Electric Railway Journal

Consolidation of Street Railway Journal and Electric Railway Review

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Volume 56 New York, Saturday, October 16, 1920 *Number* 16

P. H. Gadsden for President of the Association

THE selection of Philip H. Gadsden for president of the American Electric Railway Association is a wise choice. His very important part in the work of the Federal Electric Railways Commission has given him a vision of the industry as a whole and a comprehension of its problems that make him pre-eminently fitted for the place. The responsibilities of the office at this time are exceedingly great and critical, for upon the manner in which the industry proceeds to rehabilitate itself and carry into execution the recommendations of the Federal commission depends the future of the electric railway business. Mr. Gadsden also has a very keen and enlightened understanding of the problem of public relations, which is undoubtedly a vital part of the reconstruction work to be done.

In connection with its report the committee on nominations made a recommendation of great importance in connection with future workings of the association. It set up this year as the fixed policy of the association that in the selection of officers the association should be guided by the requirements of the time, unaffected by the choice of previous years. This is contrary to the custom of advancing the vice-president in succession. Without reference to the elections just consummated, the wisdom of this general principle is obvious.

American Executive Committee Enlarged

THE action of the association in enlarging the executive committee from fourteen to twenty members by the addition of six members-at-large is also a good move for the reasons given for this change by President Pardee in his presidential address. The association has always been fortunate in the composition of its executive committee. The constitution adopted at the time of the reorganization in 1905 has brought to the body the services of distinguished executives who have given unstintingly of their time and thought to the welfare of the association. Nevertheless, it is at least theoretically true that changes in policy considered desirable by the body at large cannot quickly be registered under the practice which has really meant that but one railway man is elected an officer of the parent association each year. This, with the fact that past-presidents of the parent association are members of the executive committee, though without vote, has still further tended to prevent changes in policies which have once been adopted.

The recognition of the interests of the manufacturer members of the association by the addition of five members to the executive committee when the manufacturers were admitted to membership was a step in the right direction, and we believe that the changes authorized at Atlantic City are in the interests of the association.

An Appropriate Conclusion of an Eventful Year

THE convention as a whole was a fitting conclusion of the association year, which has been a most eventful one. In October, 1919, the association had just completed the greatest task it had up to that time ever undertaken, namely, the collection and presentation to a Federal commission of a complete analysis with statistics of the status of the industry. The evidence was in, but the result was in doubt.

Every one knows now the successful outcome of this task. With the facts before them the commissioners could give but one verdict, and while the decision has no legal binding value its effect is already being widely seen in a better popular recognition of electric railway conditions. The improved feeling in the industry was reflected in the convention just past, where the prevailing note was optimism and a renewed courage to solve the problems of better serving the transportation needs of the public.

A review of the association year, even so brief as this, would not be complete without a statement in regard to the administration under which these changes have taken place. President Pardee was well fitted for the task to which he was called two years ago, possessing as he does that combination of conservatism and progressiveness which insures results. He has given ungrudgingly of his time and energy to the association and the industry during his term of office; has wisely guided its affairs during this critical period, and has been most succesful in inspiring his fellow members with his faith in the future. To his constructive policy is due largely the present more hopeful condition in the industry today.

The Motor Bus Is at the Convention

A NOTABLE innovation at the 1920 convention was the exhibition on the pier of gasoline-propelled motor buses by two manufacturers. This, and the reading of three important papers before the parent association, may be said to constitute the formal introduction of the motor bus into the transportation business of the electric railway industry. The railways have thus recognized the place of the bus as an ally, and the manufacturers acknowledged the electric railway field as a proper and logical one in which to develop the use and consequent sale of their product. The other vehicle much in evidence at the convention was of course the standard safety car. One might muse that here was the last word in the electric rail car and the beginning of the development of the non-rail vehicle.

The significance of the motor bus is certainly becoming more apparent and its place better defined in the problems of urban and interurban transportation. Where extensions to city systems are needed the use of the bus as a feeder to the end of the electric line is very

attractive as a means of avoiding the investment in track and overhead extension. The advantages of this use of the bus were very generally recognized by the railway men as well as by the representatives present from the automotive industry. And looking ahead, it seems probable that where interurban transportation in limited amount has to be cared for the merits of buses will be considered carefully before an electric railroad will be built. The low investment required is the chief merit of the bus for such service.

