding the effective date of the order there was a great rush for these "bargain tickets," and at least \$150,000 worth were sold. For several months they kept coming into the fare boxes, and even

Installation of weekly pass coincident with increase in cash and token rate satisfy company and public. Subsequent experiments with passes and transfers bring new business. Simplicity in collection aids increased speed

as late as August, 1930, about 10 per cent of all the tickets lifted were purchased at the old rate of eight for 50 cents. As it worked out, however, this bargain sale of tickets was an advantage because in the public mind it took off the edge of an increase in fare to those people who could not possibly use the weekly pass.

Due to these rather unusual features of fare adjustment, complications in revenue accounting made it impossible to get a direct measure of the financial effect of the new fare structure in its beginning. If all the tickets lifted subsequent to the change had been of the 8½-cent value, the company would have experienced quite a material increase in revenues, even after making up the loss due to the elimination of suburban fares. In addition, there has been a continued increase in industrial layoffs due to the general economic depression, so that without a fare adjustment the revenues would certainly have been less than they were in comparative periods of the preceding years. Actually, the revenues have held on an even keel.

The volume of riding, however, can be determined rather definitely. All figures indicate increased patronage compared with 1929. Within a few months the number of passengers carried increased about 30,000 per day. In the second week of June, 1930, the sale of passes amounted to 80,658. In the third week of August of the same year, 71,000 were sold. This decrease was purely seasonal. However, the sales picked up in the early fall and during the second week of March, 1931, a top sale of 88,337 passes was attained.

From periodical checks of the riding, it was determined that those people who previously used tickets or cash, and who were now buying weekly passes, formerly rode sixteen times per week. Further checks have indicated that the present use of the pass is about 31 rides per week, or, after making adjustments for transfer from car to car, 22 origin-to-destination rides per week. Thus, the riding of each passholder has been stimulated to the extent of six rides, and a passholder's average fare

is about $4\frac{1}{2}$ cents. This additional riding is practically all off-peak, as there has been no increase in peak riding. There has been a definite tendency for people who previously stayed downtown at noon to go home to lunch, and there has been a noticeable increase in short-haul riding. The distribution of revenue at present is approximately 28 per cent cash, 22 per cent ticket, and 50 per cent pass. The distribution of riding is approximately 16 per cent cash, 17 per cent ticket and 67 per cent pass. Cash fares have held up remarkably well and better than was expected.

Passes are good from 5 o'clock Sunday morning to the same time on the following Sunday. They are on sale on the cars from the preceding Saturday until Tuesday night. For the remainder of the week, passes may be purchased at the company's ticket offices. The majority of passes are sold on Sunday, the lightest traffic day. Monday sales are the next highest, but they have not slowed down the schedules. Between 2 and 3 per cent of the weekly passes are sold on Saturday and the sales after Monday are approximately the same percentage of the week's total. With the pass priced conveniently at \$1, and with a large volume of sales before Monday morning, there is practically no interference or congestion on the early Monday morning trips. The pass is transferable and unlimited as to quantity of riding during the week.

PASS AIDS SPEED IN OPERATION

The extensive use of the weekly pass on the system has definitely contributed to an increase of operating speed. Although not entirely attributable to the new fare structure, inasmuch as the company has made particular efforts to speed up its service, the simplicity of the new fares has had a great deal to do with making this increase in speed possible. For the first six months of 1930, the average speed, as shown in the table, was 9.33 m.p.h. against 9.70 m.p.h. this year. Further, there has been a decrease of 1.3 per cent in car-miles and 5.1 per cent in car-hours, notwithstanding the appreciable increase in riding.

It is interesting to note in this connection that, due to industrial conditions, there has been quite a material decrease in peak-hour riding across the maximum load points. Generally, also, there has been some increase in riding across the maximum-load points during the off-peak hours, but not enough to offset the decreases in the peaks. In other words, while there is a better distribution of riding across the maximum-load points, the whole volume is less than it was a year ago. Notwithstanding this, there is actually more riding on the system as a whole than there was last year. This apparent paradox is undoubtedly due to the short-haul riding, either downtown or in the outlying districts, stimulated by the weekly pass. The desirable effect of all this upon the load factor of the railway system can be readily appreciated.

ADDITIONAL FARE EXPERIMENTS TO PROVIDE FOR SEASONAL TRAFFIC

In addition to the basic weekly pass, the Milwaukee Electric Railway & Light Company has experimented with less expensive limited-use passes. These, in general, have been seasonal in character, and designed to increase off-peak riding. During the Christmas holiday season a 75-cent limited pass was sold. Later, holders of regular weekly passes were permitted to carry two

A Speed Increase in Milwaukee Follows Use of Pass

Period	Car-Miles	Car-Hours	Car-Miles per Car-Hour
Jan.-June, 1931	12,172,707	1,255,295	9.70
Jan.-June, 1930	12,332,170	1,322,796	9.33

children of half-fare age free on Sundays. In addition, a 75-cent shopper-theater pass was instituted.

The off-peak pass was introduced temporarily to determine how popular such a plan would be. It was not advertised as a trial installation but as a special Christmas shopper's pass designed to relieve rush-hour congestion and to stimulate holiday trade. It was in effect from Nov. 30, 1930, to Jan. 3, 1931, inclusive, a period of five weeks. On week days, the pass was good except from 5 a.m. to 9 a.m., and from 4 p.m. to 7 p.m. On Saturdays, it was good at all times except between 5 a.m. and 9 a.m. On Sundays and holidays there was no time limitation. In order to avoid disputes a tolerance of 20 minutes was allowed, although, of course, no public announcement of this was made. The disputes were surprisingly few.

Approximately 3,000 Christmas shopper's passes were sold each week, as compared with about 85,000 of the \$1 or unlimited passes. Peculiarly, during the first week in which the 75-cent passes were sold there was a very marked increase in the number of \$1 pass sales. Whether this was merely seasonal or not it was difficult to determine exactly, but it was believed that the publicity with respect to the off-peak pass stimulated in some measure the sales of the unlimited passes. Several comments were received to the effect that persons would as soon pay the extra 25 cents for the privilege of riding at all hours. Incidentally, the off-peak pass was instrumental in developing considerable good will, although apparently the difference in price between the limited and unlimited pass was not sufficient to create a large demand for the former.

Beginning on Feb. 1, 1931, a plan was in effect for two months on the Racine and Kenosha systems, as well as on the Milwaukee system, of permitting passholders to carry two children of half-fare age free on Sundays. If a child presented a pass, he was permitted to carry two additional children. Checks made indicated that between 28,000 and 30,000 children were taking advantage of these free Sunday rides. In developing the idea, it was believed that it might have some publicity and good will value and that it might directly or indirectly be responsible for the sale of some additional weekly passes.

SIMPLIFIED TRANSFERS USED

On April 12, 1931, the company inaugurated a new simplified transfer for a three-month trial, with all restrictions removed except time. In other words, transfers are now good in any direction without regard to originating line, and passengers may board at any point instead of only at transfer points as heretofore. Transfers are punched for a time allowance of not less than one hour or not more than $1\frac{1}{2}$ hours. The plan is to simplify the rather complicated transfer arrangements which were in effect and cause as little annoyance as possible to the passenger, so that the trainmen could be more strict in refusing transfers upon which the time limit had expired. It was believed better to have a simple transfer about which disputes could not easily arise than to have a transfer with complicated rules which neither passenger nor operator could comprehend.

In addition to simplification, the transfer partially accomplishes the desired effect of giving a lower rate

of fare to the short-haul rider. A long-haul rider cannot use the transfer and have much time left for shopping or errands, whereas a short-haul rider would have considerable spare time. It was hoped that whatever loss in revenues there might be as a result of this new transfer would be at least offset by the riding stimulated, and that there might be experienced an actual gain in revenue. There is no reason to believe that the new transfer has not been successful, although not enough time has elapsed to determine results definitely. Consequently permission has been obtained from the Public

Beginning on June 22, 1931, a special 50-cent interurban summer night pass was inaugurated. This pass is good for one night after 6 p.m. to any point on the interurban system, not only for a round trip but including stopover privileges. The summer night pass gives the holder full use of the interurban system for one evening for 50 cents. The pass can be purchased any evening from Monday to Friday inclusive. The philosophy here was that the evening riding on the interurban was so small that there was practically no revenue to be lost by such a pass. Before the pass was introduced,



All the weekly and the shopper-theater passes are printed in lively colors with designs that change each week

Service Commission for an additional three-month trial in order to study it further.

On May 17, 1931, a 75-cent pass was again put into effect, this time being designated as a shopper-theater pass. The same governing rules were followed as with the Christmas shoppers' pass, except that two children of half-fare age were allowed to ride free on Sundays along with the bearer. The time limit on this experiment expired on June 27 but was extended to Sept. 5, with the additional privilege that two children of half-fare age may ride with the holder at any time when the pass is good. The reason behind this was that many women of moderate circumstances in Milwaukee have small children and cannot afford to employ help to take care of the children, so they must either stay at home or take the children with them. If the regular fare were paid for two children as well as for the mother, it would make the cost too great to allow many street car rides. This new additional privilege on the off-peak pass would permit women to take children visiting or to the parks and, together with the \$1 weekly pass, it would in effect provide low-cost family transportation. Sales of the shopper-theater pass averaged about 1,800 up to the time the privilege of two children was added, and in the first week after the additional privilege was allowed, the sales went to about 2,200, with further increases as the plan became better known.

the interurban lines carried between 600 and 900 passengers after 6 p.m. from Monday to Friday of each week. After the pass was effective, the riding during the same periods reached 2,000 per day. Between 600 and 1,000 passes were sold daily, depending on the weather. Of the total riders after 6 p.m. on these days, between 500 and 800 continued to pay the regular fare.

The 50-cent summer night pass was to have expired on July 31, but was extended to Sept. 4. A special children's pass effective for the same period and with the same privilege, is being sold for 25 cents. These special summer night passes gave the company an opportunity to display its wares to get a large number of people on the interurban line accustomed to riding who otherwise would not ride.

Beginning on July 16, 1931, and effective up to Aug. 31, a 15-cent pass known as the "Pastime Pass" was made effective on the city buses of the company's de luxe bus lines operating in Milwaukee. The "Pastime Pass" supplements a 10-cent cash fare and is good for any number of rides after 6 p.m. on the day of purchase. On Sunday it is good all day and is sold at the same rate. This pass idea has proved very popular and has saved money for anyone riding more than once during the evening. Sales are in the order of 500 per night on a weekday and are a maximum on Sundays, the peak sale being slightly more than 2,000.

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.						
July, 1930.....	2,371,152	5.04	2,108,071	0.61	167,520	489.94	July, 1930.....	60,907	21.09	64,134	11.68	24,217	110.28
Aug.....	2,280,322	7.81	2,113,183	1.65	274,728	163.79	Aug.....	64,592	18.82	62,484	8.19	12,690	36.45
Sept.....	2,470,918	8.78	2,091,718	0.52	59,868	800.31	Sept.....	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	51.30	Oct.....	75,708	17.80	66,353	0.59	18,447	226.80
Nov.....	2,579,899	10.34	2,066,206	2.56	71,150	77.85	Nov.....	72,024	13.22	66,314	0.23	21,171	158.25
Dec.....	2,850,330	8.80	2,178,896	2.24	235,950	66.62	Dec.....	.....	.....	.....	.....	.....	.....
Jan., 1931.....	2,840,159	8.43	2,082,456	6.23	314,067	30.66	Jan., 1931.....	79,764	15.78	67,438	7.33	13,133	236.77
Feb.....	2,534,828	8.33	1,952,032	6.23	142,339	48.27	Feb.....	74,018	13.38	62,239	7.93	13,594	75.36
Mar.....	2,769,564	7.30	2,019,081	4.92	309,212	29.03	Mar.....	75,201	7.33	64,051	7.61	13,965	5.23
Apr.....	2,616,188	7.00	1,909,176	7.85	275,740	11.45	Apr.....	70,660	0.48	62,685	4.90	16,293	23.64
May.....	2,579,269	3.70	1,993,753	4.36	143,804	62.47	May.....	72,560	8.29	61,040	6.82	16,996	21.34
June.....	2,415,175	6.52	2,073,560	7.04	99,815	169.79	June.....	63,338	13.81	59,346	9.15	24,700	97.48
July.....	2,188,942	7.68	2,021,305	4.12	271,777	62.23	July.....	58,406	4.11	59,429	7.33	20,259	16.34
Brooklyn-Manhattan Transit System, New York, N. Y.							Galveston-Houston Electric Railway, Houston, Tex.						
July, 1930.....	5,003,577	2.86	3,608,741	6.06	720,302	18.55	July, 1930.....	46,757	9.65	29,248	3.52	78,159	123.5
Aug.....	4,727,623	4.39	3,558,841	6.64	465,144	14.91	Aug.....	47,425	11.42	28,402	8.12	82,135	146.25
Sept.....	4,834,251	2.49	3,453,431	4.52	667,323	6.20	Sept.....	42,823	16.19	28,052	14.83	84,893	144.43
Oct.....	5,036,775	2.68	3,572,553	4.22	758,817	2.78	Oct.....	38,032	11.66	27,266	6.85	573,425	4.16
Nov.....	4,769,083	4.37	3,366,923	6.98	689,470	2.34	Nov.....	36,974	12.19	44,183	9.68	93,685	127.12
Dec.....	5,065,484	2.66	3,546,963	4.25	814,788	2.84	Dec.....	36,166	15.00	27,949	1.79	99,343	112.93
Jan., 1931.....	4,852,706	5.48	3,475,330	7.01	674,029	5.00	Jan., 1931.....	33,291	20.15	25,057	9.18	105,000	110.59
Feb.....	4,453,655	3.79	3,159,903	5.96	583,468	2.40	Feb.....	32,281	19.80	22,990	9.64	111,359	110.17
Mar.....	5,028,562	2.66	3,475,847	3.37	814,360	4.15	Mar.....	32,904	23.38	24,732	14.59	114,459	93.49
Apr.....	4,969,481	2.09	3,458,940	3.35	804,235	0.25	Apr.....	34,729	15.98	24,132	11.98	117,394	189.69
May.....	5,056,779	3.31	3,438,037	4.51	913,877	1.64	May.....	.....	.....	.....	.....	.....	.....
June.....	4,983,112	1.71	3,466,384	3.49	870,919	12.12	June.....	39,889	12.63	24,992	11.61	116,770	67.67
July.....	4,841,635	3.24	3,499,609	3.02	631,791	7.21	July.....	.....	.....	.....	.....	.....	.....
Brooklyn & Queens Transit System, New York, N. Y.							Houston Electric Company, Houston, Tex.						
July, 1930.....	1,917,118	6.15	1,603,893	7.10	203,433	4.15	July, 1930.....	247,070	10.86	176,909	11.32	584,163	1.24
Aug.....	1,827,238	6.45	1,595,256	7.11	120,864	8.15	Aug.....	244,033	12.41	177,452	10.89	573,872	4.18
Sept.....	1,887,499	4.66	1,564,271	5.65	213,728	2.66	Sept.....	251,919	9.00	175,905	10.12	571,857	5.84
Oct.....	1,922,388	5.80	1,597,166	5.50	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	16.64
Jan., 1931.....	1,849,644	6.18	1,541,235	7.58	197,355	3.02	Jan., 1931.....	242,554	10.62	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	1.93	1,602,862	2.56	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.....	.....	.....	.....	.....	.....	.....
May.....	1,980,118	2.50	1,585,293	1.85	286,334	7.89	May.....	.....	.....	.....	.....	.....	.....
June.....	1,942,830	1.29	1,609,335	0.34	221,493	13.98	June.....	222,528	10.09	159,897	10.71	507,530	13.86
July.....	1,893,414	1.24	1,550,897	3.34	227,012	11.59	July.....	.....	.....	.....	.....	.....	.....
Capital Traction Company, Washington, D. C.							Hudson & Manhattan Railroad, New York, N. Y.						
July, 1930.....	306,527	9.02	272,490	4.65	4,935	78.13	July, 1930.....	954,538	3.12	502,515	1.61	116,747	15.77
Aug.....	314,513	3.48	268,561	4.09	16,103	2.62	Aug.....	934,204	5.65	499,806	3.98	98,977	26.27
Sept.....	327,713	7.06	268,066	1.61	30,259	6.78	Sept.....	974,433	2.80	506,845	0.23	132,332	18.68
Oct.....	374,646	1.22	288,351	1.48	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	1.54	42,659	11.05	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	491,109	7.10	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	17.83	157,098	21.78
Feb.....	312,815	3.47	252,080	5.68	30,521	1.87	Feb.....	936,542	6.67	467,137	6.09	134,717	18.34
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	5.89	65,123	12.93	Apr.....	1,002,265	5.78	485,938	5.73	181,182	15.09
May.....	362,502	1.87	281,344	1.61	50,959	5.60	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	16.83
July.....	.....	.....	.....	.....	.....	.....	July.....	897,211	6.00	470,918	6.28	91,288	21.80
Chicago Surface Lines, Chicago, Ill.							Illinois Terminal Company, Springfield, Ill.						
July, 1930.....	4,535,460	10.05	3,807,075	7.10	649,307	19.05	July, 1930.....	601,515	11.03	475,856	3.24	87,602	35.74
Aug.....	4,488,146	12.20	3,796,705	8.06	680,219	16.22	Aug.....	661,520	7.65	466,816	12.07	152,827	12.15
Sept.....	4,568,564	9.60	3,789,472	4.40	713,323	12.94	Sept.....	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	712,127	10.77	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	15.87	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	11.00	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	5.89	388,126	3.81	84,381	2.24
Mar.....	4,584,224	4.35	4,287,237	5.34	557,167	15.05	Mar.....	568,653	1.95	398,855	5.94	143,325	28.98
Apr.....	4,759,624	4.16	4,092,047	0.36	675,629	11.66	Apr.....	547,992	7.17	395,315	6.16	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	654,977	12.99	June.....	581,093	1.58	398,980	16.22	154,417	90.05
July.....	4,093,702	9.74	3,579,566	6.93	580,118	10.65	July.....	.....	.....	.....	.....	.....	.....
Department of Street Railways, Detroit, Mich.							Interborough Rapid Transit Company, New York, N. Y.						
July, 1930.....	1,549,503	27.41	1,452,871	14.20	41,888	113.55	July, 1930.....	5,382,547	1.53	4,078,983	2.52	521,522	73.64
Aug.....	1,516,209	29.02	1,426,941	16.67	58,773	119.46	Aug.....	5,183,166	4.59	4,121,083	5.06	763,422	172.17
Sept.....	1,510,161	26.36	1,436,175	12.59	51,711	115.40	Sept.....	5,684,267	0.17	3,983,368	7.78	131,270	206.26
Oct.....	1,579,476	25.24	1,458,238	14.91	22,933	91.71	Oct.....	6,315,679	1.13	4,162,660	0.83	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	22.69	1,440,503	21.87	23,052	77.93	Dec.....	6,477,864	0.52	4,194,135	3.96	293,152	47.40
Jan., 1931.....	1,550,656	28.64	1,421,575	20.95	12,759	91.44	Jan., 1931.....	6,					

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*	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.							United Electric Railways, Providence, R. I.												
July, 1930.....	635,205	11.09	573,990	8.98	21,365	144.42	July, 1930.....	513,367	11.04	458,817	8.90	5,480	77.94						
Aug.....	622,554	13.17	530,094	11.41	15,479	64.11	Aug.....	495,723	.....	442,076	.....	3,643	.....					
Sept.....	650,114	9.99	524,324	12.12	50,261	1.32	Sept.....	493,296	12.72	434,036	10.89	8,376	72.04						
Oct.....	725,428	4.89	700,311	12.90	60,495	190.35	Oct.....	531,803	13.76	.....	.....	41,223	63.80				
Nov.....	706,577	5.29	572,066	7.04	58,984	5.69	Nov.....	506,318	14.58	439,930	12.83	16,958	54.27						
Dec.....	758,045	1.73	570,065	14.68	108,444	284.88	Dec.....	559,363	13.02	460,420	21.92	51,623	889.51						
Jan., 1931.....	711,215	6.52	577,741	12.67	61,108	137.10	Jan., 1931.....	543,940	13.39	493,596	12.91	372	95.68						
Feb.....	640,676	6.87	537,583	9.72	27,392	149.06	Feb.....	482,566	14.30	437,444	13.02	4,503	160.71						
Mar.....	216,637	2.58	577,319	7.25	66,013	72.81	Mar.....	524,299	10.44	480,958	9.38	6,233	265.70						
Apr.....	709,515	0.68	565,328	6.83	71,298	99.32	Apr.....	510,645	9.39	470,964	7.00	9,992	455.60						
May.....	701,286	2.37	562,482	7.66	64,474	114.33	May.....	509,278	10.61	474,803	7.52	16,021	168.15						
June.....	655,957	0.17	540,187	6.23	42,677	683.20	June.....	482,703	9.40	438,362	8.15	4,633	201.09						
July.....	613,628	3.19	533,084	9.23	6,643	119.18	July.....	.....	.....	.....	.....	.....	.....
Long Island Railroad, New York, N. Y.							United Railways & Electric Company, Baltimore, Md.												
July, 1930.....	4,018,939	5.76	2,668,042	3.56	1,180,528	11.19	July, 1930.....	1,236,414	6.91	964,582	6.24	14,358	69.86						
Aug.....	3,968,936	5.21	2,635,376	5.06	1,152,651	6.69	Aug.....	1,198,180	8.34	831,241	18.41	6,119	71.42						
Sept.....	3,589,671	7.33	2,467,056	7.07	928,655	6.58	Sept.....	1,261,734	6.71	995,805	6.02	10,050	75.81						
Oct.....	3,371,761	5.30	2,446,346	8.97	729,067	1.77	Oct.....	1,354,086	7.28	1,049,306	4.84	25,163	71.16						
Nov.....	2,954,624	4.20	2,249,258	14.66	483,180	89.15	Nov.....	1,263,811	10.26	983,407	7.40	9,200	87.30						
Dec.....	2,905,045	6.60	2,130,182	16.27	596,812	47.11	Dec.....	1,350,553	8.19	1,043,315	7.25	36,700	64.64						
Jan., 1931.....	2,763,421	6.65	2,210,263	9.65	321,141	6.00	Jan., 1931.....	1,268,536	10.90	994,411	11.89	7,388	69.22						
Feb.....	2,561,169	7.43	2,074,216	9.13	332,002	3.86	Feb.....	1,136,604	15.78	891,421	15.97	24,088	221.16						
Mar.....	2,841,915	3.09	2,234,418	9.00	449,501	24.64	Mar.....	1,262,429	14.90	981,026	14.76	34,215	84.94						
Apr.....	2,976,402	4.69	2,269,029	7.37	533,425	1.97	Apr.....	1,253,764	13.60	966,424	13.66	11,440	82.93						
May.....	3,212,765	4.00	2,338,313	8.03	695,032	9.92	May.....	1,256,334	13.78	991,107	11.93	2,206	96.99						
June.....	3,414,354	6.78	2,351,016	7.26	907,010	5.76	June.....	1,195,126	10.29	963,857	7.59	34,962	198.96						
July.....	.....	.....	.....	.....	.....	.....	July.....	.....	.....	.....	.....	.....	.....
Market Street Railway, San Francisco, Cal.							Monthly and Other Financial Reports												
July, 1930.....	735,453	5.87	649,901	1.68	32,534	46.39	Operating Revenue		Operating Expenses	Taxes	Gross Income	Net Income							
Aug.....	770,284	6.69	643,287	5.46	72,923	16.66	\$		\$	\$	\$	\$							
Sept.....	745,298	6.35	626,770	3.74	64,731	16.38	Boston Revere Beach & Lynn R.R., Boston, Mass.												
Oct.....	786,012	6.73	675,908	6.49	57,384	45.58	6 mo. end. June, 1931..		559,758		57,690 12,669								
Nov.....	729,407	8.81	615,613	0.18	60,457	29.25	6 mo. end. June, 1930..		600,960		86,091 14,449								
Dec.....	775,508	6.12	639,249	6.62	83,460	0.03	British Columbia Electric Railway, Vancouver, B. C.												
Jan., 1931.....	738,092	5.56	641,519	4.83	45,011	12.31	May, 1931.....		1,159,759		785,945		373,814						
Feb.....	668,931	8.17	576,661	8.22	41,002	7.29	May, 1930.....		1,233,292		891,133		342,159						
Mar.....	757,960	6.40	633,346	6.81	72,828	0.05	11 mo. end. May, 1931..		13,499,141			4,698,457						
Apr.....	745,252	6.72	620,106	7.06	73,837	3.46	11 mo. end. May, 1930..		13,558,001			4,026,612						
May.....	733,105	7.50	619,934	8.21	62,805	2.08	Calgary Municipal Railway, Calgary, Alta.												
June.....	704,769	5.19	654,225	1.75	37,384	11.62	6 mo. end. June, 1931..		399,373		284,495		42,295						
July.....	700,996	4.68	598,082	7.97	52,186	60.40	6 mo. end. June, 1930..		501,503			23,836						
New York, Westchester & Boston Railway, New York, N. Y.							Community Traction Co., Toledo, Ohio												
July, 1930.....	224,469	5.89	146,233	6.00	162,635	5.38	6 mo. end. June, 1931..		1,341,334		1,270,545a		286,529						
Aug.....	196,405	10.53	152,180	0.41	184,922	22.45	6 mo. end. June, 1930..		1,678,326		1,415,836a		108,164						
Sept.....	203,617	8.18	165,256	6.57	192,861	29.53	Dallas Railway & Terminal Co., Dallas, Texas												
Oct.....	202,046	7.62	138,192	14.09	190,748	20.81	June, 1931.....		229,849		164,939		62,347						
Nov.....	184,690	8.74	170,542	2.52	216,451	19.75	June, 1930.....		252,976		181,697		63,730						
Dec.....	190,136	12.31	138,592	17.80	205,029	16.75	Denver Tramway, Denver, Colo.												
Jan., 1931.....	182,249	13.76	160,800	9.44	220,394	52.37	6 mo. end. June, 1931..		1,814,755		1,270,672		224,565						
Feb.....	161,311	15.02	149,571	11.18	222,308	29.42	6 mo. end. June, 1930..		2,038,224		1,402,195		245,166						
Mar.....	181,729	12.80	144,442	3.54	195,802	24.31	Edmonton Radial Railway, Edmonton, Alta.												
Apr.....	186,708	13.03	142,832	0.31	189,142	19.00	June, 1931.....		54,629		42,125		12,504						
May.....	195,905	15.11	149,268	0.42	186,589	25.70	June, 1930.....		59,728		41,926		17,802						
June.....	193,820	14.62	142,600	3.45	185,007	23.70	July, 1931.....		57,752		42,503		15,248						
July.....	195,461	12.92	188,581	23.55	July, 1930.....		62,225		43,476		18,748						
Northwestern Pacific Railroad, Sausalito, Cal.							Havana Electric Railway, Havana, Cuba												
July, 1930.....	597,419	2.54	392,575	18.62	195,195	55.38	3 mo. end. June, 1931..		1,038,536		909,926a		129,795						
Aug.....	638,476	11.48	415,502	18.64	210,115	4.03	3 mo. end. June, 1930..		1,331,067		1,095,636a		240,566						
Sept.....	548,282	8.68	471,657	3.78	16,471	83.67	6 mo. end. June, 1931..		2,088,287		1,868,546a		222,277						
Oct.....	555,867	18.49	534,858	4.44	7,447	95.22	6 mo. end. June, 1930..		2,687,130		2,244,476a		453,794						
Nov.....	333,193	27.74	421,717	16.33	97,567	120.85	Honolulu Rapid Transit Co., Honolulu, Hawaii												
Dec.....	312,319	20.77	465,220	3.46	158,491	74.63	June, 1931.....		82,169		47,927		7,331						
Jan., 1931.....	283,852	21.78	401,656	14.41	123,928	14.76	June, 1930.....		83,919		49,362		9,149						
Feb.....	273,818	27.40	387,512	12.96	122,521	68.87	6 mo. end. June, 1931..		498,552		301,315		155,018						
Mar.....	308,466	24.17	408,068	14.43	109,855	48.81	6 mo. end. June, 1930..		516,747		306,524		164,523						
Apr.....	322,742	23.66	402,400	16.56	88,800	58.61	International Railway, Buffalo, N. Y.												
May.....	346,743	28.61	362,722	24.85	88,886	931.64	6 mo. end. June, 1931..		4,315,727		3,684,618a		645,299						
June.....	380,604	24.60	368,559	17.82	1,970	95.39	6 mo. end. June, 1930..		5,078,809		4,370,742a		756,007						
July.....	.....	.....	.....	.....	.....	.....	Mexico Tramways, Mexico City, Mex. (In Pesos)						
State Island Rapid Transit Company, New York, N. Y.							June, 1931.....							772,340		849,820		77,480	
July, 1930.....	243,991	9.78	189,173	39.19	41,021	34.99	June, 1930.....		838,560		902,540		63,980						
Aug.....	233,371	13.92	168,110	11.19	49,486	35.97	6 mo. end. June, 1931..		4,616,550		5,131,770		516,220						
Sept.....	206,908	16.93	165,525	4.87	26,127	60.73	6 mo. end. June, 1930..		5,022,770		5,363,160		340,390						
Oct.....	205,631	10.58	167,586	6.49	29,723	26.11	New York Railways, New York, N. Y.												
Nov.....	178,652	17.42	161,608	0.58	10,788	80.37	June, 1931.....		471,975		401,683a		70,292						
Dec.....	178,474	9.08	160,715	47.29	5,997	92.23	June, 1930.....		478,122		403,151a		64,971						
Jan., 1931.....	170,387	9.68	158,982	6.35	2,151	93.49	6 mo. end. June, 1931..		2,670,717		2,352,635a		318,082						
Feb.....	161,415	13.58	142,565	9.20	1,448	114.6	6 mo. end. June, 1930..		2,747,985		2,505,364a		242,621						
Mar.....	173,723	7.98	159,035	7.78	1,164	81.24	New York State Railways, Utica Lines												
Apr.....	176,863	10.76	147,210	13.23	23,169	31.92	7 mo. end. July, 1931..		577,714		637,742a		60,027						
May.....	188,151	11.61	163,148	7.61	9,268	63.19	7 mo. end. July, 1930..		762,582			44,449						
June.....	204,452	9.12	150,345	16.01	39,203	0.38	Regina Municipal Railway, Regina, Sask.												
July.....	6 mo. end. June, 1931..		162,858		131,023		63,649						
Third Avenue Railway System, New York, N. Y.							6 mo. end. June, 1930..								19,841			
July, 1930.....																			