Effective Schedules Impossible Without Traffic Regulation

MORE or less correlated were the reports of the committees on code of traffic principles and economics of schedules, presented at two sessions of the T. & T. Association. No time-table, however safeguarded for elimination of wasteful hours and for efficient placing of cars, can be effective without sensible regulation of traffic. It is, of course, too much to expect that the model traffic ordinance will gain universal support at its inception. Opposition must be expected in the endeavor to give street cars absolute right of way at intersections, and the railway interests should be content if at the start they can secure the support of public authorities and civic bodies for a majority of the items listed in the proposed ordinance.

Those who had to do with the framing of standard rules for transportation some years ago will recall how disheartening were their early efforts because of the timidity of operators who could see nothing but insurmountable obstacles in different "local conditions." The standard rule book is still "standard," however, although changes were made here and there to suit individual company requirements. Public officials who have charge of the regulation of traffic are keen for concerted action because of the growing density of vehicle congestion. If the railway interests are not too insistent on 100 per cent approval of their views they are likely to get through a code of traffic principles which if enforced will make safer the public streets, expedite traffic in general and give users of public conveyances preference over other vehicles and over pedestrians. The convenience of the few must in the end yield to the convenience of the many.

The committee on economics of schedules has performed a helpful service to the industry in showing how deceptive are all prevailing comparisons of car speed as indicated by car-miles and car-hours. Analysis of the latter factor shows that few properties have an identical list of items making up "bonus time," and while this has to be included with revenue-hours to show the cost of platform expense, it is necessary to segregate the actual time of operating between terminals to reach a satisfactory basis for determination of "speed." Perhaps added value will come of this investigation in showing how expensive are the terms forced by labor contracts, some companies having as high as 15 per cent of bonus time as a burden on the cost of service. The "minimum day" and "straight time" for platform help are undoubtedly a serious handicap on tripper service, and when the public interest suffers because of a too grasping union it is well that car patrons should know what stands in the way of possible reduction in rates of fare or of improved schedules which will speed up traffic. The truth cannot harm the railway cause.

Has the Paper Ticket Become Obsolete?

SINCE the use of metal tokens on street cars has become common practice on a large number of properties, big and little, their practicability has been thoroughly established. If one stops to consider, then, when paper tickets should be used and when metal tickets in regular city service the metal tickets seem to show up more favorably in practically every point. On the basis of cost of tickets, the cost of handling or the accuracy with which the conductor's turn-in may be checked, either with or without registering or locked fare boxes, the comparison seems to be strongly in favor of the metal token. We refer particularly to regular city service, because on rapid transit lines where the tickets are sold from a reel and immediately destroyed in a chopper after being used another set of conditions applies.

Let us first consider the question of cost and assume that the trolley company hauls 100,000 passengers a day, of whom 75 per cent ride on tickets, or 75,000 tickets used per day. This would require the purchase of 27,000,000 paper tickets a year. While it used to be possible to buy paper tickets in large quantities at 9 cents a thousand or thereabouts, they now cost about 35 cents for a good lithographed job. At present prices, then, the first cost of the year's supply of paper tickets for this assumed traffic would be $9,450.

Experience has shown that where there is a good reduction in cost per ride to induce the use of tickets, ten times the daily number of tickets used gives an ample supply of the metal tokens. In our assumed case, then, the number of metal tickets necessary would be 750,000. For this small quantity the price would probably be $8.25 a thousand, or a total first cost of $6,187.50. This is $3,262.50 less than the cost of one year's supply of paper tickets, and since the metal tickets can be used over and over again, this cost may be spread over at least ten years, for the life of the tokens is about the same as that of coins and the shrinkage through loss is very small—less than 1 per cent a year. Hence it would seem to be a fair comparison to state that the relative annual costs would be $618.75 for metal tickets, against $9,450 for paper tickets, or, for ten years, a cost of $6,187.50, as against $94,500, not taking into account the extra cost of handling paper tickets in the accounting department. Or even assuming old pre-war paper-ticket prices and post-war metal-ticket prices, we have an annual cost of $618.75, against $2,430.