1931 WINNERS

Individual Awards Made in MAINTENANCE CONTEST

1—**W. J. McCallum**, foreman frog shop, Toronto Transportation Commission, for his article "Switch Recess Grinder." Capital prize of \$100 for best article submitted during the entire contest and \$25 prize in way and structures department for the first period.

2—**Farrell Tipton**, San Diego Electric Railway, for his article "Buffer Refinishes Armature Cores," \$25 prize in rolling stock and shops department for first period.

For his article "Frame for Testing all Sizes of Bus Starters and Generators," \$25 prize in bus and garage department for second period.

For his article "Adjustable Vise for Bus Generators," \$25 prize in bus and garage department for third period.

3—**M. B. Schwegler**, Toronto Transportation Commission, for his article "Long Graphic Charts Read with Ease," \$25 prize in electric and line department for first period.

4—**C. B. Hall**, Virginia Electric & Power Company, for his article "Bus Wheels Removed with a Simple Clamp," \$25 prize in bus and garage department for first period.

5—**John C. Burdett**, Georgia Power Company, for his article "Emergency Sash for Broken Car Windows," \$25 prize in rolling stock and shops department for second period.

6—**F. W. Drowley**, Toronto Transportation Commission, for his article "Depressing Rail Lips at Track Drains," \$25 prize in way and structures department for second period.

AT A MEETING of judges of ELECTRIC RAILWAY JOURNAL Maintenance Contest, held at American Electric Railway Association Headquarters in New York on Aug. 7, prize winners for the third period were selected as well as the winner of the \$100 capital prize for the best article submitted during the year.

In the department of rolling stock and shops, the prize for the third period goes to Walter R. McRae, Toronto Transportation Commission, for his article "Bumper Straightener." In the department of way and structures, the winner is M. W. Wales, Winnipeg Electric Company, who submitted an article "Positive Acting Mechanism for Track Switches." H. A. Brown, Cleveland Railway, is the winner in the electric and line department with his article "Heater for Headway Recorders." In the bus and garage department, the prize goes to Farrell Tipton, San Diego Electric Railway, for his article "Adjustable Vise for Bus Generators."

After careful consideration, the judges selected for the capital prize the article "Switch Recess Grinder," submitted by W. J. McCallum, foreman frog shop, Toronto Transportation Commission. This article, which won the prize for the first period in the way and structures department, was published in the March issue of the JOURNAL, page 152.

At the same time the judges examined the data submitted by a large number of electric railways for the company award in the Maintenance Contest. The decision in this part of the contest will be announced during the sessions of the American Electric Railway Engineering Association, at the Atlantic City Convention in September. Presentation of the silver plaque will be made at the same time.

7—**Grayson S. Evans**, Pittsburgh Railways, for his article "Improved Current Selective Relay for Track Switches," \$25 prize in electric and line department for second period.

8—**Walter R. McRae**, Toronto Transportation Commission, for his article "Bumper Straightener," \$25 prize in rolling stock and shops department for third period.

9—**M. W. Wales**, Winnipeg Electric Company, for his article "Positive Acting Mechanism for Track Switches," \$25 prize in way and structures department for third period.

Mr. Wales appears among the prize winners for the first time on this occasion. He was born in Elkhorn, Wis., Dec. 25, 1883. He attended public and high school there, being graduated in 1903. Then he went to New York and studied at the Webb Institute, from which he was graduated in 1907. His first job was with the Pennsylvania Railroad. After that he was engaged in a variety of engineering work, but did not return to the transportation field until January, 1923, when he joined the Winnipeg Electric Company as engineer of ways and structures.

10—**H. A. Brown**, Cleveland Railway, for his article "Heater for Headway Recorder," \$25 prize in electric and line department for third period.

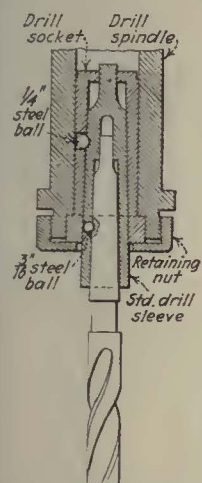
Mr. Brown, another new prize winner, entered the employ of the Cleveland Railway in 1911 as a bonder's helper. Since then he has held the positions of bonder, electric track switch maintenance man, assistant foreman, and foreman of the return circuit division. His studies in connection with electric track switches have been largely responsible for the highly efficient mechanism used on this property. All the automatic block signals on the Van Sweringen Shaker Heights rapid transit line were installed under his direction. He holds several patents on important pieces of electric track switch equipment.

PRACTICAL IDEAS for the

Maintenance Man

Drill and Sleeve Fastened to the Boring Machine*

BY W. J. McCALLUM
Foreman Frog Shop
Toronto Transportation Commission



Steel balls fix the drill and sleeve to the socket

WHEN boring screw spike holes in hardwood ties considerable difficulty has been experienced in withdrawing the drill from the tie. The drill usually jams in the hardwood tie and pulls out of the boring machine. To overcome this trouble, holes are drilled in the sleeve and socket in the manner shown in the illustration. Steel balls are inserted and are held in place by peening the edges of the holes, partly fitting in the recesses which are drilled or ground in the drill and in the sleeve. In assembling, the drill is inserted in the sleeve, the sleeve in the socket, and finally the socket is fastened in the spindle.

is then raised or lowered to center with the coupling. The generator is connected by leads to a test panel, which demonstrates its performance at the various speeds at which it is driven.

The adjustable vise is made from an old compound tool rest, and the driving unit is a 600-volt shunt motor, with a variable resistance for speed regulation. A double-pole, double-throw switch in the armature circuit controls the direction of rotation. Five sizes of universal couplings are available for the different types of generators. The keyways are machined in each coupler to correspond with each type of generator shaft. A disk is inserted in the coupling to act as a means of centering the generator and motor, and also to overcome most of the friction between the motor and generator. The shoulders on the opposite sides of the disk are at right angles to each other to prevent the disks from coming out from the coupling while in rotation.

Positive Acting Mechanism for Track Switches*

BY M. W. WALES
Engineer of Way and Structures
Winnipeg Electric Company, Winnipeg, Canada

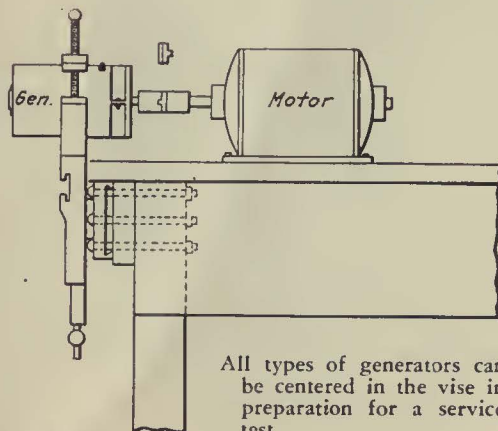
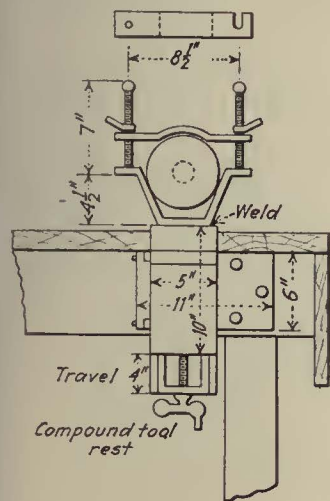
Adjustable Vise for Bus Generators*

BY FARRELL TIPTON
Electrician
San Diego Electric Railway

GENERATORS for buses of the San Diego Electric Railway are given a service test after repairs have been made. This is done by placing the generator in an adjustable vise, and connecting the shaft with that of the driving motor with a universal coupling. The vise

PREVENTION of split switches is the object of a mechanism developed by the Winnipeg Electric Company for operating and holding in position track switches while cars are passing through them. This object has been attained by designing the mechanism to operate in a manner exactly the reverse of that of existing types. The mechanism is operated by hand or electricity, and in turn it operates the switch, thus setting and holding the switch in positive position. Any movement of the switch does not shift the setting of the holding mechanism. It acts as a spring switch in both positions, and also permits trailing.

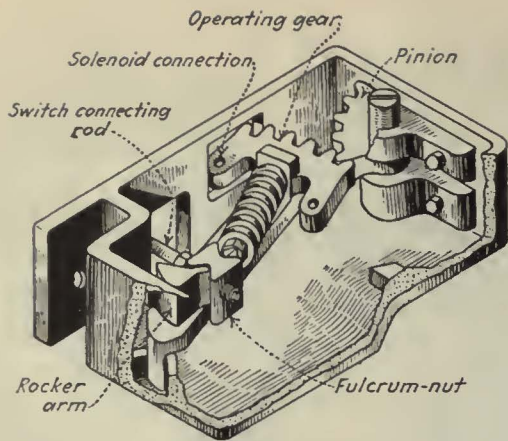
To operate the switch, or change the setting of the movable tongue of the switch to the opposite setting, a switch



All types of generators can be centered in the vise in preparation for a service test

iron is inserted in the slot and then turned to the left. This starts the pinion, which, in turn, moves the gear to the opposite side of the switch box. As shown in the illustration, the gear is attached to the pivoted arm carrying one end of the spring, and when it begins to move, it changes the direction and force of the spring and causes the fulcrum nut, which carries the other end of the spring, to move. The switch tongue is then thrown by the connecting rod.

*Submitted in ELECTRIC RAILWAY JOURNAL Prize Contest.



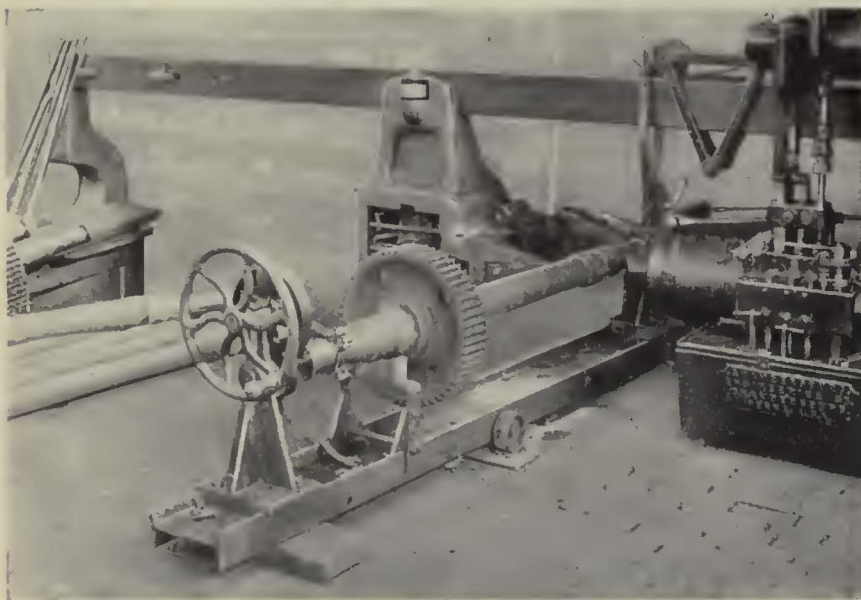
Non-split operating and holding mechanism for track switches developed by the Winnipeg Electric Company

The movement on the fulcrum nut is kept in a straight line by the rocker arm which is between the fulcrum nut and the side of the switch box. This arm is so designed that, in either set position of the mechanism, the interior angle between the intersecting lines of force from the spring, and the reaction from the side of the box through the rocker arm is less than 180 deg. Suitable connections have been designed for both the Cheatham and Collins solenoids, and we are now using the mechanism with both types for electric operation.

Straightening Axles in the Wheel Press*

BY TERANCE SCULLIN
Superintendent of Equipment and Buildings
Cleveland Railway

STRAIGHTENING of axles at the Harvard shops of the Cleveland Railway is now being done by a device that has proved very efficient. It consists of a bed carrying a stationary and a threaded center, between which the axle to be straightened is supported. The whole apparatus is mounted on two wheels to facilitate



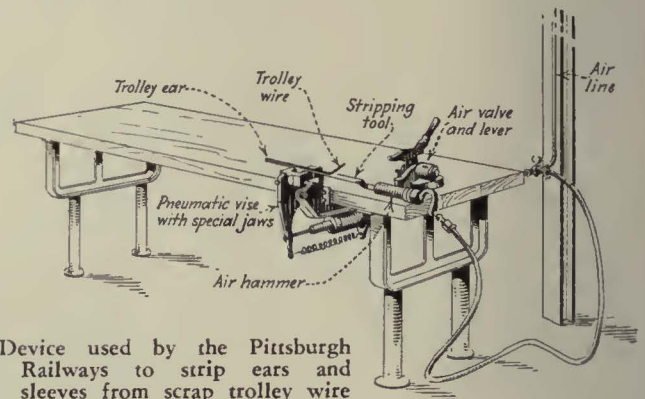
This testing device which holds the axle while being straightened in the wheel press was designed in the Cleveland Railway shops

movement. At the stationary center end, gears and a hand wheel are arranged to spin the axle so that its bent sections may be located. A special casting for holding two jaws is bolted to the wheel-press yoke. The bent portion is then centered between the two stationary jaws and the pressure arm of the wheel press. The pressure is varied according to the amount the axle is bent. The axle is then tested for trueness by spinning, and the process is repeated until the axle is found to be true. Axles can be straightened easily and accurately by means of this method.

Reclamation and Disposal of Overhead Lines Scrap*

BY R. J. RUSSELL
Pittsburgh Railways

ALL overhead lines scrap, such as trolley wire, trolley wire fittings, cable, etc., was formerly sent to the stores department for sorting and disposal. A new method has been inaugurated whereby all trolley wire scrap and fittings are hauled to the central quarters of



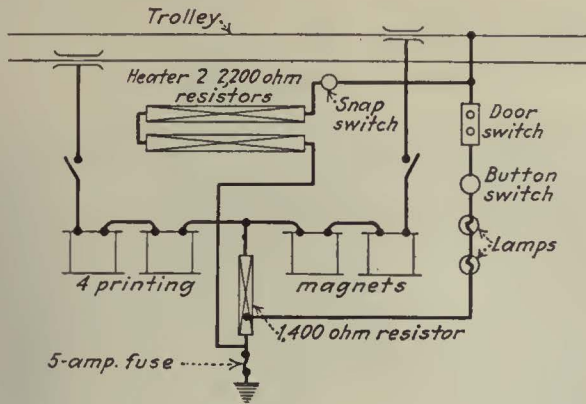
Device used by the Pittsburgh Railways to strip ears and sleeves from scrap trolley wire

the overhead lines department for inspection and reclamation, and all insulated wire and cable scrap is hauled to the stores department where the insulation is burned in the incinerator and then the copper is sold in bulk. When the scrap is taken to the central quarters all line ears and splicing sleeves are stripped from the trolley wire. To facilitate this work an air vise was purchased and was fitted with jaws designed to hold ears and sleeves firmly. An air hammer with a stripping needle is used to strip them from the wire.

After the ears and sleeves are removed from the wire they are inspected, and those that are not completely worn are put back in service. Formerly the ears and sleeves were merely cut out and sold assembled with the inclosed length of trolley wire. They were then classed and sold as unclean brass. Now, the trolley wire is removed from all ears and sleeves, and they are classed and sold as clean brass, and consequently have a higher market value. Considering the value of the

*Submitted in ELECTRIC RAILWAY JOURNAL Prize Contest.

salvaged fittings put back in service, the better prices received for clean brass and cable with the insulation burned off, we estimate our savings to be approximately \$6,000 to \$7,000 per year.



Resistors are installed in headway recorders to maintain a suitable temperature throughout the year

Heater for Headway Recorder*

By H. A. BROWN
Switch & Signal Division
Cleveland Railway

LOSS of time in the Nachod headway recorder clocks during the winter months has caused considerable trouble on the Cleveland Railway. To overcome this defect, heaters were installed in each recorder box to maintain approximately summer temperature under the most severe weather conditions.

This heater consists of two 2,200-ohm resistors connected in series. It is mounted on a slate base underneath the rounded top of the case, where it is out of the way of other equipment. The resistors are connected to the power source through a small snap switch, as shown in the illustration, so that they may be turned off when not needed.

Weed Destroyer Used on Chicago Rapid Transit Lines

CO-OPERATING with several communities in their "clean-up" efforts, the Chicago Rapid Transit Company is using a weed destroyer on its surface tracks in Chicago and its suburbs. The roadbed on the west and northwest branches of the "L" has been treated, and other lines will be treated in the near future.

The new device, mounted on a flat-car, consists of a huge tank to which is connected a distributing system for spraying an acid solution effective in

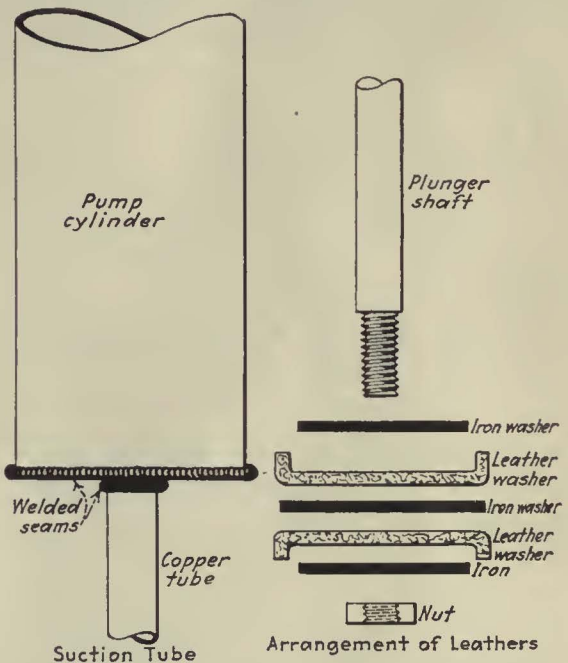


Tank car used by Chicago Rapid Transit Company for spraying acid solution to kill weeds along its right-of-way

Removing Water from Switch Boxes*

By NORMAN H. RAYNER
San Diego Electric Railway

BAILING of water from the boxes of electric track switches of the San Diego Electric Railway is accomplished effectively with an automobile pump. An old pump can be easily adapted for this purpose. An extra leather washer is placed in the plunger of the pump, as shown in the illustration, to obtain the needed suction to draw water. The base of the pump is replaced by a sheet-iron disk with a $\frac{5}{16}$ -in. hole, which is welded



Automobile pump fitted to bail water from boxes of electric track switches

to the pump cylinder. A piece of copper tubing, about 10 in. long, is inserted in the hole of the disk just far enough so that it will not come in contact with the end of the plunger shaft. The tube is also welded to the disk. By pulling the plunger to the top of the cylinder, water will be drawn into the cylinder, and it can be emptied again by pushing the plunger down.

Armature Shaft Practices

By JOHN S. DEAN

Renewal Parts Engineer
Westinghouse Electric & Manufacturing Company

MANY motor failures can be traced to homemade shafts turned down from worn out and discarded armature shafts and car axles, which have, without doubt, been previously stressed in service. Shafts of many of the older types of railway motors were made from axle steel. The present trend is to use shafts of axle or special alloy steel, heat-treated. Where severe operating conditions cause excessive shaft breakage it is advisable to use the better grades of steel for shaft renewals. The accompanying tabulation shows that the average yield point of the heat-treated axle steel is 44 per cent higher than the same material untreated; while the heat-treated alloy steel is 77 per cent higher.

Experience indicates that armature shaft troubles are mostly due to one or more of the following causes: broken shafts, bent shafts, worn journals, damaged pinion key seats and worn pinion fits. Bent shafts can generally be straightened without removal from the armature core. The armature is rotated in a lathe to check pinion and commutator ends for eccentricity with a Bath indicator or similar device. Shafts should not be more than 0.004 to 0.006 in. out of true when put back in service.

Shaft breaks occur principally where the pinion end leaves the spider or core, or at the end of the pinion seat. Broken shafts should be replaced; under no conditions should they be repaired by welding. The expense incurred and possibility of further failure makes welding of shafts unprofitable.

In replacing armature shafts, the following points should be observed:

1. Place fillets at all changes in diameter on new shafts.
2. Make press fits for new shafts 0.001 to 0.002 in. larger than the original shaft to insure the proper force when pressing them in the core.
3. Check bore of the spider.
4. Brush white lead on the shaft at the fits to act as a lubricant and to prevent rusting.
5. Check clearance between the top of the key and the key seat in the core to prevent binding.
6. Chamfer the start of the bore to allow the shaft to enter easily.
7. Maintain the shaft level when pressing it into the core.
8. Press in shafts at 15 to 25 tons on motors ranging from 25 to 50 hp., and at 40 to 50 tons for sizes above 50 hp.
9. Press out shafts at 1.5 to 2 times the force used when they are pressed in.

Characteristics of Steel for Armature Shafts

	Ultimate Strength, Lb.	Yield Point, Lb.	Elongation Per Cent	Reduction in Area, Per Cent
Special axle steel, guaranteed.....	75,000	40,000	18	30
Special axle steel, average.....	85,000	45,000	20	35
Special axle steel, heat treated—				
guaranteed.....	80,000	50,000	18	50
Average.....	105,000	65,000	23	55
Alloy steel, heat treated—				
guaranteed.....	100,000	65,000	20	45
Average.....	117,000	80,000	24	50

10. Vary the press fit with the metal of the core and use of keys. Steel or malleable iron shafts, or those without keys can safely stand a higher pressure than cast iron.

Early railway motors had laminated cores built up directly on the shaft, with core keys to align the punchings. The spider construction was adopted in later designs, having a key between core and spider, and another between spider and shaft. In recent years the key between spider and shaft had been omitted. Shaft keys of modern motors are the full depth rounded-end type. These are preferred to the old "sled runner" or full depth tapered end key, which sometimes slipped out of place when the shaft was pressed into the core, or when the pinion was driven on the shaft.

TEMPORARY REPAIRS SHOULD BE USED ONLY AS EMERGENCY PRACTICE

When key seats on pinions are damaged they may be repaired with a special offset key; if this is not possible a new key seat should be cut opposite the old one. Pinion fits sometimes become worn and slightly undersize, allowing the pinion to ride up too far on the taper. A liner of strong paper or of sheet metal fitted over the taper will make the fit tight and will hold the pinion at the proper point on the taper. This procedure should be used only in an emergency and only until the damaged shaft can be replaced. Usually damage to pinion key seats and worn pinion seats on the shafts is due to loose pinions. This trouble can be reduced by heating the pinions in an oven at a temperature of from 100 to 150 deg. C., depending upon the size of the motors, before driving them on the shaft. The pinions should be driven on with copper bar weighing 8 to 10 lb. After the pinion is in place, the pinion nut and lock washer should be screwed tightly with a wrench.

The bearing surfaces on the shafts tend to wear either tapered or hollow. Some railways have five different journal sizes varying by $\frac{1}{32}$ in., to which the worn shafts are machined. Armature bearings of corresponding sizes are kept in stock. Other railways weld the journal fit and turn it to its original size. This practice, however, tends to weaken the steel and is not recommended. A canvass indicates that a large majority of the railways turn down their worn journal fits and used undersized bearings. After the bearing seat diameters of the shafts have been reduced approximately $\frac{1}{8}$ in. the shafts are discarded.

COMPANY AWARD

in Electric Railway Journal

Maintenance Contest

will be made at the convention at Atlantic City, during the Monday session of the Engineering Association

NEW PRODUCTS

for the Railways' Use



The streamline effect and arrangement of doors and wheelhousings give the new Osgood Bradley trolley bus a pleasing appearance



Driver's compartment showing control pedals and equipment cabinet

Osgood Bradley Introduces a Trolley Bus

MAXIMUM comfort, convenience and safety for the patrons are featured in a new trolley bus just announced by the Osgood Bradley Car Corporation, Worcester, Mass. Other features are the insulation of stanchions, grab handles and electrical equipment to eliminate any danger of the vehicle becoming charged and shocking passengers, a back-to-back cross-seat arrangement over the rear wheelhousings, and the reduction of noise by insulating or cushioning the trolley base, air compressor and rear control cabinet. Although the vehicle as illustrated has a rear exit door, and a seating capacity of 42 passengers, the manufacturer offers an optional center-exit design, with a seating capacity of 40. The vehicle is of the single-end, four-wheel type, arranged for one-man operation. The body and underframe are built as subassemblies, and are finally assembled as one complete unit in which all vertical loads are borne by the full height of the side frame.

The two 50-hp. motors are controlled by an automatic acceleration, foot-operated master controller under the toe board, being the unit switches in the rear. Four-wheel air brakes are provided. The vehicle has a double-width passageway at the front, controlled by pneumatic door equip-

ment. A rear exit treadle-operated door also is provided. The vehicle's length over bumpers is 32 ft. 2 in., its width over all does not exceed 96 in., and the wheelbase is 190 in. Seats are of the semi-bucket type, with single-deck cushions and concave padded backs. They are upholstered in brown machine-buffed monkey grain leather. To conserve space, the transverse seats at the rear wheels are arranged back-to-back.

At the rear of the bus, a double treadle is provided, care being taken in the installation to protect the electrical portion from moisture.

All grab handles and stanchions at exit or entrance passageways are covered with micarta tubing.

Mudguards of molded rubber with canvas insert are provided at each wheelhousing. Splash aprons also are installed at front, rear and inside of all housings. As a further precaution to prevent the splash from the roadway wetting the wooden floor a lead sheathing has been placed underneath the entire body floor.

All longitudinal runs of power and control cable have been carried in an aluminum cable box inside of the car body under the window sill. No taps have been made for these cables either under the body or in the cable box, all cables being carried direct between the various parts of equipment. At such points as required, conductors are carried through the floor in rigid metal conduits, having fittings with porcelain covers. All electrical equipment underneath the bus, except propulsion motors, is doubly insulated from the bus framing.



Leather upholstered seats, thermostatically controlled electric heaters, ample lighting and convenient arrangement of seats are provided in the interior

To reduce the noise of the controller switches, the rear cabinet for housing this equipment is insulated by Celotex and a lining of asbestos. Trolley poles are provided with rubber insulation and the trolley bases are so mounted that trolley hum in the roof is prevented. Choke coils

having suitable characteristics are installed on the roof in both sides of the trolley circuit to eliminate radio interference. As quietness of the air compressor is essential, this unit is supported through a cushioning of rubber and electrical insulation. Heavy supports minimize vibration.

opening on the top of the radiator housing provides ample heating for the front end.

Mather chrome-vanadium springs are used. These are 56 in. long and 3 in. wide, both front and rear. They are mounted to the main frame members to obtain equal distribution of weight, and are fastened to the axles with heat-treated non-stretching U bolts of $\frac{3}{4}$ -in. diameter.

The front axle is the heavy-duty I-beam type, developed by Timken for the Twin Coach, with 78-in. tread. The rear axle is the full-floating type, with differential bevel gear drive. The axle shaft is $1\frac{3}{4}$ in. Both front and rear axles are equipped with interchangeable heavy-duty brake-shoes angled on a $1\frac{1}{4}$ -in. brakeshoe hinge pin with a Westinghouse operating cam, slack adjuster and 7-in. diaphragm. The total braking area is 350 sq.in. The shoes are lined with American Brake Blok full coverage blocks. Brake drums are of Allyn Ryan gun iron. Air for actuating the brakes is supplied by a Westinghouse 3-cu.ft. air compressor, driven by dual belts off the front end of the crank shaft.

The Hercules engine, which is identical with those in the larger buses of the same make, is a 6-cylinder model with $4\frac{1}{2}$ -in. bore and $4\frac{1}{2}$ -in. stroke. The piston displacement is 360.8 cu.in., the developed horsepower being 83 at 2,400 r.p.m. Additional details appear below.

New Features in Small Twin Coach



One of the small-capacity buses developed by Twin Coach

MANY innovations are included in the 50 small-capacity buses, a part of the order of the Brooklyn Bus Corporation, subsidiary of the Brooklyn-Manhattan Transit Corporation, for service on the recently authorized bus lines in Brooklyn. The buses, which were ordered from the Twin Coach Corporation, will seat 27 passengers as compared with 40 for the standard Twin Coach. Although changes have been necessary on account of the reduced size, the general construction is similar to that of the large bus, except that the new one has only one engine, which is of the same rating as one of the engines for the large bus, and is interchangeable with them. Many standard parts from the larger model are used, affording interchangeability.

The main body framing is built up on two full length longitudinal 6-in. 8-lb. steel channels, specially formed. To these are mounted spring shackle bars and brackets, and across them are gusseted and riveted five $2 \times 2\frac{1}{2}$ -in. pressed-steel Z-bars, forming a support for the lower body rail and wheelbase angles, to which, in turn, are riveted the side and end posts.

Side posts and carlines are bent from one continuous piece of $1\frac{1}{2} \times 1\frac{1}{2} \times \frac{3}{8}$ -in. T, covered on the sides with 14-gage duralumin panels. The roof

is of 14-gage duralumin. Joints in the body and roof are treated to retard rust, and are sealed with dumdum. The ceiling is paneled with aluminum fastened to wood blocking, and standard-sized card racks are placed on each side. The lower body sides and ends are covered with $\frac{5}{8}$ -in. Masonite fiber panels cemented to $\frac{1}{4}$ -in. felt wadding and held in place by quickly removable pilaster brackets.

As in the larger bus, the entrance is ahead of the front wheels, and the exit behind the rear wheels. Both openings are 25 in. clear. When the vehicle is empty, the first step height is 16 in. from the ground, and the height from the step well to the floor is $12\frac{3}{8}$ in., making the floor height $28\frac{3}{8}$ in. The doors are of the four-leaf folding type, operated by National Pneumatic engines.

The seating arrangement adopted calls for five 34-in. transverse seats on the left side and one double side seat over the front wheelhousing. Four double cross seats are on the right side, with a single side seat over the front wheelhousing and a double side seat over the rear wheelhousing.

Heating is by means of a Kysor heating system, developed for the small Twin Coach, forcing hot air through two heater units mounted in the floor under the seats. A small

Weight, total.....	10,600 lb.
Length over body.....	21 ft. $3\frac{1}{4}$ in.
Length over bumpers.....	22 ft. 10 $\frac{1}{2}$ in.
Wheelbase.....	140 in.
Width over all.....	7 ft. $11\frac{1}{4}$ in.
Height over all, loaded.....	8 ft. $4\frac{1}{2}$ in.
Turning radius.....	29 ft.
Window post spacing.....	32 in.
Body.....	All steel
Roof.....	Arch
Doors.....	End
Air brakes.....	Westinghouse
Axles.....	Timken
Car signal system.....	Delco buzzer
Clutch.....	Brown-Lipe
Destination signs.....	Hunter illuminated
Door mechanism.....	National Pneumatic
Doors.....	Folding, four leaf
Drive shaft.....	Cleveland Steel Products
Floor covering.....	Battleship linoleum
Glass.....	Plate; ends non-shatterable
Hand brakes.....	Twin Coach standard
Heat insulating material.....	Masonite, felt backed
Heaters.....	Kysor hot air
Headlights.....	Two Guide "Tilt-ray"
Headlining.....	Aluminum
Ignition.....	Delco
Lamp fixtures.....	Guide, dome type
Lubrication.....	Alemite
Motors.....	Hercules, 6 cylinder
Painting system.....	Arcozon
Radiator.....	Long
Roof material.....	Duralumin
Sash fixtures.....	Adams-Westlake
Seats.....	Twin Coach street car type
Seating material.....	Brown leather
Springs.....	Mather chrome-vanadium
Steering gear.....	Ross cam and lever
Steps.....	Stationary
Step treads.....	Non-skid steel
Tires.....	Medium pressure balloon front: 9.00-18 single, rear 7.50-20
Transmission.....	Brown-Lipe
Ventilators.....	Nichols-Lintner
Wheels.....	Cast steel spokes
Wiring.....	Packard cable in wiremold loom

A.E.R.A. Announces

CONVENTION PROGRAM

CELEBRATING its golden anniversary, the 50th annual convention of the American Electric Railway Association will be held Saturday, Sept. 26, to Friday noon, Oct. 2, inclusive, in the Atlantic City Auditorium. According to the tentative program just announced by the general secretary, G. C. Hecker, joint sessions of the American Association and the affiliated associations will be held on Monday, Wednesday and Thursday mornings. The Advisory Council session will be held on Tuesday evening. The Engineering Association will hold its opening general session on Monday afternoon and its divisional meetings on Tuesday and Wednesday afternoons. The Accountants' Association and Claims Association will hold sessions on Tuesday and Wednesday afternoons. The Tuesday session of the Claims Association will be preceded by a luncheon at 12:45 p.m. The Transportation & Traffic Association will hold sessions

on Monday and Tuesday afternoons.

Luncheon conferences, to be held each day at 12:45, are designed to furnish an opportunity for delegates to obtain first-hand reports of the progress being made by various properties in solving some of the more important problems with which practically every company is faced. Opportunity will be afforded delegates to ask questions and to discuss the various conference topics.

Approximately 150 interesting and instructive exhibits of manufacturers will occupy nearly 80,000 sq. ft. of space in the Auditorium. The exhibit will open at noon on Saturday, Sept. 26, and will be open each day during the convention from 9 a.m. to 6 p.m. The exhibit will close at noon on Friday, Oct. 2. Tuesday morning, Thursday afternoon and Friday morning have been set aside for exhibit inspection only. No meetings of any of the associations will be held at those times.

General Sessions

*American, Accountants', Claims, Engineering,
Transportation and Traffic*

GENERAL THEME

**Prospects for Public
Transportation in a Motor Age**

Monday, Sept. 28, 10 a.m.

Subject of the Day—Transportation Service of Growing Civic Importance.

Address of Welcome.

Address of President—"50 Years of Service and Readjustment," by J. H. Hanna, Washington, D. C.

"Accessibility a Major Factor in Urban Property Value," by Joseph P. Day, New York, N. Y.

"Keeping Open the Arteries of Trade and Commerce," by Merle Thorpe, Washington, D. C.

Report—Committee on National Relations—C. D. Cass, Washington, D. C.

ADVISORY COUNCIL SESSION

Tuesday, Sept. 29, 8:30 p.m.

Organ Recital.

Address of the Chairman—J. N. Shannahan, Omaha, Neb.

Baritone solo—Albert A. Wiederhold.

Presentation Charles A. Coffin Foundation Award, by President J. H. Hanna.

Baritone solo—Albert A. Wiederhold.

Address—Julius H. Barnes.

Organ Recital.

Wednesday, Sept. 30, 10 a.m.

Subject of the Day—Readjusting Viewpoint and Methods to Changed Conditions.

Report—Committee on Revision of Constitution and By-laws—G. A. Richardson, Chicago, Ill.

Report—Committee on Nominations—F. R. Coates, New York, N. Y.
Election of Officers.

"The Public Relations of Transportation," by Francis X. Busch, Chicago, Ill.

Organization and Purposes of the Electric Railway Presidents' Conference Committee—Dr. Thomas Conway, Jr., Philadelphia, Pa.

"Progress Towards Improving the Street Car," by C. F. Hirschfeld, Detroit, Mich.

Thursday, Oct. 1, 10 a.m.

Subject of the Day—Stability and Expansion Depend on Research and Co-ordination.

Award—Electric Traction Speed Contest—T. Fitzgerald, Pittsburgh, Pa.

Award—Anthony N. Brady Safety Contest—Lewis Gawtry, New York, N. Y.

"Economics of Electric Railway Operations" (based on work of T. & T. Committee on Operating Economics), by Joe R. Ong, Cincinnati, Ohio.

"Determining Relative Economics of Public Transportation Vehicles" (based on work of Engineering Committee on Economics of Rolling Stock Application), by James W. Welsh, New York, N. Y.

"Costs and Competition in Street Use" (based on work of American Committee on Street Traffic Economics), by E. J. McIlraith, Chicago, Ill.

"Determining the Relation Between Patronage and Price" (based on work of American Committee on Fare Structures), by Leslie Vickers, New York, N. Y.

Report of Managing Director Charles Gordon.

Report—Committee on Resolutions.

Installation of Officers.

Accountants' Sessions

Tuesday, Sept. 29, 2:30 p.m.

Address of President.

Report of Executive Committee.

Report of Secretary-Treasurer.

Report—Representative of Accountants' Association at the Annual Convention of the National Association of Railroad and Utilities Commissioners—W. L. Davis, Allentown, Pa.

Report—Committee on Standard Classification of Accounts—M. W. Glover, Pittsburgh, Pa.

Report—Sub-Committee on Bus Accounting—E. A. Tuson, Newark, N. J.

Report—Committee on Budgetary Control—R. Gilman Smith, New York, N. Y.

Report—Committee on Nominations—Edwin H. Reed, Chicago, Ill.

Election of Officers.

Wednesday, Sept. 30, 2:30 p.m.

Report—Committee on Fare Collections—J. D. Evans, St. Louis, Mo.

Address—"Cost of Fare Collections," by C. W. Stocks, New York, N. Y.

Report—Committee on Property Records—C. R. Mahan, Chicago, Ill.

Address—"Allocation of Capital and Operating Costs to Lines," by I. O. Mall, New Orleans, La.

Report—Committee on Resolutions.

Installation of Officers.

Presentation of Past-President's Badge.
New Business.

Claims Sessions

Tuesday, Sept. 29, 12:45 p.m.

Informal Luncheon—Ritz Carlton Hotel, followed immediately by opening session
Address of President.
Report of Executive Committee.
Report of Secretary-Treasurer.
Report—Committee on Nominations—Wallace Muir, Lexington, Ky.
Election of Officers.
Discussion—Should Association Act as Clearing House for Information Concerning Fake Claimants?
Round-table Discussion.

Wednesday, Sept. 30, 2:30 p.m.

Report—Committee on Uniform Negligence Law—J. S. Kubu, Cleveland, Ohio.
Report—Committee on Claims Association Work and Its Relation to the American and the T. & T. Associations—G. T. Hellnuth, Chicago, Ill.
Address.

Engineering Sessions

General Meeting of All Divisions,
Monday, Sept. 28, 2:30 p.m.

Report of Secretary-Treasurer.
Report of Executive Committee.
Address of President.
Report—Committee on Co-operation with U. S. Department of Commerce—E. P. Goucher, Washington, D. C.
"Trends," by F. R. Phillips, Pittsburgh, Pa.
Report—Committee on Heavy Electric Traction—L. C. Winship, North Billerica, Mass.
"Diesel Engine for Bus Work," by Martin Schreiber, Newark, N. J.

ELECTRIC RAILWAY JOURNAL Maintenance Contest Award—Presentation by W. W. Wyso, Baltimore, Md.

Report—Committee on Welded Rail Joints—E. M. T. Ryder, New York, N. Y.

Report—Committee on Resolutions.
Report—Committee on Nominations—W. W. Wyso, Baltimore, Md.

Election of Officers.
Installation of Officers.
Presentation of Past-President's Badge.
"The Inter-relation of Claim and Legal Departments," by R. H. Nesbitt, Akron, Ohio.

Installation of Officers.
Presentation of Past-President's Badge.

POWER DIVISION

Tuesday, Sept. 29, 2:30 p.m.

Report—Standing Committee on Power—Dwight L. Smith, Chicago, Ill.
Reports of Committees:
No. 1—Manual Review—J. Walter Allen.
No. 2—Mercury Power Rectifiers—H. W. Coddling.
No. 3—Power Contracts—Ralph H. Rice.
No. 5—Catenary Specifications—John Leisenring.
No. 7—Trolley Construction Specifications—L. R. Wagner.
No. 8—Trolley Wire Reels—J. F. Neild.
No. 9—Trolley Bus Overhead Construction—A. J. Klatte.
General Discussion.
"Present Status of the Rectifier for Traction Service," by H. W. Coddling, Newark, N. J.

"Trolley Bus Overhead Construction," by A. J. Klatte, Chicago, Ill.

The retiring president and the president-elect will also address this meeting.

Wednesday, Sept. 30, 2:30 p.m.

Reports of Committees:
No. 10—Lightning Protection—A. Schlesinger.
No. 12—Ferrous and Non-Ferrous Materials—H. F. Brown.

No. 13—Trolley Voltage Surveys—A. J. Klatte.

General Discussion.
Report of Committee:

No. 6—Trolley Wire Wear—H. S. Murphy.
"The Effects of Street-Railway Equipment and Service Characteristics on Energy Consumption," by T. F. Perkinson and R. H. Sjoberg, Erie, Pa.

"Six Hundred-Volt Railway Substation Spacing," by E. A. Imhoff, Chicago, Ill.

PURCHASES AND STORES DIVISION

Tuesday, Sept. 29, 2:30 p.m.

Report—Standing Committee on Purchases and Stores—C. A. Harris, Pittsburgh, Pa.

Reports of Committees:

No. 1—Manual Review—J. Fleming.
No. 2—Unit Piling and Standard Packages—A. E. Hatton.

No. 3—Stores Investment and Costs—W. S. Stackpole.

No. 4—Pricing Methods and Records—Harley Doncaster.

General Discussion.
"Standard Packaging," by A. E. Hatton, Pittsburgh, Pa.

Formal Discussion by Edwin W. Ely, Washington, D. C.

General Discussion.
The retiring president and the president-elect will also address this meeting.

Wednesday, Sept. 30, 2:30 p.m.

Reports of Committees:

No. 5—Standardization and Simplification of Stock—C. A. Harris.

No. 6—Material and Supplies Control—W. F. Maher.

No. 7—Bus Materials—W. S. Stackpole.

No. 8—Handling of Stationery—A. S. Duncan.

No. 9—Stores Material Handling Equipment—J. Y. Bayliss.

General Discussion.
"Handling Bus Materials from the Users' and the Vendors' Viewpoint," by W. E. Scott, Philadelphia, Pa.

General Discussion.

ROLLING STOCK DIVISION

Tuesday, Sept. 29, 2:30 p.m.

Report—Standing Committee on Rolling Stock—Thomas H. Nicholl, Cleveland, Ohio.

"Brake Lining Development and Brake Tests," by F. C. Stanley, Bridgeport, Conn.

"Experience in Trolley Bus Operation," by W. C. Wheeler, Chicago, Ill.

The retiring president and the president-elect will also address this meeting.

Wednesday, Sept. 30, 2:30 p.m.

"Aluminum—Its Uses and Past Experience in Car Construction," by A. H. Woolen, New Kensington, Pa.

Reports of Committees:

No. 1—Manual Review—W. C. Bolt.

No. 2—Motor Coaches—P. V. C. See.

No. 3—Car Design—H. H. Adams.

No. 4—Lighting—R. W. Cost.

No. 5—Car Trucks—R. B. Smyth.

No. 6—Lubrication—J. H. Lucas.

No. 7—Trolley Buses—W. C. Wheeler.

No. 8—Air-Operated Car Equipment—A. D. McWhorter.

No. 9—Noise Reduction—H. S. Williams.

No. 10—Rheostatic Car Heating—A. W. Baumgarten.

No. 11—Current-Collecting Devices—Hugh Savage.

No. 13—Limits of Wear—Walter S. Adams.

General Discussion.

WAY AND STRUCTURES DIVISION

Tuesday, Sept. 29, 2:30 p.m.

Report—Standing Committee on Ways and Structures—C. A. Smith, Atlanta, Ga.

Reports of Committees:

No. 1—Manual Review—W. R. Dunham, Jr.

No. 2—Special Trackwork—E. M. T. Ryder.

No. 3—Weed Elimination—J. I. Catherman.

No. 4—Wheel and Rail Contours—P. J. Mitten.

No. 5—Wood Preservation—C. A. Smith.

No. 6—Arc Welding—Chester F. Gallor.

No. 7—Alloy Steels for Special Trackwork—P. A. Kerwin.

General Discussion.
Address.

The retiring president and the president-elect will also address this meeting.

Wednesday, Sept. 30, 2:30 p.m.

Reports of Committees:
No. 8—Pavement—Roy C. Cram.

No. 11—Track Construction—C. L. Hawkins.

No. 12—Rail Corrugation—H. S. Williams.

No. 14—Rails—C. A. Alden.

No. 15—Track Gauge—C. H. Clark.

No. 16—Foundations for Special Trackwork—W. A. Underwood.