From the standpoint of the public, the metal tokens are preferable because they do not become crumpled, dirty, soft from perspiration, perhaps to the point of rejection and consequent argument. The conductor likes them better for these same reasons. The accounting department finds the metal tokens can be accurately counted and separated from other coins by machines. While paper tickets can be counted by machines if in perfect condition, there is more or less trouble because of an occasional crumpled or soft ticket, and hence counting by hand or weighing is resorted to usually. Also, there is the advantage that metal tokens can be used with registering fare boxes while paper tickets cannot. As to the opportunity for counterfeiting, the metal tickets seem to offer an even less attraction than paper tickets. The metal tickets are made of german silver and have a high intrinsic value, and to make them requires very expensive dies and other machinery. What

few counterfeits have been observed in the cities using them have been made of lead and were so crude and different in appearance from the regular tickets that they could escape the scrutiny of the conductor only through the most careless inspection. The fact that there has been almost no counterfeiting of the metal tokens on the properties using them seems to bear out the theories advanced as to why there would not be any.

All of these advantages for the metal tokens noted thus far apply whether a company is using a registering fare box, a locked fare box or no fare box at all. Where a registering fare box is used several other advantages accrue.

We are acquainted, it is true, with cities where paper tickets are still preferred, but the tendency is certainly in the direction of the metal token.

"Load Factor" Is a Term of Wide Application

WE ALL remember the fable of the hare and the tortoise. The latter won in the long run because he kept steadily at it, while the speedier fellow ran only in spurts. In other words, the tortoise operated at the higher load factor. That's the whole story in a nutshell, and the same principle holds whether it is a footrace, a power plant load, an electric car line or a coal mine. The point is that when any kind of equipment is used uniformly, rather than in spurts, the operation is most efficient and the least amount of investment is needed.

Take the matter raised by Eugene McAuliffe in his paper on the coal supply, read at the convention of the American Association on Oct. 12. He applied the load-factor idea to the basic fuel industry, and showed that the seasonal congestion in the production and utilization of coal plays an important part in making the cost of fuel high. Obviously, coal cannot be consumed uniformly. Hence, if it is to be produced uniformly, it must be stored somewhere, and if it is to be produced and transported uniformly the storage must be at or near the point of consumption. Fortunately coal is a commodity which can be stored practically without loss, and, considering the amount of energy contained in a cubic foot, two hundred kilowatt-hours or more, an enormous amount of potential energy can be stored on a reasonable space, say an acre. The losses due to weathering and overhead cost in consumption during storage are more than offset by the insurance against interruption, and if the purchase price per ton can be cut down also, the saving here is "so much velvet." The problem is to get consumers to spread out their fuel orders so as to bring about the desired consummation outlined by Mr. McAuliffe.

The possibilities in the line of saving through improved load factor in the fuel field are even greater than they are in the boiler and turbine rooms, where presumably the idea was first extensively developed. Electrical energy cannot be stored to any great extent. In the waterpower realm some water storage is possible, but topographical conditions must be favorable. But there are few places where an acre or two cannot be found within easy reach of the power plant for coal or oil storage purposes. Such areas would be found even more extensively than they are if the coal producers and the railroads would provide a seasonal variation in price to accelerate buying during the "off-peak" seasons.

Some of the Ramifications of Standardization

THE outstanding thing in regard to electric railway equipment and practices is the effort, one might almost say the struggle, of manufacturers and railway companies to standardize. Now the ultimate aim in this effort is economy, and it is only the promise of money saving that will convince individuals and companies that they must give up pet notions if necessary in order to bring standardization about. There is increasing evidence that they are giving up at least some fads and using stock products to an increasing extent. The engineers have pushed standardization the hardest, and the designs promulgated by the Engineering Association are coming to be regarded in the same light as those which for years have made the Master Car Builders' and other steam road associations famous. And now the association is going into the American Engineering standards committee, a step which will enhance the reputation of its efforts.