General Discussion.
Address.

Transportation and Traffic Sessions

Monday, Sept. 28, 2:30 p.m.

Address of President.
Report of Executive Committee.

Report of Secretary-Treasurer.

Report—Committee on Nominations—Samuel Riddle, Pelham Manor, N. Y.

Election of Officers.

Report—Committee on The Transportation Employee—Clinton D. Smith, Norristown, Pa.

Formal Discussion.

Report—Committee on The Passenger—W. B. Brady, Chicago, Ill.

Formal Discussion.

Tuesday, Sept. 29, 2:30 p.m.

Report—Committee on The Equipment—L. C. Datz, St. Louis, Mo.

Report—Committee on Operating Economics—Joe R. Ong, Cincinnati, Ohio.

Report—Committee on The Movement of the Vehicle—C. W. Wilson, Pittsburgh, Pa.

Formal Discussion.

Installation of Officers.
Presentation of Past-President's Badge.

Entertainment

Sunday, Sept. 27

9 a.m.-5 p.m.—Golf Tournament—Country Club of Atlantic City, Northfield, N. J.

9-11 a.m.—Hotel Musicales.

Concert programs in the main lounges of beach front hotels.

Monday, Sept. 28

AUDITORIUM BALLROOM, SECOND FLOOR

2:30-4 p.m.—Ladies' Informal Bridge.

4-6 p.m.—Tea and Dancing.

8:45-9 p.m.—Reception by President and Officers of the Association.

9 p.m.-1 a.m.—Informal Dance.

Tuesday, Sept. 29

3 p.m.—Ladies' Musicale. Song Recital by Albert A. Wiederhold, baritone; Edith M. Wiederhold, pianist and accompanist.

4:30-6 p.m.—Tea and Dancing.

8:30 p.m.—Advisory Council Session. Informal Dancing.

Wednesday, Sept. 30

2:30 p.m.—Ladies' Pivot Bridge Tournament.

4:30-6 p.m.—Tea and Dancing.

9 p.m.-1 a.m.—Golden Birthday Party. Informal Dancing.

Thursday, Oct. 1

2:30-4 p.m.—Ladies' Informal Bridge.

4-6 p.m.—Tea and Dancing.

9 p.m.-1 a.m.—Formal Dance.

NEWS of the Industry

Improvement Projects

Boston, Mass.—The State Department of Public Utilities has approved the plans of the Elevated for an addition to the present fare collection lobby and a shelter and waiting-room for bus passengers at the Everett Terminal.

Richmond, Va.—The new \$12,000 car and bus terminal of the Petersburg, Hopewell & City Point Railway, at Hopewell, Va., under construction for the past six months, was occupied on Aug. 24 for the first time. The old building is being torn down. The new building provides waiting rooms, restrooms for both white and colored persons, ticket offices and a modern lunch, soda fountain and cigar stand.

Brooklyn, N. Y.—Officials of the Board of Transportation have promised to investigate the possibilities of building new subway routes to the Bay Ridge and Dyker Heights sections.

St. Louis, Mo.—The contract for wrecking the ten-story building at Twelfth Boulevard and Washington Avenue to make way for the new \$1,500,000 passenger station and office building of the Illinois Terminal Railroad has been awarded to Merker & Company. The development will be in the charge of the Midwest Industrial Development Company, a subsidiary of the railroad. Plans for the building are in charge of architects Mauran, Russell & Crowell. The first unit, an eleven-story building with basement and sub-basement, will cost \$750,000. Ultimately the building will be twenty stories high.

Fare Changes

Gary, Ind.—More than 4,000 5-cent fares are being collected daily in the three short-haul fare zones on Gary Railways lines here. A 5-cent fare for a short haul was first tested on a twenty-block stretch on Broadway between Twentieth Avenue and the north Broadway loop at the steel mill gates. The rate was placed on trial for 30 days, beginning on June 1. The trial period was later extended. Two additional 5-cent zones were next established here for a 30-day trial period commencing on July 26.

Bus Operations

Spokane, Wash.—The departure of the four new 28-passenger buses bought by the Spokane United Railways from the Fageol Company in Oakland, Cal., was delayed at the factory, but the buses are expected to arrive here by Sept. 1. They are for the Cable Addition line.

(Late News Continued on Page 486)

An Operation, Not Nostrums, Seattle's Need

Plans to employ an expert to make a new survey of Seattle's Municipal Railway, at an estimated cost of \$50,000, received a serious set-back when Mayor Robert Harlin opposed the proposition. At the same time, F. J. McLaughlin, president of the Puget Sound Power & Light Company, issued a statement indicating that bondholders expect prompt action toward a solution of the system's difficulties, but will not insist on a survey. Mayor Harlin declared that the needs of the railway have been made known by previous surveys and experience in the operations of the system, and that what the system needs is expert management. He said:

We should hire the best man available, in whom all affected interests have confidence, and give him full power to run the system.

John A. Beeler, consulting engineer, who has been in Seattle for several weeks, offered to make a complete survey of the system under a plan by which the city and the power company, to whom the purchase price for the lines is still due, would divide the cost. A majority of the Council is believed to agree with the Mayor that the survey is not necessary. Mayor Harlin states that he will leave the public utilities department under the present assistant and acting superintendent, A. E. Pierce, pending settlement of plans for refinancing the railway.

President McLaughlin said:

As a citizen and taxpayer and as a creditor, we are, of course, vitally interested in the efficient operation of the railway. I have heard numerous criticisms as to service, and suggestions for improvement.

The Business Outlook

PRECEDENT of 1921 favors the hopeful prospects that the endurance dance of this unduly prolonged depression ought by all odds to end this month, if ever. In the summer of 1921 stocks and trade sloshes along in uncertain stagnation, as they have this time, till September. The recent improvement in textiles and other consumer industries is strikingly similar to that in 1921. Still, the third week of August gives no sign of expected seasonal improvement, and scepticism about its prospective strength increases. Late building figures alone lend a little fitful light to the encircling gloom growing out of the steadily weakening bond market. The European scene continues a succession of crises met by emergency measures which only stave off the inevitable large-scale international action on fundamental issues of which there is still no sign.

—The Business Week.

I have consistently maintained that the matter of providing efficient transportation service rests with the city, not with the Puget Sound Power & Light Company, but that, in our position as a citizen and as creditor, we wanted to help in solving present difficulties. Any plan that makes the operation more efficient is certainly welcome.

The railway system, as it is now operated, is not able to pay its obligations. When an individual gets real sick it is considered desirable to call in a good doctor.

I have not and will not make any request that the Council have a survey made. Should they decide to do so I do not propose to make any recommendation as to who shall be employed or what the nature of the survey shall be.

I do believe, that in the best interest of all concerned, a constructive program looking to a solution of the transportation difficulties should be initiated promptly.

Calumet Sale Approval Sought

Approval of the sale of the physical properties and permits of Calumet Railways, Inc., Shore Line Motor Coach Company and Mid-West Motor Coach Company to the Chicago & Calumet District Transit Company, Inc., is asked in a petition filed with the Public Service Commission of Indiana.

The Chicago & Calumet District Transit Company, Inc., was organized by Walter J. Cummings, Chicago, who recently contracted to purchase the railway system in Hammond, East Chicago and Whiting and the motor coaches which operate in the same general territory.

A second petition has been filed in which the commission is asked, in event it approves the sale, to rescind its order for abandonment of operation of the railway. This order, directed to Calumet Railways, Inc., originally authorized abandonment of service on July 1, but when negotiations for sale of the system were begun, it was amended so that operation might be continued beyond July 1. If the Chicago & Calumet District Transit Company is authorized to purchase the transportation properties, it plans to continue to operate them.

For the present, operation of the railway system and the routes of the two motor coach companies will continue under the present management.

Marylanders to Meet at Braddock Heights

The mid-year meeting of the Maryland Utilities Association will be held on Sept. 11, 1931, at the Vindobona Hotel, Braddock Heights, Md. Beginning at 10 o'clock, there will be meetings of the electric, gas and transportation groups at which many pertinent problems will be discussed. The afternoon will be devoted to sports and recreation, with ample provision made for entertainment. There will be golf, bowling, swimming, sightseeing trips and bridge. In the evening delegates will dine and dance.

The Vindobona is located 6 miles from Frederick on a narrow ridge overlooking two valleys with mountains in the distance. Copies of the program and full information about the meeting are expected to be ready about Sept. 1.

Bus Operations

(Continued from Page 485)

Albany, N. Y.—The Public Service Commission has just authorized the receivers of the Capitol District Transportation Company, Inc., in conformity with an order of the United States District Court, to issue receiver's certificates amounting to \$153,720 for the purchase of thirteen buses and two snow plows.

Providence, R. I.—A petition seeking authority to substitute service by bus for the Branch Avenue trolley line has been filed by the United Electric Railways with the Public Utilities Commission. The company would operate from 30 to 36 buses over the route, and asks permission to carry standing passengers to the extent of 50 per cent of the rated seating capacity of the buses.

Wabash, Ind.—Local street cars were supplanted by bus service on Sunday, Aug. 30. Service is furnished by the Indiana Service Corporation with three new six-cylinder Fargo coaches, each seating 21 passengers. The buses operate over the same routes as the former street cars. Fares have been increased from 5 cents to 10 cents cash, or four tickets for 25 cents. The buses are operated for seventeen hours daily on headways varying from 20 to 40 minutes.

Pittsburgh, Pa.—Thirty-eight operators of the Pittsburgh Motor Coach Company did not have an accident of any kind during the three months of April, May and June. A total of 349,050 miles was driven by these men.

Brooklyn, N. Y.—A temporary injunction has been granted by Supreme Court Justice Dodd barring operation of two lines by the Kings Coach Company, an unfranchised concern which has been operating a line in the Gerritsen Beach section and another from Flatbush Avenue to the Rockaway ferry. Recently the Midtown Transit Company, another independent operator with lines in the Sheepshead Bay district, was restrained by a similar injunction. The only pending litigation against the Brooklyn Bus Corporation, railway subsidiary, is the suit brought by Paul Blanshard of the City Affairs body.

Greensboro, N. C.—The City Manager announced, following a conference with K. K. Garrett, general manager of the North Carolina Public Service Company, that plans were being worked out for the substitution of buses for street cars on the Asheboro run.

Syracuse, N. Y.—Stockholders of the Syracuse Northern Railroad have confirmed the action of the directors in deciding to substitute buses for trolleys on its route between Syracuse and South Bay, N. Y.

Belleville, Ill.—Officials of the East St. Louis & Suburban Railway have declined to extend motorbus service a distance of seven blocks on North Church Street. They say the probable traffic on North Church Street would not justify a twenty-minute schedule and that a 30-minute headway would prove unsatisfactory.

Baltimore, Md.—The United Railways & Electric Company on Aug. 25 placed in service ten of its new buses, the first of an order for 50 of similar type soon to be delivered. The first group replaces vehicles now in service on the Mount Royal Avenue route. Each vehicle seats 33 passengers, and is equipped for front entrance and exit.

St. Louis, Mo.—The Public Service Commission will conduct a public hearing on Sept. 9 on the application of Rapid Transit, Inc., to operate buses on Federal Highway No. 40 between Wellston and St. Charles. This application has a direct bearing on the St. Louis Public Service Company's plea to abandon service on the western 7 miles of its St. Charles rail line, now being operated at a loss.

Service Changes

St. Louis, Mo.—The St. Louis Public Service Company plans to install one-man cars on its Compton division. During the morning and evening rush hours, service will be increased 20 per cent, and the total miles operated during the day will be increased 15 per cent. Cars will be operated every two minutes during rush hours in the morning and every 2½ minutes in the evening rush period. Cars equipped with the latest safety devices and similar to those now in use on the Tower Grove line will be installed on the Compton division.

Los Angeles, Cal.—The Pacific Electric Railway has applied to the Railroad Commission for authority to discontinue local auto stage service in North Hollywood, and has applied for a certificate of public convenience and necessity to operate auto stage service between North Hollywood and Hollywood, and between intermediate points in Los Angeles.

Harrisburg, Pa.—Permission to operate one-man trolley cars between Greensburg and Irwin has been asked in an application filed with the Public Service Commission by the West Penn Railways.

Vancouver, B. C.—The special committee of the City Council dealing with British Columbia Electric Railway affairs is to consider the advisability of asking the company to provide a belt line, embracing eight city blocks, as an alternative to the city terminus of the Oak Street car line.

Camden, N. J.—Plans for the operation of a high-speed rail line over the Delaware River Bridge were advanced another step when the Transportation Committee was empowered on Aug. 21 by the Delaware River Joint Commission to negotiate with the Philadelphia Rapid Transit Company and others. The commission authorized a bond issue, not to exceed \$44,000,000, to repay New Jersey, Pennsylvania and Philadelphia for their interest in the bridge, and to finance construction of the high-speed line.

Indianapolis, Ind.—Public hearing on the amended petition of the Indiana Railroad for abandonment of a portion of its interurban line between Indianapolis and Richmond has been postponed by the Public Service Commission until Sept. 17. Action to abandon the entire 68-mile line between Indianapolis and Richmond was begun last spring by Elmer W. Stout, receiver for the former Terre Haute, Indianapolis & Eastern Traction Company. Before a ruling was handed down, however, the company asked that only that part between Indianapolis and Dunreith be abandoned. Under this plan, service would be continued to Richmond indirectly.

Pattonville, Mo.—Counsel for residents here has protested to the Public Service Commission against the application of the St. Louis Public Service Company for permission to abandon service on its St. Charles line, between Pattonville and St. Charles. The company contends it has been operating the line at a loss.

Spokane, Wash.—Because of the conflict among property owners and residents of Browne's addition for and against proposed street car line changes in that district, the City Council has placed on file the franchise for a proposed new line of the Spokane United Railways running east from Fourth and Spruce on Fourth to Hemlock and south on Hemlock to Sixth. The alternative proposal of the company was to run south from Fourth on Chestnut to Sixth for a connection between the West Pacific and Fort Wright lines.

Marion, Ind.—The Northern Indiana Power Company's interurban freight station on Adams Street has been consolidated with that of the Indiana Railroad at 1219 South McClure Street, following the abandonment on Aug. 15 of the Marion-Bluffton division of the Indiana Service Corporation, which formerly maintained joint freight terminal facilities with the Northern Indiana Power Company. The power company's passenger station will remain at the present Adams Street location. Both lines are operated by a co-ordinated management as units of the Indiana Railroad System.

Spokane, Wash.—Fare boxes and metal tokens will soon displace tickets on the Manito-buses and Hillyard and Broadway-Lidgerwood cars of the Spokane United Railways. The John-Spokane Fare Box Company of Chicago is supplying the fare boxes and metal tokens. The fare box and token will be used later on the Cable addition buses.

Financial News

Boston, Mass.—Trustees of the Boston Elevated Railway on Aug. 26 declared a quarterly dividend rental of \$1.25 on the common stock of the company, thereby reducing the dividend rate to a \$5 annual basis, compared with the \$6 basis formerly in effect. The reduction constitutes the initial declaration at the new rate under the public control bill, which provides for retirement of preferred stocks by sale of 6 per cent bonds to the Metropolitan Transit District. The \$5 dividend, which is payable on Oct. 1 to stock of record Sept. 10, is guaranteed at least for the next 28 years.

(Late News Continued on Page 488)

Substantial Business Built in Handling Road Materials

Five years ago—nothing.

Estimated for 1931—460,000 tons, with a total of 270,000 already delivered.

That, in a nutshell, is the story so far of the development, from scratch, of a substantial business in the hauling of road building and maintenance materials by the Indiana Railroad System.

The story began on the organization of the Indiana Service Corporation at Fort Wayne, but subsequent chapters have been written at various points on the system, of which the Indiana Service is a part. And the end is not yet.

Five years ago the idea that electric railways could be of service in handling the immense tonnage of road building and maintenance material used in Indiana was a new one to contractors and State and county officials. The first traffic represen-

down or eliminated, and there is no delay or waiting for switch engines or motors to facilitate unloading.

So successful has this service been that Ben Petty, assistant professor of highway engineering at Purdue University, investigated the plan and has since given it further study and attention. In fact, W. L. Snodgrass, general superintendent of traffic of the Indiana Railroad System, was invited by Professor Petty to describe the service before the annual meeting of the Road School at Purdue.

Expansion of this service is being planned and vigorously promoted by the Indiana Railroad System's traffic department.

If This Be Intimidation

Police of East St. Louis, Ill., are seeking to determine whether a shot fired through the motorman's vestibule of a street car on the Broadway division of the East St. Louis Railway resulted from the company's quarrel with jitney drivers.

Muncie to Pay the Penalty of Competition

Abandonment of the local railway system in Muncie, Ind., was proposed by the Indiana Railroad in a petition filed on Aug. 18 with the Public Service Commission. Until last year the local service was operated by the former Union Traction Company. It has been unprofitable since 1926. The petition stated that "no change can be made in the operations that will increase revenues or reduce expenses so that the deficit can be eliminated or substantially reduced." The company concluded in its petition that there is no public necessity for local service in Muncie or other cities in the State under 75,000 population. Ten single-truck one-man cars are being operated on the Muncie city lines, paralleled by independent bus lines in almost all parts of the city. Outsiders have advocated protecting the rail lines from the inroads of bus competition by giving the railway exclusive passenger carrying privileges in the sections of the city which they serve.



Indiana's roads profitable pay load

tatives who called on these men were received without enthusiasm.

The electric railway men retired, but only in search of ammunition for a heavier bombardment of the sacred heights of habit and established custom. Renewing the attack, the electric men fought a long and determined battle. With the years has come an impressive, although far from complete, victory for the attacking forces.

It was in 1928 that the plan first recorded success. The initial jobs were handled with a dozen cars borrowed from the maintenance department of the Indiana Service Corporation. It wasn't long before the company was justified in buying ten new steel differential, side-dump cars, electrically controlled.

It was at this point that the outstanding advantages of moving road materials by electric railway became apparent. Contractors and public officials were quick to learn and appreciate the advantages of this type of service. First and foremost is a saving of from 10 to 20 cents a ton in the cost of handling. The cost for the contractor of unloading the car is eliminated entirely by the electrically operated dumping equipment. A six-car train can be completely unloaded in slightly more than two minutes, with the labor of one man the only cost involved.

Second, this system of delivery eliminates demurrage charges. Its flexibility and its speed prevent delays at the scene of construction activity and keep an even flow of trucks running to the concrete batcher.

The setup of trackage and storage for cement is eliminated, and truck hauling distance is substantially cut through the slight cost of establishing new unloading points. Storage warehouse space is cut

Acting on a petition filed by the Illinois Commerce Commission, Circuit Judge Miller at Belleville has enjoined 202 jitney operators from competing with the street cars of the East St. Louis Railway and the East St. Louis & Suburban and the buses of the Blue Goose Motor Coach Company. The State commission charged the service men with defying State laws. In order to avoid the terms of the injunction some of the jitney men are carrying passengers under a voluntary contribution plan while others have organized "clubs," for which they act as the hired chauffeur. Other cars have extended their operations to St. Louis, under the theory that interstate operation places them beyond the jurisdiction of the Illinois Commerce Commission.

Coming Meetings

Sept. 9-10—Central Electric Railway Master Mechanics' Association, Cincinnati, Ohio.

Sept. 11—Maryland Utilities Association, Braddock Heights, Md.

Sept. 26-Oct. 2—Annual Convention, American Electric Railway Association, Atlantic City, N. J.

Sept. 28-29—Annual Convention, National Association of Motor Bus Operators, Atlantic City, N. J.

Oct. 12-19—Annual Safety Congress Including Special Electric Railway Section, Chicago, Ill.

Oct. 29-30—Annual Transportation Meeting of Society of Automotive Engineers, Washington, D. C.

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

BOOK REVIEW

A Scholarly Presentation

"Onward Industry!—The Principles of Organization and Their Significance to Modern Industry," by James D. Mooney and Alan C. Reiley. Harper & Brothers, New York. 564 pages. \$6.

When fears first gripped our primitive ancestors they banded together for a common purpose — protection. From this, organization has expanded and become more complicated, but the underlying principle of a common objective of organization remains the same. As the authors put it, organization is "the form of every human association for the attainment of a common purpose."

With the state, church and army as examples of successful organization, Messrs. Mooney and Reiley attempt to discover if the theory and history of organization can be applied for similar objectives in industry. No fault can be found with their exposition of the subject as applied for generations in the state, church and army, and the authors seek to answer the question which they pose, whether the history and theory of organization throw any light on sound organization methods for industry. Especially interesting in the light of recent events is the discussion of the subjects "The Moral Problem of Modern Industry" and "The Economic Problem of Modern Industry." The final chapter is particularly provocative in its discussion of the present challenge to American business leadership.

Mr. Mooney is vice-president of the General Motors Corporation, and Mr. Reiley was connected with the Remington Typewriter Company for many years as an executive and has been a profound student of history and philosophy. Their knowledge enables the authors to handle the subject well historically. Certainly the book is informative. As Messrs. Mooney and Reiley see it, the application of principles of organization "requires but the technique of the organizer, plus the qualities of true and enlightened leadership, to apply them in the more efficient pursuits of all worthy objectives."

G. A. Richardson Recommended for A.E.R.A. Presidency

The Committee on Nominations of the American Electric Railway Association unanimously recommends the following to be placed in nomination for election as officers and members-at-large of the Executive Committee for the year 1931-32:

For president, G. A. Richardson, vice-president and general manager Chicago Surface Lines.

For first vice-president, J. H. Alexander, president Cleveland Railway.

For second vice-president, Walter A. Draper, president Cincinnati Street Railway.

For third vice-president, W. E. Wood, vice-president Engineers Public Service Company.

For treasurer, Barron Collier, president Barron G. Collier, Inc.

For operating members-at-large of the Executive Committee for the three-year term expiring 1934:

A. B. Paterson, president New Orleans Public Service, Inc.

Robert M. Feustel, president Indiana Service Corporation.

For manufacturer members-at-large of the Executive Committee for the three-year term expiring 1934:

M. B. Lambert, assistant to vice-president Westinghouse Electric & Manufacturing Company.

H. E. Listman, vice-president General Motors Truck Company.

John B. Tinnon, sales manager Metal & Thermit Corporation.

The committee has not placed in nomination any one for the office of fourth vice-president, although it has agreed upon a nominee which it will be prepared to submit from the convention floor, if the proposed change in the constitution eliminating this office, is not adopted.

The committee, also having been informed of the recommendation of the Committee on Revision of the Constitution and By-Laws proposing the addition of an operating member-at-large of the Executive Committee to serve for a one-year term, has unanimously agreed upon a nominee for this office and is prepared to submit his name from the convention floor if that recommendation of the Committee on Revision of the Constitution and By-Laws is approved.

The Committee on Nominations includes: H. C. Abell, Stanley Clarke, Sanford K. Colby, George Frev, Willits H. Sawyer, L. F. Stoll, and F. R. Coates, chairman.

Texas Interurban Under Option

An option good for 60 days has been secured by R. C. Duff, Houston, for the purchase of the interurban electric railway of the Eastern Texas Electric Company, between Port Arthur and Beaumont, 25 miles. If the transaction is consummated, it is understood the line will be made a part of the electric railway projected by H. K. Johnson, with whom Mr. Duff is associated. This line is to run between Houston and Port Arthur via Goose Creek, approximately 85 miles. Mr. Duff is president of the Waco, Beaumont, Trinity & Sabine Railroad with lines between Weldon and Livingston, 48 miles, and Trinity and Colmesneil, 67 miles. Some time ago the Interstate Commission approved the construction of extensions from Weldon to

Waco and from Livingston to Beaumont, but denied that part of the application providing for a line from Beaumont to Port Arthur. By acquiring the interurban line, the Waco, Beaumont, Trinity & Sabine would secure an entrance to Port Arthur.

Financial News

(Continued from Page 486)

Bucyrus, Ohio—The City Council has declined to adopt a resolution granting permission to C. G. Mayers, Cleveland, receiver for the Cleveland-Southwestern Railway & Light Company to dismantle the company's interurban line in Bucyrus. The action was taken after Council urged that the city unite with other cities to have other interests take over the interurban line and operate it again. On the other hand, the Galion City Council has voted to permit the system there to be dismantled.

New York, N. Y.—The Third Avenue Railway has declared a semi-annual interest payment of 1½ per cent on the 5 per cent income bonds, payable Oct. 1. The bonds have been on a 2½ per cent annual basis since 1925.

Mystic, Conn.—The Groton & Stonington Traction Company, at a meeting of directors on Aug. 20, voted to pay interest due on July 1, 1931. The payment was anticipated in a vote on June 8, but it was necessary to assure earnings were sufficient. It has now been determined that earnings after interest for six months were at the rate of \$1 a share. Net for the six months was \$12,584. Bond interest lowers the net to \$5,060.

Indianapolis, Ind.—Suit to foreclose a \$4,000,000 mortgage on the property of the Indianapolis Street Railway has been filed in Circuit Court here by the Central Hanover Bank & Trust Company, New York City, trustee for the Citizens Street Railroad 44-year 5 per cent bonds, totaling this amount. The suit paves the way to remove the company from receivership and for its reorganization. Under the reorganization plan \$5,000,000 would be spent for new equipment and to rejuvenate the system.

Regulation and Legal

Minneapolis, Minn.—The City Council has engaged W. C. Fankhauser, specialist in securities for the California Railroad Commission, to assist in its fight before the Minnesota Tax Commission against a proposed reduction in the property valuation of the Minneapolis Street Railway. The Council had previously retained Walter W. Cooper, valuation expert with the California Commission, for similar services. The hearing is early in September.

Columbia, S. C.—Recommendation has been made that the Broad River Power Company pay a \$125,000 fee to attorneys who conducted the litigation to force it to operate cars here. This finding is contained in a report to the South Carolina Supreme Court by Special Referee Perrin of Spartanburg. The attorneys had asked \$250,000. The company also would pay certain lesser

costs in the case, under the referee's recommendations. The referee points out that the case is "one of the most novel and interesting heard or tried in this State for many years."

Highwood, Ill.—Hearings in the Interstate Commerce Commission's investigation of the ferry-truck service facilities operated by the Chicago, North Shore & Milwaukee Railroad, have been assigned to be heard at Chicago on Nov. 3. The facility embraces the loading of detachable truck bodies on railroad flat cars.

Chattanooga, Tenn.—The Tennessee Electric Power Company has filed a bill in Chancery Court against T. E. Boyd, operator of a jitney line from the city to the suburbs, to enjoin him from operating his jitneys in competition with the plaintiff's street cars. Restraint is sought on the grounds that the jitneys failed to comply with the law by securing a certificate from the Public Utilities Commission.

General

Hartford, Conn.—Tests made by the State Motor Vehicle Department of erstwhile motormen who would become bus operators because of the substitution of buses for trolleys have disclosed that many of these men when given tests are unable to secure a certificate which would permit them to operate a public service motor vehicle.

Philadelphia, Pa.—President Judge Harry S. McDevitt, of Common Pleas Court No. 1 has warned Philadelphia Rapid Transit Company men against the union now seeking to organize the Philadelphia transit workers. He told the employees to "beware of wolves in sheep's clothing" and urged them to place their faith in the heads of the company.

Detroit, Mich.—A delegation of shop employees of the Detroit Municipal Railway, headed by Neil McClellan, business agent for the Amalgamated Association, has protested to Mayor Murphy against the working hours allotted to them. The men now are employed six hours a day, five days a week. They receive an average wage of 80 cents an hour. The delegation requested that the working day be increased.

Springfield, Ohio—A reduction of 10 per cent in the salaries or wages of all employees was announced on Aug. 13 by the Springfield Railway. The reduction is effective immediately. W. H. Sawyer, receiver, declared that the gross income of the company during the past six months was less than the expenses and that the step was necessary to continue operation. The company operates the co-ordinated railway and bus service here.

Philadelphia, Pa.—A new deal between the city and Philadelphia Rapid Transit Company, covering operation of rapid transit lines, is necessary, John A. McCarthy, Finance Committee chairman of the reorganized board of directors of the company, declares. The new agreement, he said, "must be free from prejudice, politics and quackery" in order to preserve P.R.T. and solve the city's subway problem.

London Transport Bill

Approved by Committee

After hearings of evidence and arguments extending at intervals over a period of many weeks, the joint committee of the House of Lords and the House of Commons on the London Passenger Transport Bill decided on July 20 to allow the bill to proceed, subject to certain alterations. It may be recalled that the main object of the bill is to transfer to an especially nominated transport board all the passenger transport undertakings in the London traffic area, that board to run them as one consolidated, co-ordinated undertaking.

THE L.C.C. POLICY

At a sitting of the joint committee on July 7, counsel for the London County Council stated that a meeting of the Parliamentary Committee of the County Council was held shortly after Sir Oscar Warburg had given his evidence, and resolution was passed confirming the policy as to the need for a larger body to supervise the work of the transport board proposed by the bill. That resolution declared that the proposed transport board should be responsible to a larger body; that the larger body should be composed of members specially selected and equipped as regards financial, labor, and other consolidations; and that one-third of them should be appointed by local authorities. A subsequent meeting of the County Council confirmed the resolution.

Sir William McLintock, who prepared the financial details embodied in the bill, was questioned by Bruce Thomas, K.C., on behalf of the Society of Motor Manufacturers and Traders. With regard to a proposed contract between the Associated Equipment Company (associated with the London General Omnibus Company) and the proposed transport board, he said that it was intended that the board should be obliged to purchase for the first ten years 90 per cent of the chassis of its standard fleet of buses from the Associated Equipment Company. Mr. Thomas pointed out that those whom he represented would be excluded from the market to that extent. The witness, resuming, said that from 1921 to 1930 the total purchase by the London General Omnibus Company from the Associated Equipment Company amounted on the average to £870,000 a year, and he estimated that it would be £750,000 a year under the new board. Mr. Thomas then urged that the board should be left free to make whatever contracts it thought fit.

TERMS FOR INDEPENDENT BUSES

In speaking on July 8 for the Association of London Omnibus Proprietors, Mr. Montgomery, K.C., submitted that the proposal to pay these independent proprietors in cash or stock as the arbitration tribunal might determine was unfair. He asked that the bill provide that his clients should be paid in cash. It was also announced that a settlement had been reached between the promoters and the Westminster Coaching Services and the Westminster Omnibus Company.

On July 14 determined opposition was made to the proposal that the transport board should be empowered to manufacture motor vehicles and spare parts and to carry on business as garage proprietors. Bruce Thomas, K.C., argued that, if the bill was passed in its present form, grave injustice

would be inflicted on manufacturers. It was contended that the transport board should be prohibited from manufacturing motor vehicles or spare parts and that the board should be left free to buy from manufacturers. Walter Bonablock, a past president of the Institute of British Carriage Builders and Automobile Manufacturers, stated on July 16 that about £1,500,000 capital was involved in the industry which he represented and that not a single firm in the industry was working to capacity. The sole concern of his association was to try to preserve to the industry the business which it had been getting in the past. This closed the case for the opposition.

Lord Lytton, the chairman of the joint committee, in announcing on July 20 that the bill should be allowed to proceed to its remaining stages, said that the first alteration which the committee wished to make as a condition was that the minimum period of office of a member of the transport board should be three years. He went on to say that the committee had decided that the transport board should not have power to manufacture, but this would not limit its right to repair. The committee wishes the board to be perfectly free either to accept the new contract by agreement with the Associated Equipment Company, or to place its orders elsewhere, but the Associated Equipment Company should have the right to compensation for the loss of the new contract.

ADJUSTMENTS

For several days after this, the joint committee heard points of detail to give effect to the main decision. The committee also considered a question arising out of the decision refusing the transport board power to manufacture. The committee had indicated that it would be prepared to consider allowing the board to continue to manufacture the bodies of buses at the Chiswick works of the London General Omnibus Company, which are to be transferred to the board. The London General Omnibus Company has manufactured bus bodies for its own use for the last 70 years, and until the last few years manufactured to meet the whole of its requirements. When rapid changes in construction created recently a large temporary demand for new omnibus bodies, some of the work was placed outside, but there has been no steady placing of orders outside. If the board were denied power to continue the work at Chiswick, 500 men would lose their employment, the board would be prevented from using a valuable plant, and the outside manufacturers would benefit by trade which they did not have at present and which they never had. He asked the committee to give the board power to continue to manufacture bodies.

On July 30 the joint committee ended its prolonged labors on the bill. The chairman (Lord Lytton) stated that the committee had drafted a clause, to be inserted in the bill, which would give the fullest possible discretion to the arbitration tribunal regarding the principles on which compensation is to be awarded to those undertakings which are to be transferred and which have not made agreements with the promoters. The clause directed the arbitration tribunal to secure that the standard of the consideration payable should be fair and equitable.

Clauses for insertion in the bill were then submitted by the promoters for the purpose of setting up conciliation machinery of the same character as that established by the Railways Act, 1921. After hearing objections from non-trade unionist interests, the committee approved the clause.

PROSPECTS

On July 31, the day after the joint committee had finished its work on the bill, Parliament adjourned till Oct. 20. Nothing further can accordingly be done on the bill till after that date.

More Street Railway Lines for Russia

Among the tremendous tasks confronting the Soviet Union is that of raising the standard of housing and sanitation in the U.S.S.R. to the accepted level in the advanced industrial countries. The inheritance from pre-war Russia in this respect was an exceedingly poor one. For instance, in pre-war Russia only nineteen cities out of 1,063 in the Russian Empire had sewage systems, about 200 had central waterworks, 34 cities had street car lines and 32 possessed municipal gas works. Not only was the country backward in modern sanitary installations and municipal services, but what facilities did exist deteriorated during the years of the world and civil wars.

At present new street car lines are being built in such new industrial centers as Cheliabinsk in the Urals, Grozny in the North Caucasus, Schakhty in the Donetz Basin, Zaporozhye in the Ukraine, and Erivan in Armenia. The extent of the street car system in the Soviet Union in 1926-27 totaled only 2,044 km. (1,275 miles), and this was extended to 2,437 km. by 1929-30. During the same period rolling stock increased from 4,497 cars to 5,615; the number of cars in daily use grew from 3,120 to 4,564 and the passengers carried from 1,490,000,000 to 2,750,000,000 in number.

In Moscow the greatest achievements have been made. In 1928 each street car carried an average of 491,000 passengers; in 1930 the number rose to 637,000, and it is anticipated that this year the number will increase to 757,000. Between 1913 and 1930 the passenger traffic increased four-fold, the length of street car lines 145 per cent, and the average number of cars in use daily 167 per cent. The network of tracks on the outskirts of the city will be considerably extended and the Moscow City Railroad plans the construction of 43 km. (27 miles) of new street car lines. Plans for building a subway are being discussed.

"Expresscalator" in London Subway

The fastest escalator in the United Kingdom has just been installed at the Highgate Station of the London Underground Railways, where it carries passengers to and from the subway at a speed of 125 ft. per minute. The new escalators can reach a speed of 180 ft. per minute. It is intended to increase the speed gradually and study how passengers adapt themselves to the change. Highgate Station has a rubber floor. It is also equipped with a set of automatic machines which juggle with money like robot bank cashiers, making it unnecessary to place coins in the slots one at a time. A handful of half-pennies is swallowed at one gulp by them and the correct ticket issued with never a mistake.

PERSONAL MENTION

E. K. Eastham Directs St. Louis Personnel Plan

A newly established personnel department, with E. K. Eastham as director of personnel, will be directly responsible for all activities of the St. Louis Public Service Company, St. Louis, Mo., which are strictly of a personnel nature. The department will act in a supervisory capacity with regard to activities in other departments which directly affect personnel or industrial relations. It will act in a consultant capacity to other departments on matters indirectly affecting personnel or industrial relations.

Establishment of the new department marks a recognition of the need for concentrating responsibility for personnel activities. The personnel department will work toward the end of furthering sound industrial relations and will co-operate with all other departments in helping to meet their personnel needs and problems.

Mr. Eastham, director of personnel, will be responsible to the president and will report through E. F. Thayer, assistant to the president. The activities for which the personnel department will be directly responsible are as follows:

Accident Prevention—Mr. Eastham has been responsible for accident prevention work for a number of years, as safety director. He will continue to be responsible for it, but a new safety director will be appointed as soon as it is feasible, to report to Mr. Eastham.

Employment and Placement—The preliminary interviewing of all prospective employees will hereafter be handled by the personnel department. This includes office workers as well as trainmen, mechanical department employees, etc. Requisitions for regular or temporary employees, after having been approved by the president or vice-president and general manager, will be forwarded to the personnel department. Individuals who have been interviewed and approved by the personnel department will be sent to the requisitioning department head for approval.

A job analysis survey will be undertaken by the personnel department to determine what jobs and pay brackets are now in existence. Ultimately, the department will be in a position to assist in effecting job placements as between various departments.

Education and Training—The present policy of training conferences and classes will be continued and amplified under the jurisdiction of the personnel department. A supervisor of education will be appointed to be responsible for this work. Close liaison will be maintained with the transportation department, through the superintendent of instruction.

Employee Magazine—The editor of the *Public Servicer* is transferred from the advertising department to the personnel department, Mr. Allen, advertising manager, will continue to maintain a supervisory direction over the craftsmanship and technical production of the *Public Servicer*, and will advise also on articles bearing on company or management policy which may be inserted in the magazine from time to time.

Mr. Bolling, editor of the *Public Servicer*, in addition to his editorial duties, will as-

sist with such other personnel work as may be assigned to him.

Mr. Eastham has for many years been the safety director of the company, a position in which he was constantly brought in contact with the entire operating force, and one which the management believed eminently fitted him for the new position of director of personnel. Under Mr. Eastham's direction, the conference training plan for employees has achieved notable results during the past year and one half.

Messrs. Coffy and Van Sichel Advanced

Robert C. Coffy has been made manager of the Eastern division of the Oklahoma Gas & Electric Company with headquarters in Muskogee, and W. S. Van Sichel has been named to succeed Mr. Coffy as vice-president and general manager of the Mississippi Valley Power Company and president of the Fort Smith Traction Company, Fort Smith, Ark.

Mr. Coffy succeeds W. H. Crutcher, who died recently. Mr. Coffy has been associated with the Byllesby organization since 1908, when he joined the Oklahoma Gas & Electric Company. Mr. Van Sichel has been associated with the Byllesby organization since 1907, and until recently served as assistant general manager in charge of operation of the Fort Smith Traction Company and the Mississippi Valley Power Company.

E. T. Fitzgerald on Michigan Commission

The personnel of the Michigan Public Utilities Commission was completed by Governor Wilbur M. Brucker on July 22, with the appointment of Edward T. Fitzgerald as the fifth member. Mr. Fitzgerald, whose home is in Detroit, formerly served as secretary to Mayor Marx there, the only public office he has heretofore held. Born in St. Paul, Minn., he is 42 years old. Moving to Detroit in 1908, he joined the staff of the *Detroit News*, and served as reporter for more than five years.

J. A. Kiggen, Jr., Heads White Motor Coach Division

Formation of a motor coach division, a new sales department, is announced by George F. Russell, vice-president and sales manager of the White Company. To this post the company has advanced J. A. Kiggen, Jr., for the past two years New York State manager for the company. He will have headquarters in Cleveland. Mr. Russell said that the rapid advance of motor coach transportation makes it necessary for the White Company to afford to this field an organization of trained personnel which can devote its entire time to meeting and solving coach problems.

Mr. Kiggen has been with the White organization since July 18, 1921, when he enrolled in the technical apprentice course. After he was graduated from this course he entered the repair department in Cleveland, serving successively as foreman and general foreman. He

later joined the export department and became service manager, subsequently becoming assistant to the vice-president of the Eastern region and then being promoted to manager of the New York State district.

George M. Wilkins, formerly branch manager at Albany, succeeds Mr. Kiggen as manager of New York State district. Mr. Wilkins has been with the White Company since 1924, serving as a salesman at Syracuse and Utica, later being manager at Utica.

Succeeding Mr. Wilkins as branch manager at Albany is W. G. Winslow, who has been manager at Utica. Mr. Winslow joined the White Company in January, 1925, as a retail salesman at Boston. He was made manager at Utica in 1930.

Marmont Edson, branch manager at Syracuse, will also manage the Utica branch.

J. S. Bleecker With Lukens Steel

John S. Bleecker has been appointed manager of sales of Lukenweld, Inc., (division of Lukens Steel Company), Coatesville, Pa. Mr. Bleecker was graduated from the Massachusetts Institute of Technology in 1898 where he specialized in both mechanical and electrical engineering. He began his career with the American Bell Telephone Company. Most of his activities from 1901 to 1928 were confined to executive management of many enterprises for Stone & Webster, Day & Zimmermann, and Bates, Inc. From 1928 and until his association with Lukenweld, Inc., in 1931, he was a registered professional engineer engaged in industrial and public utility work, specializing particularly in transportation and merchandising.

Commission Appoints Motor Transport Inspectors

Milton R. Stahl, chairman of the Missouri Public Service Commission, has appointed two inspectors for the bus division of the commission. They will assume their duties on Sept. 15. They are Coin Combs, Springfield, and O. J. Beuschert, Columbia. The appointment of the inspectors was authorized in the bus and truck regulatory law passed by the recent Missouri General Assembly. A conference of bus and truck operators with members of the Missouri Public Service Commission was held in Jefferson City on Aug. 21 to discuss the new regulations for buses and trucks.

Charles E. Sperron has resigned as vice-president, general manager and director of the Stark Electric Railway, Alliance, Ohio. Mr. Sperron will continue his association with the Suburban Power Company, but plans to leave Alliance soon for a visit in California. After serving eleven years with the Westinghouse Electric & Manufacturing Company, Mr. Sperron joined the Suburban Power Company in May, 1927. He was transferred to Alliance from Cleveland in March, 1928. A short time later he was named assistant general manager of the Stark Electric Railroad, being promoted to the office of vice-president and general manager one year later.

Westinghouse Promotes Messrs. James, Davis, and Loomis

William F. James, formerly Middle Atlantic district manager of the Westinghouse Electric & Manufacturing Company, has been appointed assistant to the commercial vice-president of the Atlantic division of that company.

Mr. James entered the employ of the Westinghouse Company in 1909, in industrial sales work in the Philadelphia office. In 1912 he began to specialize in steel mill electrification, and in 1923 became sales manager of the industrial division. In 1925, he was appointed Middle Atlantic district manager, with headquarters in Philadelphia.

R. R. Davis, who for many years has directed various Westinghouse advertising activities, has been appointed apparatus advertising manager of the Westinghouse Company, at East Pittsburgh. He will have charge of all apparatus advertising activities of the company except the merchandising department, headquarters for which are located at Mansfield, Ohio.

Mr. Davis had been active in the creative as well as the executive side of every form of advertising, its associated mediums and methods, that has been used by the Westinghouse Company.

His service with the company started in 1905, following his graduation as an electrical engineer from the Western University of Pennsylvania, now the University of Pittsburgh. In the next five years, he sought experience in engineering, sales and management, and, for this reason, following a course in engineering apprentice work at East Pittsburgh, went to Philadelphia as an advisory engineer and salesman. For two years he also served as electrical superintendent of the Megargee Paper Company.

In 1910 he became associated with the Westinghouse advertising department, and in the ensuing period had directed the activities and had executive control of most of its divisions. In 1925 he was named assistant to manager of the department and last year became editor-in-chief.

C. E. Stephens, vice-president of the Westinghouse Company has announced the appointment of E. W. Loomis as Middle Atlantic district manager of the Westinghouse organization, with headquarters in Philadelphia. After he was graduated from the University of Delaware in 1914, he entered the student course of the Westinghouse Company at East Pittsburgh. A year later, after completing his training, he was transferred to the sales department in New York. In a few years, he was made manager of the mill and mining section, and later he was appointed manager of the Northeastern industrial division, in which capacity he has recently been serving.

Thomas F. Roche, engineer in charge of track for the Springfield Street Railway, Springfield, Mass., for ten years, has been appointed superintendent of streets, sidewalks and sewers for West Springfield, Mass.

George H. Webb, an employee of the Springfield Railway, Springfield, Mass., since April 2, 1890, and master mechanic since 1895, has been retired after 41 years of service. William L. Harwood, engineer of equipment, succeeds Mr. Webb as master mechanic and retains his position as engineer of equipment.

William H. Duffy has resigned as city service director, Columbus, Ohio, to become secretary of the city sinking fund trustees. Mr. Duffy has been considered the right bower in the Mayor Thomas administration. He entered his present office in January, 1920. Differences between the Mayor and Mr. Duffy appeared during the building of Port Columbus.

Alfred A. Anderson has been elected president and general manager of the Jamestown, Westfield & Northwestern Railroad, the Jamestown Street Railway, the Jamestown Motor Bus Transportation Company, and the Chautauqua Lake Navigation Company, Jamestown, N. Y., succeeding the late George L. Maltby.

M. J. Powers, Denver, at one time master mechanic for the Denver & Rio Grande Railroad, has been named inspector of bus and truck carriers by the Colorado Public Utilities Commission. He succeeds John R. Hamrock, resigned.

John Menietto resigned recently from the East St. Louis & Suburban Railway, East St. Louis, Ill., to accept a position with the Missouri Pacific Transportation Company. Mr. Menietto entered the service of the East St. Louis & Suburban Railway Company about nine years ago in the mechanical department at the car sheds. Later when the company placed buses in service he transferred to the automotive department where he acquired the greater part of his mechanical experience. His new position is that of general foreman of the Missouri Pacific garage at Poplar Bluff, Mo.

Charles E. Skinner, assistant director of engineering, Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., has been elected president of the American Institute of Electrical Engineers for the year beginning Aug. 1, 1931. Announcement to this effect was made at Asheville, N. C., June 22, during the annual summer convention of the Institute.

OBITUARY



Horace Lowry

Horace Lowry, president of the Twin City Rapid Transit Company, Minneapolis, Minn., died on Aug. 22 at his home in that city from a heart attack. He was 51 years old. He is said, by the *Minneapolis Tribune*, to have overtaxed himself with the press of business affairs last winter.

Mr. Lowry was the son of the late Thomas Lowry, one of the founders of the street railway system in Minneapolis. The elder Lowry took over the presidency of the railway when it was still a struggling corporation, with little or no surplus for extending its operations. As the only son, Horace Lowry, in time, took over the same duties, but under vastly different conditions. He found that the bus was coming into prominence as a means of transportation, and, during his business career, Mr. Lowry encouraged the development of bus lines in the city wherever feasible. In keeping with his desire to provide quick, dependable transportation was the establishment of the Minneapolis-St. Paul intercity bus service. He also was interested in the airplane as a factor in transportation. He declared many times that his company would, when airplane trans-

portation from suburbs to downtown business places became feasible, provide such transportation.

He also advocated, as his particular dream of Twin Cities advancement, the fusion of St. Paul and Minneapolis into one political unit, saying rivalry between St. Paul and Minneapolis businessmen was a constant hindrance rather than a help.

As head of the Arcade Investment Company, he sponsored several building projects, the largest and most recent of which was the block-unit development of the Lowry block in St. Paul. This project, completed at a cost of several million dollars, including a new five-story garage in the center of the block, a complete encircling arcade linking the garage and other new structures with the present Lowry Medical Arts Building and the Hotel Lowry, a new sixteen-story office building on the Fourth Street side of the block, and a new four-story wing addition to the Hotel Lowry.

Mr. Lowry was born in Minneapolis on Feb. 4, 1880. He was graduated from the University of Minnesota with the degree of Bachelor of Science in 1900.

For two years after leaving the university, Mr. Lowry worked as an electrician in the shops of the Minneapolis Street Railway, familiarizing himself with the mechanical operation of the company. He then was appointed to a position in the auditing department where he became chief clerk. This position he resigned to enter the office of his father, taking charge of the latter's real estate interests and acting as personal representative of his father.

In 1908 he resumed active connection with the Minneapolis Street Railway, accepting the superintendency of the Minneapolis division. A year later, on Feb. 4, 1909, his father died and he became head of the Arcade Investment Company, a holding company for the real estate interests of his father. On Dec. 10, 1910, Mr. Lowry resigned from the railway to concentrate his attention on the Arcade Investment Company. He immediately planned and then supervised the construction of the Lowry Building in St. Paul.

On Jan. 1, 1912, he was appointed general manager of the Twin City Rapid Transit Company, which controls the Minneapolis Street Railway and the St. Paul City Railway, and a year later he was elected to the vice-presidency. He continued to act as the second executive officer of the company until 1916 when he was elected president to succeed C. G. Goodrich, who died on Dec. 21, 1915.

At the time of his death, Mr. Lowry was president of the Arcade Investment Company, a director in the Duluth-Superior Traction Company, director in the Soo Railroad, and Northwestern National Bank of Minneapolis.

He was a member of all the leading clubs in Minneapolis and St. Paul as well as a member of the University Club of Chicago. He was a member of the board of trustees of the Minneapolis Institute of Fine Arts.

Uzal H. McCarter

Uzal H. McCarter, president of the Fidelity Union Trust Company, of Newark, the largest bank in New Jersey, one of the founders of the Public Service Corporation of New Jersey, which is headed by his brother, Thomas N. McCarter, and for many years a great financial power in New Jersey, died at his home in Red Bank, N. J., on Aug. 15.

Uzal H. McCarter was born in Newton, N. J., July 5, 1861. His father was then a country lawyer, the descendant of a Scotch-Irish Presbyterian family which settled in New Jersey prior to the American Revolution. Mr. McCarter was educated at Newark Academy, Pingry School, in Elizabeth, N. J., and Princeton, from which he was graduated in 1882. After he was graduated from college, Mr. McCarter went to work for Kidder, Peabody & Company, in New York. Five years thereafter he obtained a position with the Lamboro Investment Company, of New York. While with this company, Mr. McCarter obtained the friendship and then the trust of John F. Dryden, founder of the Prudential Insurance Company, and induced Mr. Dryden to invest a portion of the Prudential funds in bonds handled by the Lamboro Company. That was the start of his rise. In 1889 he moved to Newark as executive manager of the Fidelity Title & Deposit Company, then a small institution less than two years old, with an original capital of \$200,000.