A good example of the benefits of standardization was cited in the paper by P. F. McCall before the Engineering Association at Atlantic City on Tuesday. Mr. McCall is storekeeper for a large railway property and is therefore in a position to know what is to be saved and gained by reducing the number of stock parts which must be kept on hand. The same idea was brought out before the accountants. It is simple enough, and it can be put into a few words, like these: If one part can be put to two possible uses, fewer items need be kept in stock; if manufacturers' stock parts are ordered, delay will be avoided, and if many purchasers will use the same designs, manufacturing costs will be lowered. Here are three money-saving considerations. Are they not enough and convincing?

The Millionaire in the Subway; the Bricklayer in the Taxicab

ACCORDING to a New York paper, times have changed. A young lady writes an interesting article about the prominent bankers and business men she elbowed in the subway on her way to and from work.

Next we read of a taxicab drawing up in front of a well-known hotel from which two well-dressed men emerge carrying real leather bags. Paying their taxi driver from a fat roll of bills, they entered the hotel, and curious bystanders were startled a little later to see them emerge dressed in overalls and carrying trowels. They were bricklayers working near by.

Why do the millionaires now ride in the subway when they have cars of their own?

The answer is congestion of streets and the value of time. With the bricklayers going to work in taxicabs the bankers can't possibly get downtown quickly in their cars, so they take the subway. The bricklayers have plenty of money, comparatively speaking, and are enjoying an unaccustomed luxury. Both bricklayers and bankers are good natured about such conditions, but here is something for railway men to think about.

What factors caused the decrease in the population of Manhattan and are causing the movement of banks and offices from Wall Street to Forty-second Street and vicinity? Congestion of streets by automobiles and lack of adequate transportation facilities are important factors in the growth of any city with more than 2,000,000 inhabitants.

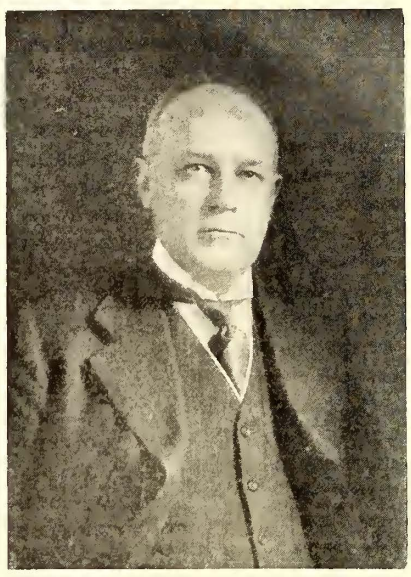
Industry on Road to Better Days*

By John H. Pardee
President American Electric Railway Association

Recognition by Public of Essential Nature of Electric Railway Industry Is Growing—General Situation Discussed—Internal Affairs of Association—Increase in Size of Executive Committee on Publicity and Committee of One Hundred Suggested

THIS, the thirty-ninth annual convention of the association is assembled under circumstances which give us good cause for optimism, both as to the future of the industry, which the association represents, and as to the part that the association will play in the development of that future.

I have no hesitancy in saying that never before in its history have the affairs of the association been in such a satisfactory condition. The membership has increased and is still increasing and the industry generally is giving to the organization splendid support. These conditions are reflexes of the work which the association is performing. In every respect its usefulness to the industry has been increased, and the co-operation given to its officers plainly indicates that the railway companies of the country and their executives are coming to appreciate more and more not only the essential nature of the service which the association renders, but the absolute necessity of that service and the desirability of increasing the association's ability to perform it in the most efficient manner.



Mr. Pardee has steered the association ship through the storms and stress of the most trying period in the history of this country. He retires from the presidency at a time when the skies are clearing and when the haven of a reasonable net income is in sight.

The secretary will later give you a detailed account of the association's activities. You will, I believe, be surprised at their variety and extent. Their recital indicates to me that the association has reached a stage in its development where it is performing for the member companies a necessary, practical service that has an important bearing upon the economy and efficiency of their operation, and that could be performed in no other way so completely or so well.