Dr. H. M. Bascom

Dr. H. M. Bascom, for many years chief surgeon of the North American Light & Power Company, the Illinois Power & Light Corporation, Illinois Traction System, and the employees' association, is dead at the age of 78 years, after an operation. Until recently, Dr. Bascom had been in apparently good health, and had maintained his usual schedule of business and professional activities. Dr. Bascom went to Peoria in 1909 to take the position of chief surgeon of the group of utility companies then known as the Illinois Traction System. Later his jurisdiction was extended to include the operating properties of the North American Light & Power Company. Previously, he had practiced medicine in Ottawa, Ill., following his graduation at an early age from the

Hahnemann Medical College of Chicago. As chief surgeon of the Illinois Terminal Railroad System he was an active member of the Association of Railway Chief Surgeons, serving as vice-president in 1926, and as president in 1927. He was also a member of the American Medical Association.

J. L. Agnew

John Lyons Agnew, vice-president of the International Nickel Company of Canada, Ltd., died at his home in Copper Cliff, Ont., recently. Death was due to heart failure in a sudden attack of influenza. Mr. Agnew had just returned to his home from a business trip to New York. He was in charge of the company's operations in both Canada and Great Britain. Born July 28, 1884, Mr. Agnew was brought up in the mining and metallurgical atmosphere of the Pittsburgh district. Going to Canada when he was about 19, he joined the predecessor company—the Canadian Copper Company—at Copper Cliff, Ont., on Feb. 15, 1904. He worked in practically every capacity in the smelting department, eventually becoming smelter superintendent. Subsequently he became general superintendent of the Canadian Copper Company. From then on he held executive positions in the various companies which existed prior to the consolidation in 1929 of these enterprises as the International Nickel Company of Canada, Ltd. At that time he became vice-president of the new company.

Gardner F. Wells

Gardner F. Wells, 60, of New York and Westport, Conn., president of the Boston, Revere Beach & Lynn Railroad, died in his office at Boston on Aug. 21 from gun shot wounds believed to have been self-inflicted.

Mr. Wells also was president of the Interstate Street Railway, with offices at Attleboro, and was a director in other corporations. He was formerly connected with the Old Colony Street Railway, and until 1902 was superintendent of the Brockton & Plymouth Street Railway. In 1902 he was named general manager of the Terre Haute Traction & Light Company. Mr. Wells had been associated with the Boston, Revere Beach & Lynn Railroad since 1927, when the road was electrified and new interests assumed control. Mr. Wells was a member of the engineering and public utility management firm of Hemphill & Wells, New York. His partner, Albert W. Hemphill, is treasurer of the road. A brother, George W. Wells, is a former vice-president.

Gardner F. Wells was born in Quincy, Mass., educated in the Cambridge and Boston schools and then attended Massachusetts Institute of Technology, from which he was graduated in 1891. He became associated with the old Thompson-Houston Company, of Lynn, predecessor of the General Electric Company, and was recognized as an expert in the electrification of horse car lines. He was engaged in work of this kind for ten years in Boston, Fall River, Lowell, Salem, Taunton and other cities.

Mr. Wells became associated with Stone & Webster in 1901, and continued with that firm until March, 1916. During the World War he was a major in the Ordnance Department. At the close of the war, with Albert W. Hemphill, he formed the firm of Hemphill & Wells.

E. C. Foster

Elwin C. Foster, former president of the Manchester Traction, Light & Power Company, Manchester, N. H., and a native of Hancock, died on Aug. 18 in Miami, Fla. He was 78 years old.

After his retirement in 1925 he went to Miami and had resided there ever since, but he found time each summer for a trip to Manchester and his native village of Hancock.

From Jan. 1, 1912, until his retirement, Mr. Foster headed the Manchester Company. His retirement preceded the formation of the New Hampshire Public Service Company, in which the Manchester company was merged.

Under his leadership the company enjoyed marked growth and development. Among the many forward steps taken during the period of his presidency were the merging, in 1913, of the Nashua Light, Heat & Power Company with the Manchester company, and the erection, in 1915, of the power plant at Kelley's Falls on the Piscataquog River, and of a substation at Brook Street.

Mr. Foster's connection with the power and railway industries covered a period of 53 years. In that time he rose from the position of street car conductor to the presidency of one of the largest power companies in New England.

In May, 1922, power and railway officials from all over New England paid homage to Mr. Foster at Manchester as he celebrated his 50th anniversary as a street railway man.

In 1872, a youth of 19, he became a street railway conductor at Lynn, Mass. In various capacities he continued with this company and its successors for 31 years. In 1903 he went to New Orleans as president of the New Orleans Railway & Light Company, and remained there seven years.

Bruce Ford, inventor, engineer and authority in the storage battery field, died on Aug. 10 in Philadelphia. He was in his 59th year. Mr. Ford was second vice-president and a director of the Electric Storage Battery Company, of which until recently he had been general manager. After serving two years with the Electric Storage Battery Company, Mr. Ford spent six years at Johnstown, Pa., with the Johnson Company and the Lorain Steel Company, but returned to the battery company in 1899 as engineer in charge of development and design. He registered more than 50 patents on inventions in the storage battery field.

Harry C. Wells, court claim agent of the United Railways & Electric Company, Baltimore, died on Aug. 10 at Radford, Va., where he was spending the summer. He had been in ill health for some time. Mr. Wells, who was 63 years old, had been connected with the street railway company in Baltimore for 39 years, 30 of which he was court claim agent.

Eugene Schmoeger Gould, only son of Lawrence E. and Martha E. Gould, of Chicago, died at Petoskey, Mich., on Aug. 5 from a heart attack while bathing in Little Traverse Bay. The son of the president of the Economy Electric Devices Company, Eugene Gould was graduated with high honors this spring from Milford School, Milford, Conn., and planned to enter Hobart College, Geneva, N. Y., this fall. He is survived only by his parents.

INDUSTRY MARKET AND TRADE NEWS



One hundred buses of this type are part of an order recently placed for service in Brooklyn

Brooklyn Bus Order Placed

Following the approval of its franchise, orders for equipment have been placed by the Brooklyn Bus Corporation, the new subsidiary of the Brooklyn-Manhattan Transit Corporation formed to operate bus lines in the Borough of Brooklyn. The contract was given to the Twin Coach Corporation.

Of the 150 buses purchased, 100 will be 40-passenger Twin Coaches. These will be of the standard urban type, with minor modifications to meet the purchaser's requirements. The 50 smaller buses, which will seat 27 passengers, are a new development of the Twin Coach Corporation. They are similar in general appearance to the larger model, but have only one engine and employ a differential drive. A more complete description of this bus appears in this issue, page 482.

Allis-Chalmers Widens Field by Acquisition of Two Companies

Announcement is made by the Allis-Chalmers Manufacturing Company, Milwaukee, Wis., of the acquisition of the principal assets of the American Brown Boveri Company, Inc., and the capital stock of Condit Electrical Manufacturing Corporation, Boston, Mass. By this purchase, Allis-Chalmers secures several new lines of equipment, such as electric railway apparatus, mercury arc rectifiers, and oil circuit breakers.

After completing the manufacture of material on order at Camden, N. J., the operations now carried on by the American Brown Boveri Company, Inc., will be segregated. The large apparatus departments and work, with substantially the same personnel, will be transferred to the Allis-Chalmers plants at Milwaukee and Pittsburgh, while the remainder will be moved to the plant of the Condit Electrical Manufacturing Corporation at Boston, Mass. The Allis-Chalmers district and branch sales offices will, in the future, serve as the main outlet for the former American Brown Boveri products.

The corporate entity, the organization, plant and product of the Condit Electric

Manufacturing Corporation, for 31 years manufacturers of oil circuit breakers, will be retained as at present. With few exceptions, the present sales connections of the Condit Electrical Manufacturing Corporation, throughout the United States, will be continued.

Trolley Bus Purchases Active

Recent orders for trolley buses placed with the J. G. Brill Company show evidence of an increasing appreciation of the place of this modern vehicle in urban transportation. Among these are:

- Five for the Illinois Power & Light Company for service in Peoria.
- Four for the United Electric Railways, Providence, R. I.
- Two for the Duluth Street Railway, Duluth, Minn.
- Five for the Shreveport Railways, Shreveport, La.

All of these are of the standard 40-passenger type except those for Shreveport, which seat 30 passengers.

Another evidence that the trolley bus is destined to be a growing factor in future public transportation is recognized in the larger number of this type of vehicles that will be exhibited at the coming convention of the American Electric Railway Association.

Signal Contract for Union Switch & Signal

The Board of Transportation of the City of New York has awarded the Union Switch & Signal Company, equipment contract S-3, involving the installation of automatic block signals and interlocking equipment for the line between Fulton Street, Manhattan, and Church Avenue, Brooklyn. This section includes approximately 25 track-miles, of which 1 mile is on elevated structure, 5 miles of tube construction, and the balance, two-, three- and four-track subway construction. The work involves 500 color light signals, 50 electro-pneumatic switches, and 332 electro-pneumatic train stops. Approximately half of these signals and all the switches will be controlled by four electro-pneumatic interlocking machines with a total of 140 levers.

Memphis Orders Nine Trolley Buses

An order for nine trolley buses, with a seating capacity of 40 each, has been placed by the Memphis Street Railway with the St. Louis Car Company. These vehicles will replace the present Lamar Avenue car line, and will operate along 9.9 miles of route. Approximately 7,000 ft. of double track is to be taken up. The trolley buses are to be delivered about Oct. 1, and the service will be inaugurated about Oct. 15, 1931.

The body framing will have straight sides and rounded corners. The front end will be reduced in width to permit a greater angle of approach to the street curb for loading. The main controller will be located under the rear seat, and the master controller and reverser will be located in a weatherproof cabinet under the center of the vehicle.

The motors, air compressors and resistors are to be placed under the floor, as are the master controller and reverser, between two transverse baffle plates that will extend from side sheet to side sheet and reach to within 12 in. of the ground, with a 6-in. flexible apron on the bottom. All wiring, except the leads to the master control, reverser, motors, air compressor and resistors, will be run in a cable box on the closed side of the vehicle.

Additional detail specifications of the trolley buses follow:

Length over bumpers.....	33 ft.
Wheelbase.....	193 in.
Width over all.....	98 1/4 in.
Height, floor to ceiling,	
Front end, 82 1/2 in.; Rear end, 78 1/2 in.	
Post spacing.....	38 1/2 in.
Body.....	All steel
Doors.....	Front and rear ends
Air brakes.....	Westinghouse
Compressors.....	Westinghouse DH-10
Control.....	General Electric, PCM
Door mechanism.....	National Pneumatic Co.
Doors.....	Outwardly folding
Fare boxes.....	Ohmer No. 3 type
Floor covering.....	Battleship linoleum
Hand rails.....	Micarta and chrome plated
Heaters.....	Railway Utility Co.
Lamp fixtures.....	Dome type
Motors.....	General Electric No. 1154
Roof material.....	No. 10 cotton duck
Seats.....	Karpen Manufacturing Co.
Seating material.....	No. 1 machine buffed leather
Seat spacing.....	29 1/2 in.
Tires.....	Front, 10.50-22 in.
	Rear, 9.75-22 in.
Ventilators.....	Railway Utility Co.

Bendix-Westinghouse Moves Detroit Office

Bendix-Westinghouse Automotive Air Brake Company, of Pittsburgh, Penn., announced the removal of its Detroit office, formerly located at 7-255 General Motors Building, to 8-211 in the same building. By this move, Bendix-Westinghouse will share office space with the Bendix Aviation Corporation, whose address has been established in the General Motors Building for some time. R. L. Morrison will continue his regular duties as district sales manager for Bendix-Westinghouse in the Detroit area, and has added to his staff three new associates, namely, A. E. Young, representative; George S. Sarver, representative; and R. H. Casler, field engineer.

Bus Deliveries

Brooklyn Bus Corporation, Brooklyn, N. Y., 50 Twin Coach, Model 40.

Central Transportation Company, Chicago, Ill., one Yellow Coach, 21-passenger city type.

Columbia Railway, Gas & Electric Company, Columbia, S. C., two Twin Coach, Model 30.

Delaware Bus Company, Philadelphia, Pa., four Yellow Coach, 29-passenger city type.

Illinois Power Company, Springfield, Ill., three Yellow Coach, 21-passenger city type.

Interstate Power Company, Dubuque, Iowa, 25-passenger city type.

Kansas City Public Service Company, Kansas City, Mo., fifteen Twin Coach, Model 30.

Louisville Railway, Louisville, Ky., two White, Model 65A.

Milwaukee Electric Railway & Light Company, Milwaukee, Wis., four Yellow Coach, 25-passenger city type.

Mississippi Valley Public Service Company, Milwaukee, Wis., two Yellow Coach, 21-passenger city type.

Southern Pennsylvania Bus Company, Philadelphia, Pa., three Yellow Coach, 29-passenger city type.

Springfield Traction Company, Springfield, Mo., two Yellow Coach, 21-passenger city type.

Tennessee Public Service Company, Knoxville, Tenn., two Twin Coach, Model 30.

United Service Company, Tulsa, Okla., two Yellow Coach, 21-passenger city type.

Washington Railway & Electric Company, Washington, D. C., eight Yellow Coach; four 21-passenger, and four 29-passenger city type.

West Ridge Transportation Company, Girard, Pa., one Yellow Coach, 29-passenger observation type.

Reading's Electrified Operation Gives Higher Speed

The Reading Railroad on July 26 placed 70 new multiple-unit cars in service on its suburban lines out of Philadelphia. There are 144 stations and towns along the lines affected by the electrification. As a special feature for the first week of the new schedule, a special rate of 10 cents for a round trip to Philadelphia was made for all stations on the electrified road.

The total cost of the Reading electrification was \$21,500,000. Seventy cars, each seating 86 persons, will be used. According to engineers of the General Electric Company, which furnished the electric equipment, there will be an increase in service of from 31 to 73 per cent, in addition to the important factor of increased speed. Thirty-two electric-train crews will man the 70 cars, constructed at a cost of \$52,500 each.

Conspectus of Indexes for August, 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	
				Highb	Low
Street Railway Fares* 1913 = 4.84	Aug., 1931 7.81	July, 1931 7.81	Aug., 1930 7.78	July, 1931 7.81	Aug., 1926 7.35
Electric Railway Materials* 1913 = 100	Aug., 1931 113	July, 1931 114	Aug., 1930 134	Dec., 1926 159	Aug., 1931 113
Electric Railway Wages* 1913 = 100	Aug., 1931 232.9	July, 1931 232.9	Aug., 1930 231.8	April, 1931 233.2	Aug., 1926 225.9
Electric Ry. Construction Cost* Am. Elec. Ry. Assn. 1913 = 100	Aug., 1931 164	July, 1931 169	Aug., 1930 196	Nov., 1928 206	Aug., 1931 164
General Construction Cost Eng'g News-Record 1913 = 100	Aug., 1931 168.4	July, 1931 174.4	Aug., 1930 201.0	Jan., 1927 211.5	Aug., 1931 168.4
Wholesale Commodities U. S. Bur. Lab. Stat. 1926 = 100	July, 1931 70.0	June, 1931 70.0	July, 1930 84.0	Sept., 1928 100.1	June, 1931 70.0
Wholesale Commodities Bradstreet, 1913 = 9.21	Aug., 1931 8.79	July, 1931 8.78	Aug., 1930 10.45	Jan., 1928 13.57	June, 1931 8.64
Retail Food U. S. Bur. Lab. Stat. 1913 = 100	July, 1931 119.0	June, 1931 118.3	July, 1930 144.0	Dec., 1926 161.8	June, 1931 118.3
Cost of Living Nat. Ind. Conf. Bd. 1923 = 100	June, 1931 85.9	May, 1931 86.9	June, 1930 97.0	Dec., 1926 105.5	June, 1931 85.9
General Business The Business Week Normal = 100	Aug. 8, 1931 74.2	July 11, 1931 76.8	Aug. 9, 1930 87.2	Oct. 6, 1928 117.6	Aug. 1, 1931 73.0
Industrial Activity Elec. World, kw.-hr. used 1923-25 = 100	July, 1931 97.9	June, 1931 101.7	July, 1930 105.1	Feb., 1929 140.4	Jan., 1931 97.6
Bank Clearings Outside N. Y. City 1926 = 100	July, 1931 68.6	June, 1931 71.2	July, 1930 91.6	Oct., 1929 111.8	July, 1931 68.6

*The three index numbers marked with an asterisk are computed by Mr. Richey, as follows: Fares index is average street railway fare in all United States cities with a population of 50,000 or over except New York City, and weighted according to population. Street Railway Materials index is relative average price of materials (including fuel) used in street

railway operation and maintenance, weighted according to average use of such materials. Wages index is relative average maximum hourly wage of motormen, conductors and operators on 121 of the largest street and interurban railways operated in the United States, weighted according to the number of such men employed on these roads.

Material Prices

AUGUST 26, 1931

Metals—New York

Copper, electrolytic, delivered, cents per lb.	7.75
Lead.....	4.40
Nickel, ingot.....	35.00
Zinc.....	4.15
Tin, Straits.....	26.37
Aluminum, 98 to 99 per cent.....	22.90
Rabbit metal, warehouse	
Commercial grade.....	34.50
General service.....	28.75

Track Materials—Pittsburgh

Standard steel rails, gross ton.....	\$43.00
Track spikes, $\frac{3}{4}$ -in. and larger, per 100 lb.....	\$2.70
Tie plates, steel, cents per 100 lb.....	1.95
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.....	1.21
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.....	7.00-11.00
Colored.....	7.00-10.00

Wire—New York

Bars copper wire, cents per lb.....	9.50
Rubber-covered wire, No. 14, per 1,000 ft.....	\$4.09
Weatherproof wire base, cents per lb.....	11.37

Paint Materials—New York

Linseed oil (5 bbl. lots), cents per lb.....	8.50
White lead in oil (100lb. 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.....	\$1.35
Central Ill. screenings.....	.80
Kansas screenings, Kansas City.....	1.20
Big seam, Ala., mine run.....	1.70
Smokeless mine run, Chicago.....	1.60

Paving Materials

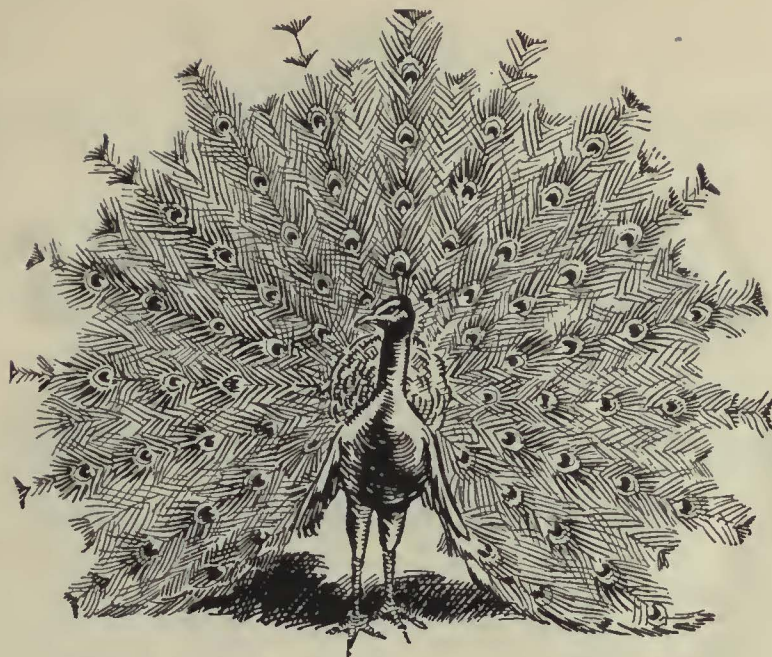
Paving stone, granite, 5 in., f.o.b.:	
New York—Grade 1, per thousand.....	\$120.00
Wood block paving 3 $\frac{1}{2}$, 16 lb. treatment, N.Y., per sq.yd., f.o.b.....	2.50
Paving brick, 3 $\frac{1}{2}$ x8 $\frac{1}{2}$ x4, N.Y., per 1,000 in. carload lots, f.o.b.....	50.00
Paving brick, 3 $\frac{1}{2}$ x8 $\frac{1}{2}$ x4, N. Y., per 1,000 in. carload lots, f.o.b.....	45.00
Crushed stone, $\frac{1}{2}$ -in., wholesale, f.o.b. per cu.yd.....	1.80
Cement, Chicago, in carload lots, without bags, f.o.b.....	1.35
Gravel, $\frac{1}{2}$ -in., 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.....	6.12
Light copper.....	5.12
Heavy brass.....	3.12
Zinc.....	1.50
Lead, heavy.....	3.10
Mixed babbitt.....	3.25
Battery lead plates.....	1.37
Cast aluminum.....	6.75
Sheet aluminum.....	8.25
Auto radiators.....	3.12
Tires, standard, mixed, per ton.....	\$3.12
Inner tubes, mixed, per cwt.....	\$1.20

Old Material—Chicago

Steel car axles, net ton.....	\$12.25
Cast iron car wheels, gross ton.....	9.75
Steel car wheels, gross ton.....	9.00
Leaf springs, cut apart, gross ton.....	10.50
Angle bars, gross ton.....	9.50
Brake shoes, net ton.....	6.00
Steel rails (short), gross ton.....	11.25
Relaying rails, gross ton (65 lb. and heavier)	24.50
Machine shop turnings, gross ton.....	4.25
Coil springs, per gross ton.....	10.75
Frogs, switches and guards cut apart, per gross ton.....	8.25



The Motorman's last line of defence...

Peacock

Reg. U. S. Pat. Office

Staffless

Brakes

Are direct, emphatic, sure in action. Fast on the take up, lots of power, never clog with chain, no matter how slack the rigging may be. *They stop cars* when they are called into action.



National Brake Co., Inc.

890 Ellicott Square
Buffalo, N. Y.

General Sales Office:

50 Church St., New York

Canadian Representative:

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



DeVilbiss

**HEADQUARTERS FOR SPRAY-PAINTING
AND FINISHING EQUIPMENT
FOR
ELECTRIC RAILROADS**

THE reason electric rolling stock can be spray-painted today is because DeVilbiss engineers found the answer to the exhausting problem,—a problem which *had* to be solved before electric railways could enjoy the speed and economy of this modern method of applying protective and

decorative coatings.

The ingenious combination of induced draft and suction, as found in the DeVilbiss Canopy Type Exhaust, made possible for the first time the entire removal of vapors and odors during the spray-painting of such large objects as cars. Now, this

DeVilbiss Equipment is efficiently and economically serving many transportation systems,—both large and small. The modern practice of keeping rolling stock bright and attractive at lower cost, was the result of this DeVilbiss invention. Ask your nearest DeVilbiss representative for details. Or write.

THE DEVILBISS COMPANY . TOLEDO, OHIO

NEW YORK

PHILADELPHIA

CLEVELAND

DETROIT

INDIANAPOLIS

CHICAGO

ST. LOUIS

LOS ANGELES

SAN FRANCISCO

WINDSOR, ONTARIO

Direct sales and service representatives available everywhere

The wide DeVilbiss Line embraces every outfit and accessory for spray-painting and spray-finishing



SINCE 1924 357 MILLION MILES IN TRAFFIC



more than 1½ BILLION passengers

Such figures stagger the imagination. The first is equal to *14,280 times around the world!* The second is only a little short of *the total population of the earth!* Yet these impressive totals are actual miles traveled and passengers carried in the past seven years by the largest motor coach operation in the United States — in that period over 90% on Goodyears!

That operation is the Public Service Coordinated Transport with its subsidiary the Public Service Interstate Transportation Company — jointly operated from Newark, N. J. 2,436 coaches are employed in the service. The territory covered in New Jersey, New York, and Pennsylvania, is the most

heavily congested district *as to traffic* on earth. More brake applications are required here on more station and traffic stops than in any other service. There have been minimum road failures on Goodyears. *Over an extended period of years, on an overall test including thousands of coach units, on every point of stamina, traction, cushioning, and public safety there has been maximum satisfaction with the Goodyear Tire.*

It is a straight-shooting fact, and for good reason, that "more people ride on Goodyear Tires than on any other kind." Both for motor coaches and passenger cars it is *the leading make of tire.* On all your coaches you can have this quality — specify Goodyears.

GOODYEAR

THE GREATEST NAME IN RUBBER



INSULATING MATERIALS

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-319, Merchandise Department, Bridgeport, Conn.