There is scarcely a phase of electric railway operation and management, financial, engineering, operating, or those dealing with policy, that has not been the subject of investigation by the headquarters staff during the past year, and concerning which information has not been compiled and distributed. In no other way than through the association could this work have been done, and the most significant report that I have to make to you today is that there is a real and growing appreciation by the industry of the value of these efforts, and a constantly increasing spirit of co-operation in the task of making the association of greater and greater usefulness in this respect. When I assumed the office of president, two years ago, I asked of the association members a full measure of that co-operation without which the officers of the organization could not hope to accomplish the work that was committed to their charge. That co-operation has been forthcoming in the fullest degree, and whatever has been achieved for the association and for the industry has been made possible because of the loyal response made by both railway and manufacturer members whenever they were called upon for assistance.

The association, now as never before, is representative of the entire industry. At the last convention, through amendments to the constitution and by-laws, providing for representation of manufacturer members upon the executive committee, the final steps in the process of welding together the two major interests—railway and manufacturing—were taken, with a most harmonious result. In the conduct of the association's affairs, and especially in the work that is being performed by the technical committees of the affiliated associations, the admission of manufacturer members on terms of absolute equality is producing good results, and the association is now prepared for the consideration of any problem, assured of the best thought and best advice from the two most important angles.

Our problem for some years has been not so much the creation of an efficient working organization, since that was largely a matter of proper organization and proper direction, but to bring to the electric railways of the country a better realization of what the association was actually accomplishing, and of its potential powers of accomplishment, in order that the necessary financial and moral support might be forthcoming. We are making real strides in this direction. The very substantial increase in dues made effective in 1919 brought com-

*Presidential address delivered at annual convention at Atlantic City, N. J., Oct. 12, 1920.

paratively few resignations, and of the companies that withdrew a substantial number have rejoined. In addition, thanks to the well-directed efforts of our very efficient committee on company membership, a considerable number of companies not before members have been enrolled, and the committee's experience indicates that by persistent personal effort further gain can be made.

Once more I wish emphatically to state my belief that it is the absolute duty of every railway company to be a member of this association, and executives who do not authorize such membership are not properly conserving the interests of their stockholders and investors.

Increase in Size of Executive Committee

Efforts should be made to bring the membership of the association in closer touch and closer harmony with the association's work. Our present form of organization, while, in my opinion, particularly efficient from the standpoint of getting things done, is not sufficiently democratic to insure the most complete understanding between those in direct charge of the association's affairs and the membership as a whole.

The association is now administered by an executive committee consisting of the president and the four vice-presidents, the presidents of the four affiliated associations and five manufacturer members. I am convinced that a much closer relationship between the actual directing force and the members may be obtained without any diminution in the organization's effectiveness.

Accordingly, I recommend that the constitution and by-laws of the association be so amended as to create an executive committee of twenty instead of fourteen as at the present time, the committee to consist of the president, the four vice-presidents, the four presidents of the affiliated associations, five manufacturer members, as at present, and six members elected at large, each to serve for a term of one year, and to be ineligible for re-election for one year from the date when his term expires. If this is looked upon favorably I recommend that you elect at this convention these additional members of the executive committee, which members can act without vote until the constitution is amended at the mid-winter meeting.

It seems to me that in this way there will be a constant influx of new blood into the direction of the association's affairs, and that the thought and wishes of the industry will be more fully and directly registered than under the conditions now obtaining.

Changes Recommended in Committees

It has been possible for the association to perform an increasingly important work along the lines of broad publicity for the industry during the last year. The importance of this work cannot be overestimated. The so-called electric railway problem has come to be recognized as a matter of profound public interest, and public attention is everywhere being devoted to the readjustment of present conditions. Our course of conduct is well indicated for us. It is our duty to work with the public and not as an independent group. The information, the knowledge, the experience necessary to a proper and satisfactory solution are in our possession and to the degree which we make this available to the public, the outcome will be satisfactory. The field of our useful activity in this respect is well defined. It is distinct from purely local publicity and should confine itself to the more general and universal phases of its subjects.

A publicity committee of exceptional personnel was organized during the year. It has carefully considered the possibilities before it and is convinced that a work of great benefit and importance may be performed. The success that attended the efforts of the Committee of One Hundred in this respect is well known to it. It may be truthfully said that through the work of that organization, the popular conception of the electric railway problem has been so changed that it is no longer regarded merely as a local question involving only local issues, but is considered in its true light as a national problem, involving great economic and political principles, and that its correct solution is a concern of all the public.