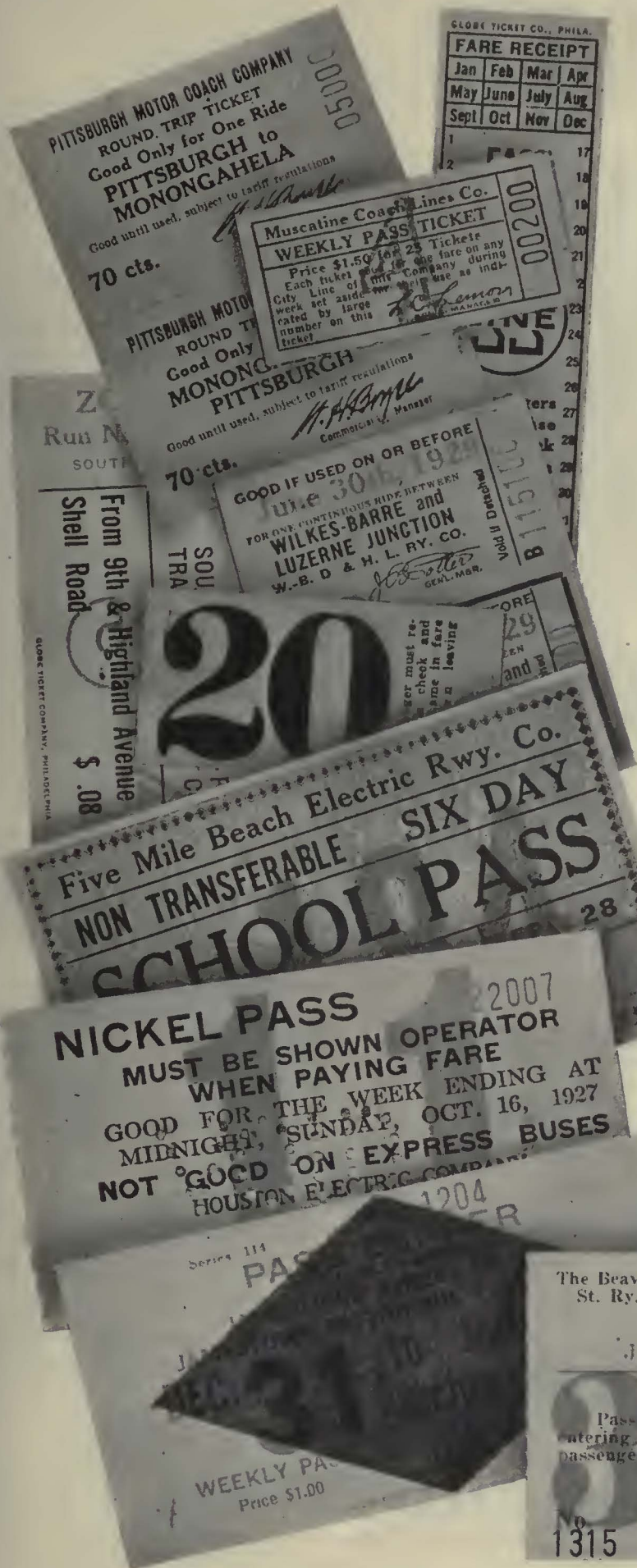


GENERAL  **ELECTRIC**

INSULATING MATERIALS

MERCHANDISE DEPARTMENT, GENERAL ELECTRIC COMPANY, BRIDGEPORT, CONNECTICUT





ARE YOU USING THESE REVENUE-INCREASING FARE HELPS?

PRACTICALLY all of the larger traction companies in this country are using Globe Transfers to insure maximum revenue return and minimum losses at transfer points. But not all of these companies are taking advantage of the equally important cash-in-advance value of Globe Passes, and the sure, simple fare check afforded by Globe "Hat Checks" and zone Fare Receipts.

We strongly urge you to investigate the numerous advantages of these forms. Our entire facilities and many years of experience as "the nation's transportation fare specialists" are at your service.

GLOBE TICKET COMPANY

112 North Twelfth Street
PHILADELPHIA

Additional Factories in

- | | | |
|---------------|--------------|-----------|
| Los Angeles | Boston | New York |
| | Jacksonville | |
| Sales Offices | | |
| Baltimore | Cincinnati | Cleveland |
| | Pittsburgh | |

The Beaver Valley Traction Company, Pittsburgh & Beaver St. Ry. Co., and Beaver Valley Motor Coach Company

WEEKLY PASS

JULY 29, 1928 TO JULY 29, 1928

GOOD IN ALL ZONES

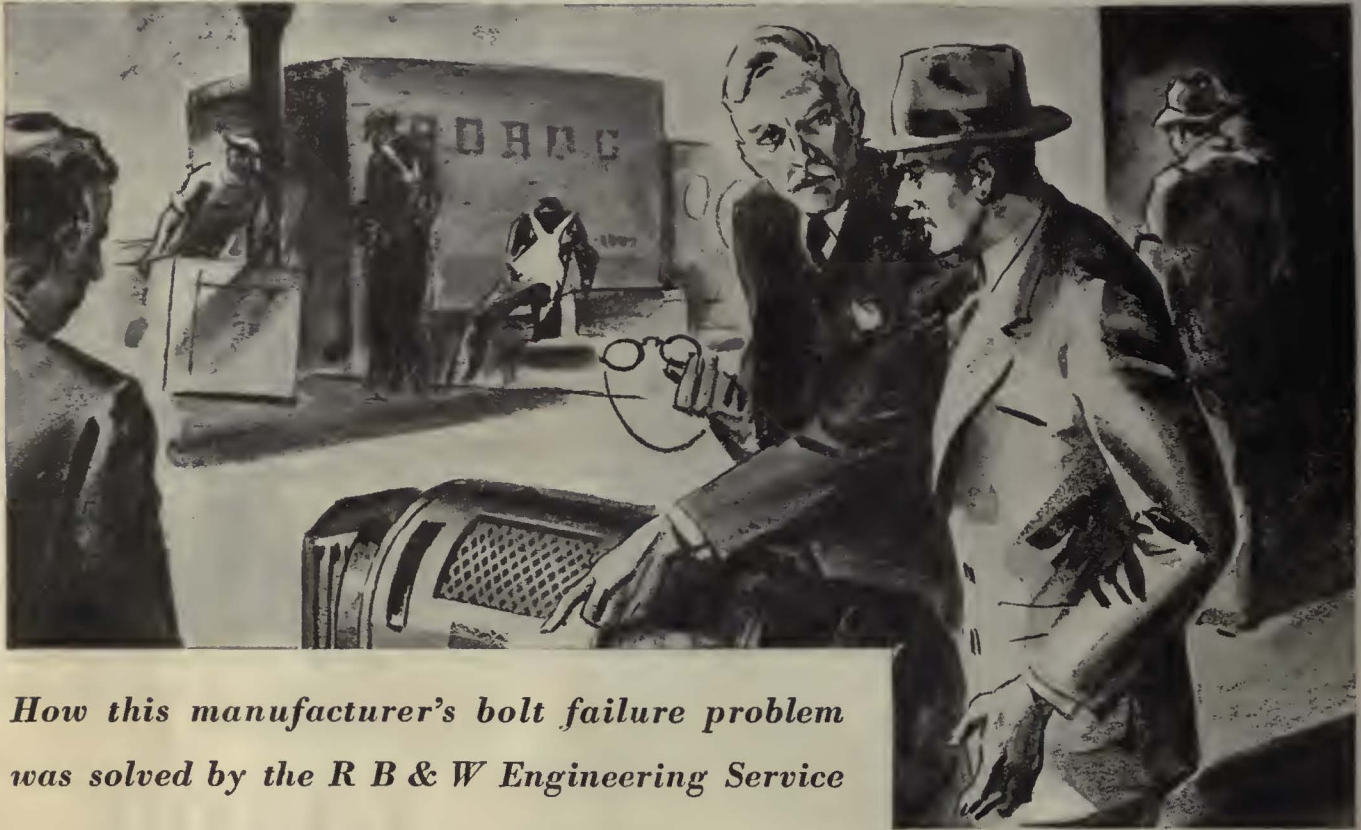
Pass must be shown to the conductor or operator upon entering and leaving the car and is good for only one (1) passenger.

Price, \$2.00

J. R. MARSHALL,
Sup't of Transportation.

1315

HE FORGOT... TO FIGURE INITIAL STRESS



How this manufacturer's bolt failure problem was solved by the R B & W Engineering Service

"Bolts still failing. Rush new shipment. Must have higher tensile strength." Thus wired a customer. And then the R B & W Engineering Service got busy.

The customer was a builder of a portable electric machine used in construction work. He was using bolts to attach the heavy machine assembly to the frame of a trailer truck. We had tested specimens of his bolts before shipment and they had

shown 86,000 pounds, so the next thing to do was to make an on-the-spot investigation.

We discovered that the customer, when estimating the strength of the bolts he needed, had forgotten to allow for the initial stress placed on the bolts when his machine was assembled. The bolting together of the

parts exerted a stress, which, when increased by service loads, exceeded the capacity of his bolts. A slight increase in diameter of the bolts eliminated his trouble.

The skilled engineer, and the layman as well, can utilize the specialized knowledge of bolting material available without obligation through the R B & W Engineering Service. Send us your problems.



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.



OK

100

40 passenger
Twin Coaches
for
Brooklyn -
New York City's
greatest residential
Borough

The Nation's greatest

through the Brooklyn Bus Corporation
of the great Brooklyn &



Selects 100 Dual
for 5 reasons

transportation center

motor coach subsidiary

Queens Transit Corporation



Motor Twin Coaches

WIDER APPEAL

NON OBSOLESCENCE

CIRCULATING LOADS

CAPACITY

POWER



Interior view of forty-passenger Twin Coaches being shipped to Brooklyn, showing use of new pass meter, or turnstile, expected to materially increase average speed

\$1,100,000 Brooklyn Bus Order Approved by Commission

The New York Transit Commission on July 30 granted the application of the Brooklyn Bus Corporation, a subsidiary of the Brooklyn & Queens Transit Corporation, to issue \$1,100,000 in notes to pay for 100 buses purchased from the Twin Coach Corporation, of Kent, Ohio. In its decision the commission says that it found no evidence that the price of \$11,000 a vehicle, proposed to be paid, was too high. It points out that the vice-president of one of the leading competitors of the Twin Coach Corporation had testified on the stand that the price for which the Brooklyn Bus Corporation had contracted was "in line" with prices asked by the bus manufacturers generally for practically the same type of bus.

*From August 1st issue
Electric Railway Journal News*



**The SAFETY CAR
CONTROL EQUIPMENT**

**Speeds Transportation
SAFELY ▲ ▲ ▲ ▲ ▲ ▲ ▲**

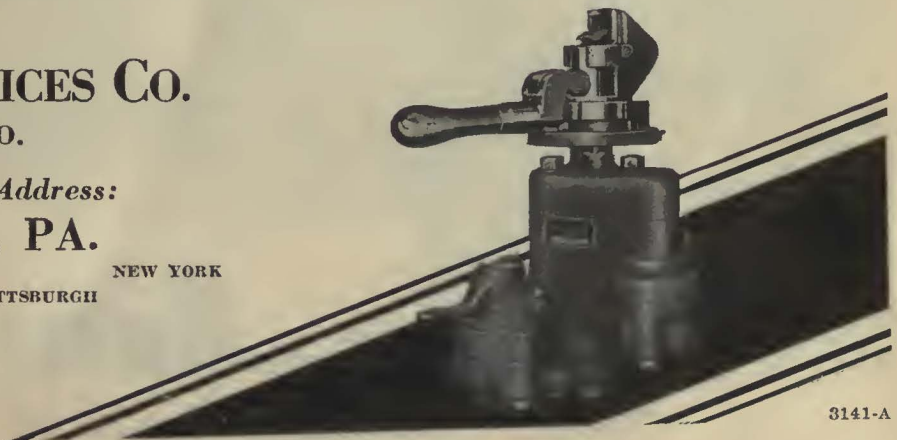
When conditions impel shorter headway to reduce waiting time of patrons . . . quicker brake applications to reduce stopping time . . . rapid interchange of passengers to cut down standing time . . . prompt release of brakes to permit quick get-away . . . THEN the Safety Car Control Equipment, with all of the latest improvements, will speed up service while maintaining the basic element of safety.

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

Postal and Telegraphic Address:

WILMERDING, PA.

CHICAGO SAN FRANCISCO NEW YORK
WASHINGTON PITTSBURGH



3141-A

B. M. T. goes



Approach to Manhattan Bridge, New York.
 Tying up traffic here on account of tire
 trouble is a serious, punishable offense
 ... Note the B. M. T. bus in the foreground.

Goodrich

Another B. F. Goodrich Product

Goodrich - 100%

Gigantic metropolitan bus system standardizes on Silvertowns after 18-month test period

5:30 P. M. Rush hour. Seething crowds pour into subways . . . jam street cars . . . elevated trains . . . every available means of transportation . . .

Manhattan Bridge—huge connecting link between Manhattan and Brooklyn—becomes a focal point of the world's heaviest traffic.

Here, at this "bottle-neck" you'll find B. M. T. buses—delivering thousands of Brooklynites. Day in—day out—traveling on clocked schedules—over Manhattan Bridge—capacity loads—with never a hitch.

Surely, this is a crucial test of tire

One of a hundred new Goodrich-equipped buses just delivered to the B. M. T. by the Twin Coach Company, of Kent, Ohio.

equipment. Yet, since using Silvertowns B. M. T. has never had a single road delay on the Manhattan Bridge due to tire failure.

The B. M. T. (Brooklyn Bus Corporation) selected Goodrich Silvertowns as best meeting the require-

ments of their heavy duty service only after a rigid eighteen-month test period during which they tried out several makes of tires. Silvertowns are now standard equipment on every B. M. T. bus.

Whether your buses travel in heavy city traffic or on fast cross-country hauls, you'll find Silvertowns the best answer to your tire requirements.

The B. F. Goodrich Rubber Company, Est. 1870, Akron, Ohio. Pacific Goodrich Rubber Company, Los Angeles, California. In Canada: Canadian Goodrich Company, Limited, Kitchener, Ontario. The International B. F. Goodrich Corporation (Export).



HEAVY DUTY



Silvertowns

SPECIFY GOODRICH ON YOUR NEW BUSES

This month —

GOLDEN JUBILEE CONVENTION NUMBER

1881
/
1931

The CONVENTION NUMBER of *Electric Railway Journal* will be mailed to subscribers September 15. It will also be distributed at Atlantic City. It will be much more than an ordinary convention issue. The history of the Journal is the history of the industry, and this issue will reflect that fact. It will be an invaluable historical document that every one interested in community transport will want to read and keep.

GOLDEN JUBILEE CONVENTION NUMBER

Mailed Sept. 15 — Forms close Sept. 11

and next month —

CONVENTION REPORT NUMBER

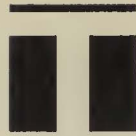
THE BIG SHOW is coming in less than a month. The 50th meeting—Golden Jubilee—of the A. E. R. A. An event that comes but once in an industry's lifetime.

Important industry executives will be at Atlantic City during the week of September 26-October 2. Important features will distinguish this year's Exhibit—in the great Atlantic City Auditorium—displays recalling the industry's fifty years of progress, as well as the latest modern equipment. And this year, for the first time, the National Association of Motor Bus Operators will hold their annual meeting during the same week, at the same place.

The CONVENTION REPORT NUMBER of *Electric Railway Journal* will bring you a full and accurate account of all the important happenings at Atlantic City during this busy week. It will preserve in permanent form a record of this Golden Jubilee meeting—a record both interesting and valuable to every man connected with the electric railway industry.

CONVENTION REPORT NUMBER

Mailed Oct. 10—Forms close Oct. 2



THE FINEST POLE
 . . IN 50 YEARS OF AERA HISTORY



In Topeka, Kas., Union Metal Poles support trolley span wires, street lights and traffic signals. Note absence of guy wires

BACK in the horse-car days there was no need for poles for trolley-span wire support. With the advent of electric cars poles became a necessity. Those used in the early days were crude compared with the Union Metal Fluted Poles of today. Sturdy, graceful, dignified, these poles do their work efficiently and at the same time beautify the streets.

When the A. E. R. A. celebrates its centennial in 1981 Union Metal Poles now in service will still line the curbs of American cities.

Fluted Poles have been termed the ideal for street railway service. They are rugged, long-lived; their flexibility enables them to carry abnormal wind or ice loads without taking a permanent set; they are simple to install and maintain; moreover, their appearance, far superior to any other pole, helps build good will for the owners.

Progressive street railway companies in dozens of our largest cities are using Union Metal Poles. They realize that in the 50 years of A. E. R. A. history no finer pole has been built.

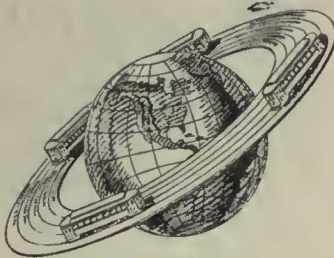
THE UNION METAL MANUFACTURING CO., General Offices and Factory: CANTON, OHIO

Sales Offices: New York, Chicago, Boston, Los Angeles, Atlanta, Dallas, San Francisco • Distributors: Graybar Electric Company, Inc.; General Electric Merchandise Distributors. Offices in all principal cities.

Abroad: The Canadian General Electric Co., The International General Electric Co., Inc.



UNION METAL 
DISTRIBUTION POLES



CAR CARD
ADVERTISING
ALMOST
EVERYWHERE

TENS of millions ride the Electric Railway Lines every day. This tremendous group of buyers is steadily being influenced to increase their purchase of car card advertised products. Thus Car Card Advertising helps to sustain business.

Consider what might happen if these tens of millions were not given attractive, forceful suggestions and timely reminders to buy day in and day out, rain and shine.

Is it any wonder that Car Card Advertising has the active endorsement of the Electric Railway Operators?

Barron G. Collier
INCORPORATED



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

910 So. Michigan Avenue

Chicago, Illinois



MATCHED TO GIVE PERFECT PERFORMANCE

*In the nation's
capital*

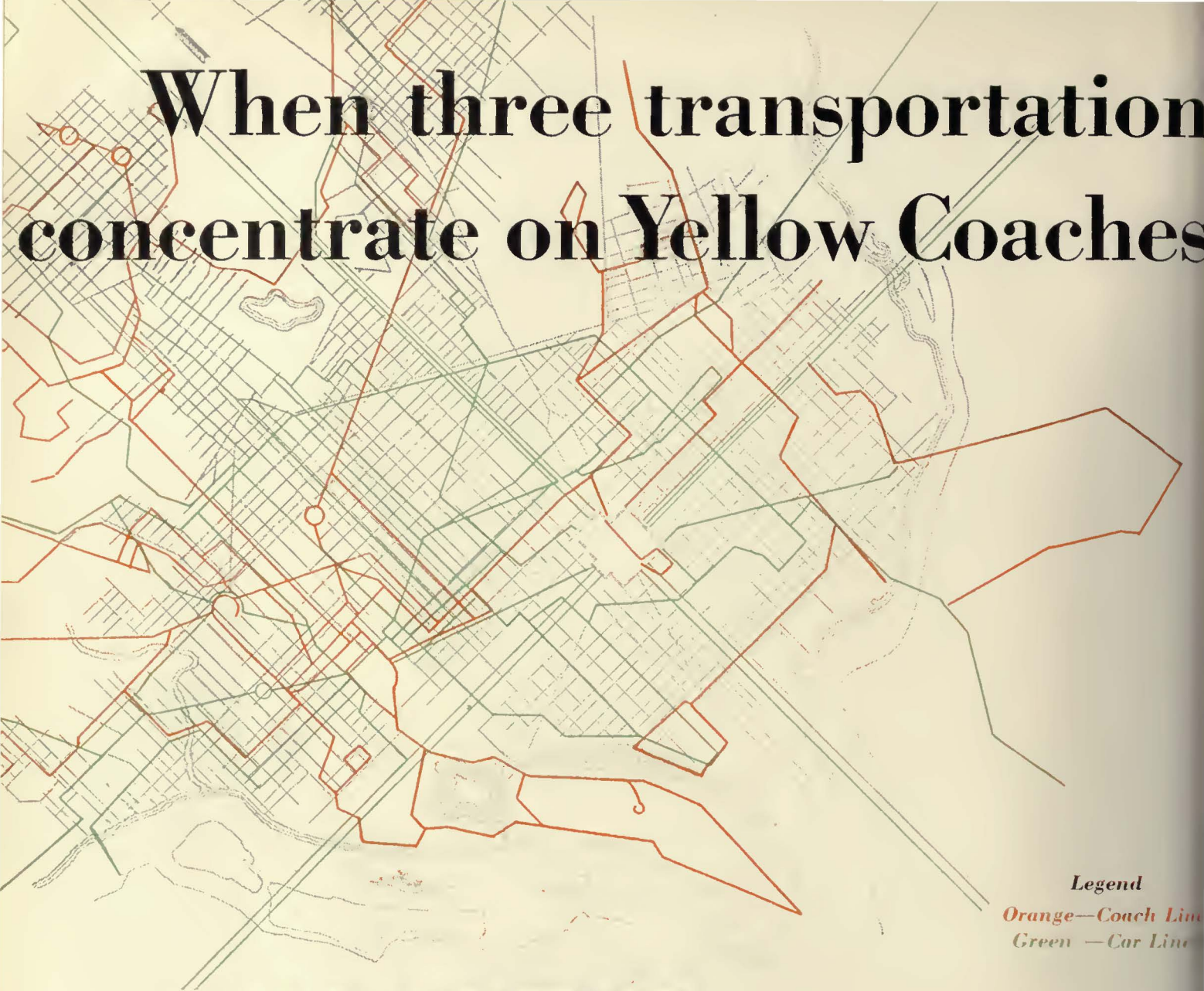
3 4
185 out of 243

are

YELLOWWS



When three transportation concentrate on Yellow Coaches



Legend
Orange—Coach Line
Green —Car Line



*The Washington Railway and
Electric Company operate 128
motor coaches—107 of them
are Yellows*



companies in the same city

—there's a reason —

When three progressive operators, giving in some instances parallel service, all specialize on one make of motor coach and individually prove their preference by reorders, *there must be more to such a united policy than mere chance.*

When three different companies, in the same city, all keyed to make the strongest bid for passengers, agree on Yellow Coaches it proves that it *takes a Yellow to compete with a Yellow.*

This is the situation in Washington, D. C., where automobile registration per 1000 population is greater than in any other Eastern city and where only the best and most comfortable motor coach service can hope to win.

Comparative figures tell their own story—

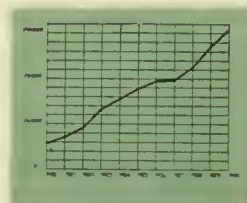
The Washington Railway and Electric Company, the largest system and operating both street cars and motor coaches, owns 107 Yellow Coaches in a fleet of 128 motor vehicles.

The Capital Traction Company, the second largest operator of street cars and coaches, owns 31 Yellows in a fleet of 47.

The Washington Rapid Transit Company, operating motor coaches only, uses 47 Yellow Coaches in a fleet of 68.

Three out of four coaches in Washington are Yellows. And all Yellow Coaches purchased in 1925 have given over 300,000 miles of service each—in perfect condition and operating every day.

Washington's three transportation companies have made the Nation's Capital a Yellow Coach city and a profitable one for motor coach operation.



Automobile Registrations in Washington

Motor coach service *must* be comfortable, convenient and efficient to meet this competition



The Capital Traction Company operate 47 motor coaches—31 of them are Yellows



The Washington Rapid Transit Company operate motor coaches only. They have a fleet of 68 coaches—47 of them are Yellows



It takes a **YELLOW** to compete with a **YELLOW!**

- In addition to the outstanding qualities of comfort and convenience rendered by Yellow Coaches in Washington, they have been remarkably economical on all three operations.

The operating figures on equipment purchased as early as 1925 shows an economy of operation which today is almost unbelievable.

	Gas and Oil Cents	Tires Cents	Chassis and Body Repairs Cents	Total Cents
Type Y Yellows, After 300,000 Miles Each, in Express Service. Purchased in 1925				
1925	3.18	1.75	.82	5.85
1926	3.92	1.75	1.99	7.66
1927	3.08	1.45	1.74	6.27
1928	3.04	1.03	2.41	6.48
1929	3.00	1.10	2.50	6.60
1930	2.41	.93	1.78	5.12

52 Type Z-29 pass. Yellows in Local City Service. Purchased 1925 - 1928

1926	4.709	1.936	2.129	8.774
1927	4.417	1.493	2.524	8.434
1928	4.027	1.410	2.653	8.090
1929	3.953	1.360	3.115	8.428
1930	3.420	1.061	2.640	7.121

18 Type X - 21 pass. City Service Yellows Purchased 1925 - 1928

1926	2.770	1.843	1.851	6.464
1927	2.663	.947	1.882	5.492
1928	2.590	.884	2.141	5.615
1929	2.542	.839	2.595	5.976
1930	2.212	.811	2.865	5.888

- No wonder the record of purchases of motor coaches in Washington, D. C., is a record of repeat orders for Yellow Coaches.