At a meeting of the executive committee of the Committee of One Hundred in New York recently the question of the future of the committee was thoroughly discussed and a resolution unanimously adopted recommending that the committee be continued for the purpose of carrying on the public dissemination of information. This resolution will come up for consideration at a meeting of the entire Committee of One Hundred to be held in Atlantic City later in the week. I trust that it will then be approved and that the committee will then be continued in the interest of the industry. If this be done, I recommend that the work of the association's committee on publicity be amalgamated with that of the Committee of One Hundred and carried on under its direction.

Affiliated Associations Have Been Efficient

Your affiliated associations have during the year just passed functioned in a manner particularly efficient. Their activities, interrupted during the war, are now again under way, and the investigation of those subjects which most intimately affect problems of accounting, engineering, operation and the disposition of claims have been resumed. Attendance has been as large and the work has been as actively pursued as heretofore. A study of the program of the affiliated associations will disclose to you better than I can do it the nature of the work that they are doing, as well as its great value.

Stability of Industry Demonstrated

The industry which we represent has, I am firmly convinced, passed through its period of greatest travail, and is now upon the road to better days. Statistics indicate for practically all companies both larger earnings and increased riding. Some companies are now earning a satisfactory return, and many are earning an amount above their operating expenses and fixed charges, while few are in that desperate financial condition that was present with nearly all of them two years, or even a year, ago.

This showing emphasizes the inherent stability of the electric railway industry. The troubles that have come to it are not the result of any causes involving the nature of the enterprise. No business in the world is more certain or assured. The service performed is a necessary service. It will be essential so long as communities exist. From the disaster that has overtaken it, it emerges with none of the demand for its service destroyed, and, under conditions that would have caused the disintegration of most private industrial enterprises, it has remained intact.

Its misfortunes have been the result of mistaken policy in conduct by the men who operated it and mistaken policy in its control and regulation by public

authorities. There has been too wide a departure from basic economic law in both instances, so that when an emergency came, the industry was in no condition and without the means to guard itself. What then was and is needed to restore it to a completely sound condition is the recognition and the adoption of a certain few common-sense principles that are by no means new, but which because of the rapid development of the industry have been lost sight of.

The most encouraging sign of the present times in so far as electric railways are concerned is the growing public recognition of these principles. A perusal of the reports of the numerous commissions, national, state and local, that have investigated and studied electric railway affairs discloses a striking unanimity in the conclusions reached. The three foundation conclusions met with in the report of the Federal Electric Railways Commission are distinctly stated and alone more than compensate for the time and effort of the commission. This report carries an authority which is most beneficial and far reaching.

These basic principles are:

First—That the industry is an essential industry and that there is in sight no means of local transportation that can adequately perform its function.

Second—That under existing conditions public ownership and operation is inadvisable in the interest of the public.

Third—That in the regulation of electric railways provision must be made through fares for such an adequate return upon the capital used and useful in the public service as will restore general credit, inspire confidence in investors, and insure a continuing flow of new capital.

These principles are being reflected in all of the other reports which I have examined and seem to me to indicate a growing public knowledge of the economics of the situation and to form a basis for a lasting readjustment of the industry's affairs.

Cardinal Points Made by President Pardee

The electric railway industry is essentially stable. The troubles that have come to it are not the result of any causes involving the nature of the enterprise. No business in the world is more certain or assured. The service performed is a necessary service. It will be essential so long as communities exist. From the disaster that has overtaken it, it emerges with none of the demand for its service destroyed, and under conditions that would have caused the disintegration of most private industrial enterprises it has remained intact. Its misfortunes have been the result of mistaken policy in conduct by the men who operated it and mistaken policy in its control and regulation by public authorities. There has been too wide a departure from basic economic law in both instances, so that when an emergency came, the industry was in no condition and without the means to guard itself. What then was and is needed to restore it to a completely sound condition is the recognition and the adoption of a certain few common-sense principles that are by no means new, but which, because of the rapid development of the industry, have been lost sight of.

Re-established Credit for Electric Railways Necessary

There is general recognition of the necessity of higher fares. Statistics gathered by the association show that in more than 500 cities in the country electric railways have increased their fares. In 81 such communities having a combined population of more than 6,500,000 people a 10-cent base fare is charged, in 58 others the base fare is 8 or 9 cents, while in more than 300 it is either 6 or 7 cents. And contrary to prophecies and statements, made in connection with the subject, there has been no general decrease in the number of passengers occasioned by these increases. Fares are but responding to the influence of the general higher price level. They have not, however, kept pace with the increase in individual income and the ability of the public to pay them, and that is a sufficient guarantee that there will be no general falling off in the riding habit for this reason.

But neither increased revenue, increased riding or the public disposition to permit of increased fares has as yet restored the credit of these companies, and without credit the future usefulness of this utility will most certainly be destroyed. The investor has been badly used in the last few years. He has been compelled to shoulder the entire burden of costs caused by the failure of the machinery of public utility regulation to respond to a great economic emergency. His confidence has been destroyed to a degree that makes its restoration impossible until there is some satisfying assurance that his interests will not again be sacrificed through a failure to apply the fair and just principles of upright business dealings to the regulation and control of the electric railway industry.

I can see plain signs that this assurance will be forthcoming. I can read in recent decisions of courts and commissions and in settlements that have taken place in many communities not only a desire for equitable adjustment but a growing recognition of the right of investors in the public utility securities to receive the same treatment that is accorded to other enterprises, and of the necessity of providing such safeguards to capital in these utilities as will preserve its integrity and assure to it an adequate and satisfactory return. Flexibility in fares and charges, flexibility in the rate of return, a greater freedom of management, public protection against unfair competition—these are essential to the restoration of credit, and it is these essentials that are being more and more frankly recognized by the representatives of the public and by the public itself.

The day is not far distant when these principles will everywhere be so fully understood and appreciated that regulating laws, ordinances and franchise contracts will be based upon them, and when this is done the question of electric railway credit will be solved, the railways will be able fully to function in the public interest, and public utility investment will regain its proper place as the soundest, safest and most conservative investment next to government securities.

With this convention I am ending my service of two years as president of your association. When I assumed office I asked for the co-operation of all the membership, railway and manufacturer. It has most willingly and fully been accorded me. I am sincerely appreciative and regret that I have not words in which adequately to convey my sense of gratitude for the support that has been given me by my fellow officers, by our able and efficient secretary and his staff, by the technical press, and by each and all of you whom I have called upon for advice and assistance. It is with feeling of pride in the association, with confidence in its future and with the greatest hopes and belief in the future of the industry that I am relinquishing my charge.

The Settlement of Labor Disputes*

By Hon. Henry J. Allen
Governor of Kansas

GOV. HENRY J. ALLEN

The Government Has a Right to Insure the Continuity of Public Service—The Right to Work Is as Sacred as the Right to Loaf—Experience in Kansas Cited to Illustrate Fundamental Relations of Workers and the Public Welfare

THERE is coming to the people of our country a new appreciation of the fact that electric railways are obliged to take in more than they pay out, a new appreciation of the fact that this industry is essential to the growth of institutional life and community life. There has been existent in the country for a long while the unjust feeling that the electric railways are a necessary evil, but the situation will improve. Out in my State, during the last nine months, a court which I appointed has increased street car fares in four localities and there is still a reasonable probability that I may be re-elected, although I do not deny that it is not helping my vote any.

I am going to discuss a theme which is probably the most challenging one in the United States today, the theme of industrial relationship. After we have settled everything else, after we have decided whether we are going into the league with Harding or stay out of the league with Cox, after we have made all these arrangements, we shall still have with us the industrial problem.

In Kansas we have sought to stabilize this relationship by turning over to a Court of Industrial Relations the age-old quarrel. I shall relate the progress made in the few months since this court was provided for in our statutes, giving first a little of the background against which we built this new expression of justice.

How the Coal Strike Was Broken

You all remember that when the coal strike came on last winter, a monstrous attack on the public, made in the interest of what in very polite phrase is called "economic pressure," most of the people of Kansas were soon out of coal. In two weeks we closed the schoolhouses and the business houses closed. There was suffering in the homes and some suffering in the hospitals.