Reorders by the three Washington transportation companies show that since the first purchase in 1925, Yellow Coaches have predominated in all years. The record follows—

Prior to	Yellow Coaches	Orders	Other Makes
1925	0	0	27
1925	22	7	16
1926	23	8	0
1927	56	9	2
1928	31	9	2
1929	26	6	0
1930	19	5	7
1931	8	1	4
	<hr/> 185	<hr/> 45	<hr/> 58

- And carrying forward the reorder policy 4 Type W-21 passenger Yellow City Coaches and 4 additional Z-29 Yellow Coaches have just been shipped to the Washington Railway and Electric Company.

GENERAL MOTORS TRUCK CO.

Pontiac, Michigan

Subsidiary of Yellow Truck & Coach Mfg. Co.



Long Life in a Severe Service



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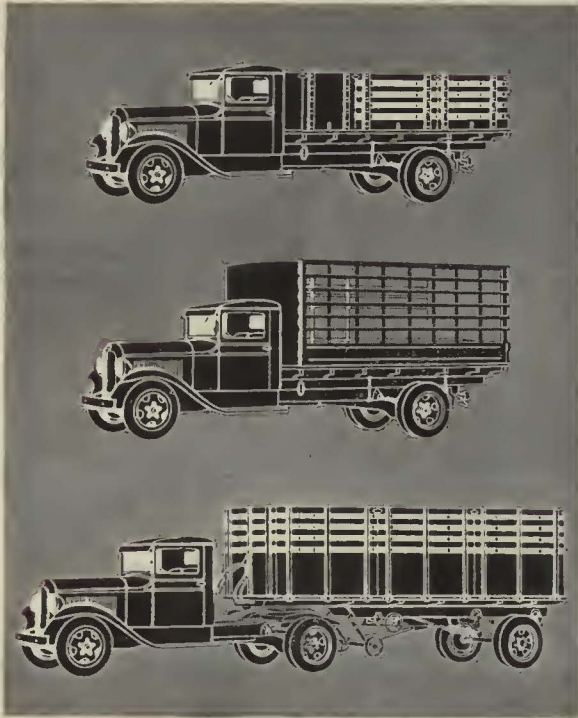
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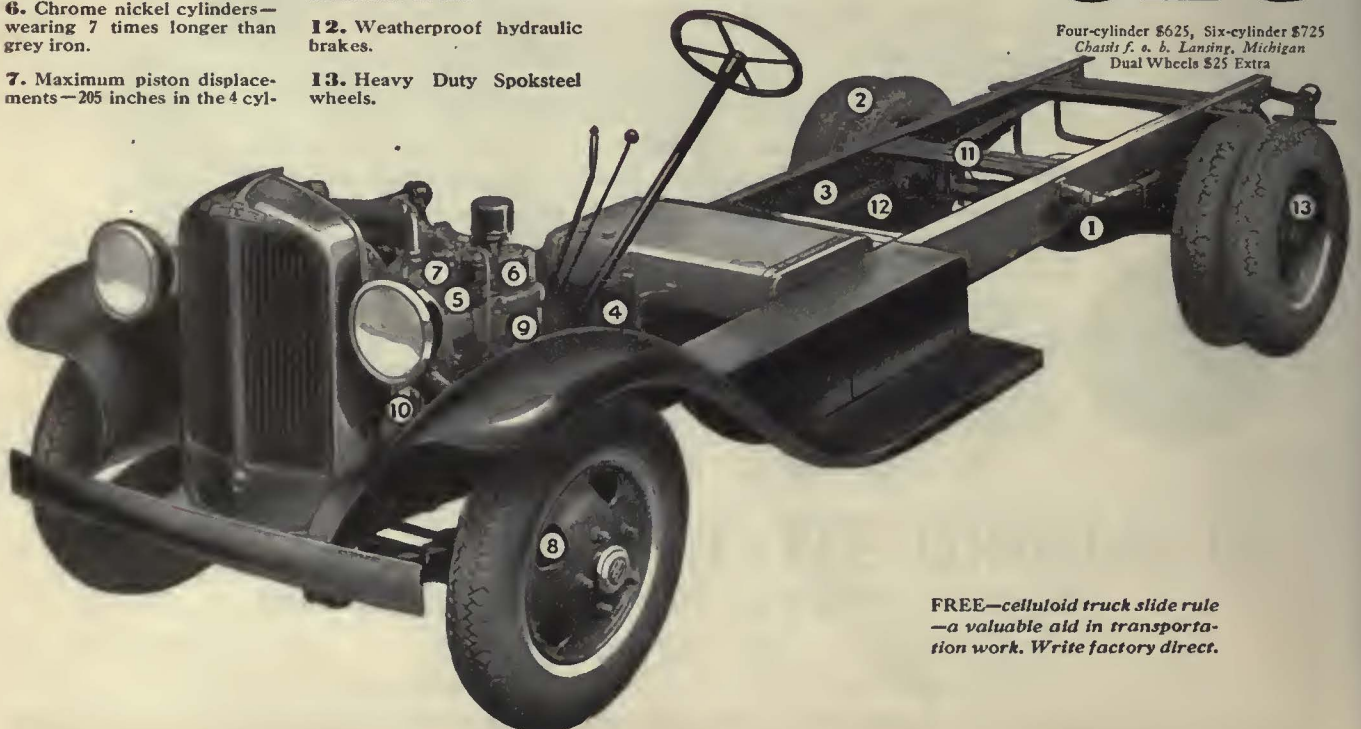
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The car on the left stops to open switch then passes through and stops in position of car on the right to close switch. These two stops are eliminated by the 3-in-1 Switch Stand.

THERE is a tremendous annual cost at the ends of double track and on passing sidings where cars must stop to operate a switch. The calculated annual cost per car for this stopping and starting is large; when multiplied by each operating car the figure becomes staggering. It can be magnified further by considering the time on every schedule sacrificed to switch operation.

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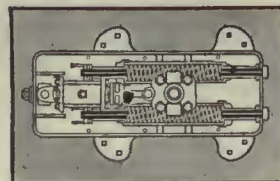
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 Metropolitan Bank Building, Washington Builders Exchange Building, St. Paul

Nine Racor Works: Hillburn, N. Y., Niagara Falls, N. Y., Chicago, Ill., East St. Louis, Ill.,
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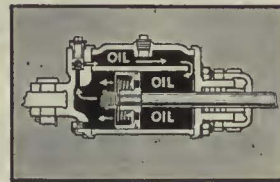
Stops

**AT THE ENDS OF
 DOUBLE TRACK**

**COST
 MILLIONS
 ANNUALLY**



The automatic double-coil spring return after trailing car has passed.



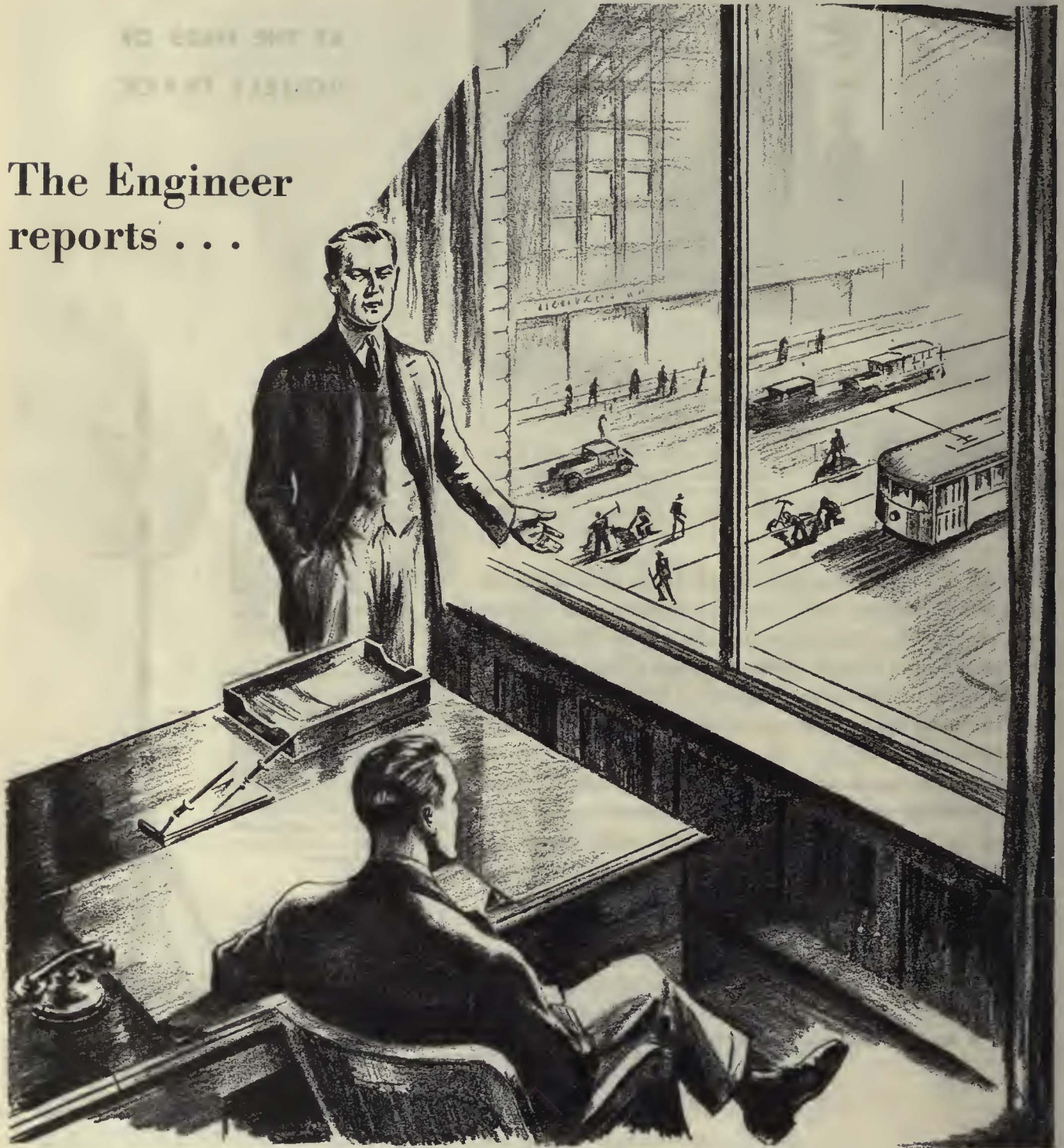
The adjustable oil buffer preventing return between successive pairs of wheels.

The rigid-throw always ready for hand operation. Parts simple and readily accessible for oiling and inspection.



"Yes Sir, this

The Engineer reports . . .



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Toronto

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WE'VE patched those joints too many times already! And now the City Engineer is beginning to kick about giving us permits to open up the pavement again. He says he's getting complaints from everybody along the street.

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"So we've decided to Thermit weld"



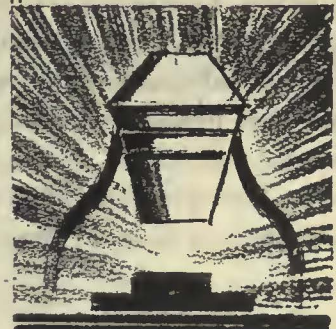
"just about ends all their joint troubles"



"welding under traffic solves the problem"



"they've improved the process and reduced the cost..."



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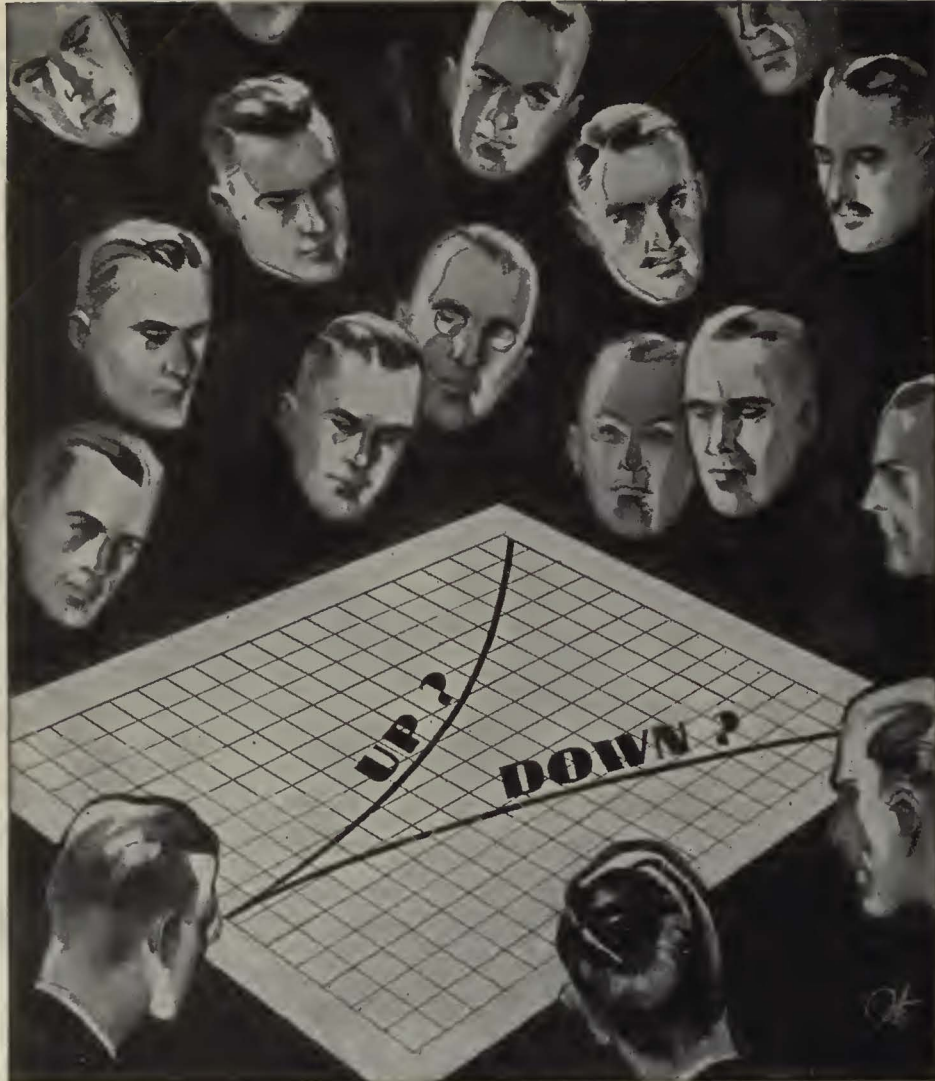
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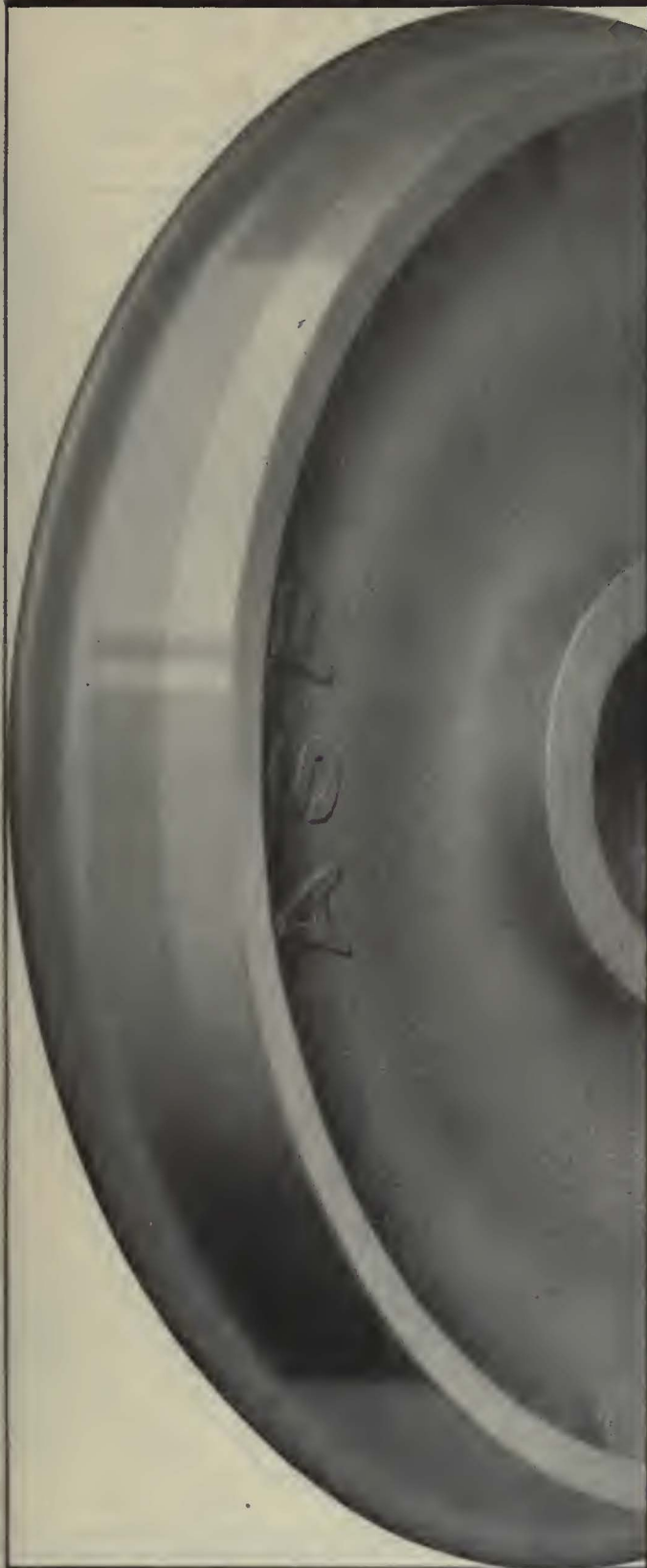
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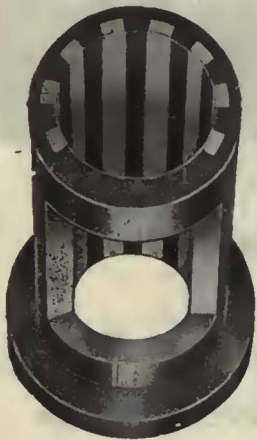
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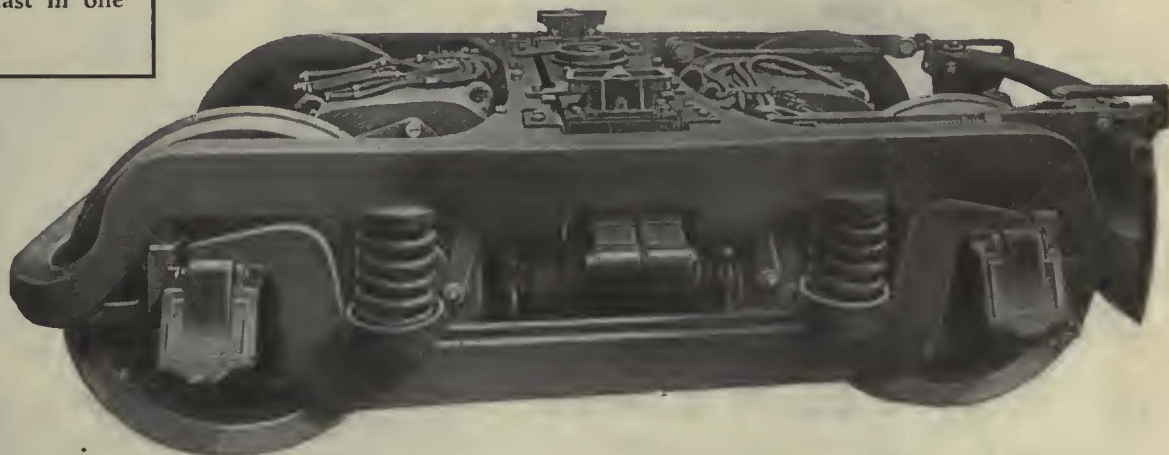
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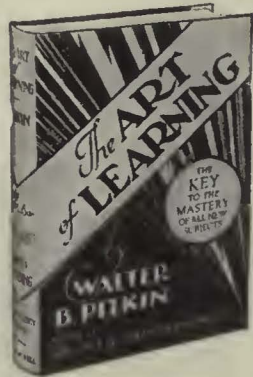


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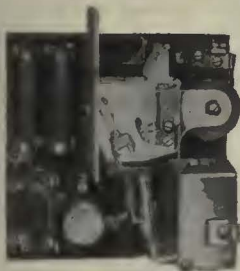
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Industrial Cleaning Materials and Methods

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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.

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MASTER mechanic, 18 years' practical experience street and interurban cars and busses overhauling. Location anywhere. PW-255, Electric Railway Journal, 520 No. Michigan Ave., Chicago, Ill.

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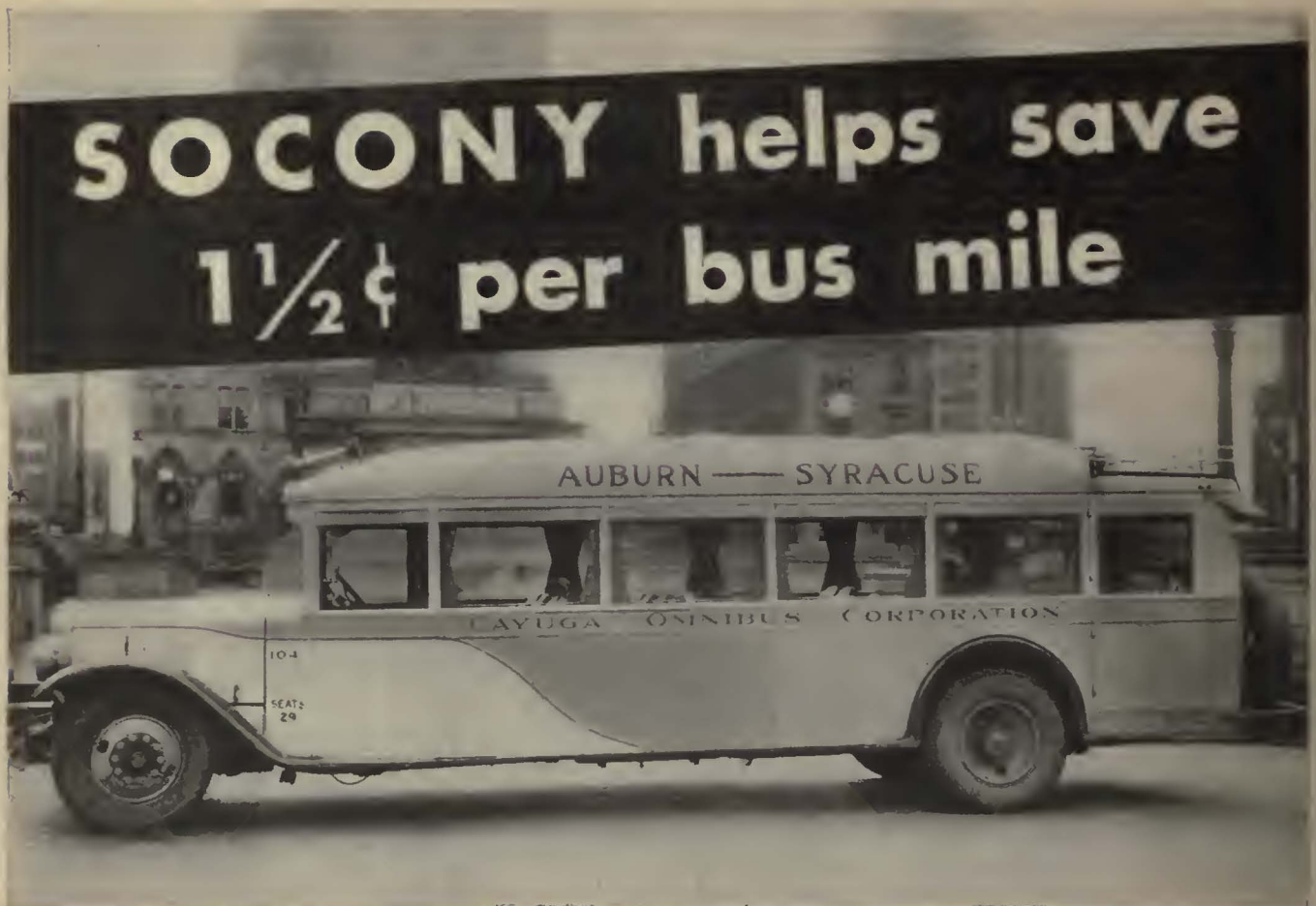
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This year's convention marks the 50th Anniversary of our American Electric Railway Association, and the 100th since the introduction of the first street car drawn by horses.

We approach these two anniversaries not so much with any great feeling of satisfaction or contentment but rather looking upon this occasion as but another opportunity to show confidence in the progressive development of our industry. We are looking forward—not backward. Every effort is being put forth to contribute our part to the further development of public transportation service. The results of valuable research, development and test will be shown in our convention exhibit.

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