I asked the Supreme Court to turn over to the State the custody of some 300 or 400 coal mines, in order that we might produce coal for the people who would suffer otherwise. I shall never forget the look of surprise that came over the face of Chief Justice Johnson, who has been at the head of our Supreme Court for forty years. He asked, "What allegation will you make on which to take these mines over?" I replied, "Judge, any allegation you think will work."

Although I am credited with considerable courage in straightening out that strike at the coal mines, the first and great credit for courage in that matter belongs to the Supreme Court of the State. The judges of that court did not hesitate to do a needful thing merely because it had never been done before.

After we took over the mines I pleaded for a week with the miners to go to work for the State, realizing they would not go to work for the operators. I offered them increased wages and guaranteed that whatever benefits came to them out of the controversy, going on there at that time between their officials and various of the operators, the benefits would be retroactive. In justice to the miners I think that many of them would have been glad to go back to work when I placed before them the picture of suffering that would ensue in case they did not do so. But they entered the plea that unless the president of this district ordered them back to work they could not return. Later, when the strike had been broken, one man who had remained loyal to his task was blacklisted and driven from the district.

When we took over the operation of the mines I called for volunteers to dig coal. I was not concerned at that moment in the justice of the fight between the operators and the miners. I was concerned only for the relief of the public. Within twenty-four hours more than 11,000 people in Kansas had volunteered.

From among the volunteers I selected several hundred young men to man the mines, men who had been in service overseas. I had seen them over there overcoming obstacles of great difficulty, so that when I heard the district president of the miners' union say that not a pound of coal would be produced in that district except by union men I knew that the district was in for a surprise.

The morning when the first trainload of volunteers arrived in Pittsburg the miners were assembled at the station to give them a proper welcome. When the miners realized that they were a group of good-natured young Kansans, who had come there to relieve the emergency of the public and not to take part in a labor war, they received them in silence.

Well, these fine Americans went to work, and that night, while they were throwing out the guard line, they began to pump the water from the pits. The next day, against obstacles which seemed to be insuperable, at one of the mines they had produced a carload of coal. The next day they mined ten carloads of coal, and on the next day thirty. In ten days these young chaps, who had never seen a coal mine but who were trained in all the fundamentals of American belief in American justice, had produced enough coal to relieve the emergency in more than 200 Kansas communities that were suffering from lack of coal.

But as these boys were performing this great task they did another thing, fundamentally of greater value even than the coal we needed; they arrived at the con-

*Abstract of address delivered before American Electric Railway Association, Atlantic City, N. J., Oct. 13, 1920.

clusion for themselves and for all of us that the State has the right to protect the public against anybody's strike in an essential industry.

THE ESTABLISHMENT OF THE INDUSTRIAL COURT

Next a special session of the Legislature was called to deal with the situation and to write into the statute that the paramount right is the right of the public. After suggestions had been received from all quarters and considered a law was passed essentially as originally drafted. It was passed almost unanimously. It has since been held to be constitutional by the Supreme Court of the State. It is the law of the State, and everybody expects that it is to be enforced just as every other law in the State is enforced.

It may be said that we have taken from labor the only weapon it had, its right to strike. If we had taken away from labor that weapon and had provided nothing in its place we should have had a very unjust law. But every one of us must realize that the history of progress in our day is the history of the better condition of the workingman. It is true we have taken from him in Kansas the weapon of the strike, but we have given him for use in every honorable controversy a more dependable and usable weapon; we have given him the backing of the State government, and it is the first time he has ever had a weapon that will do business.

Down in the Pittsburg district, where the need for this legislation first occurred, there had been in the forty-five months that preceded the writing of the Kansas court bill 705 strikes at various mines, which cost the miners more than their victories brought in. Surely, the strike, the weapon that cost the men so much and can do so little, is not so effective a weapon as the weight of justice guaranteed by an impartial and righteous government.

RIGHT TO LOAF NOT NECESSARILY SACRED

Out there the most frequently uttered misrepresentation of the law is that it takes away from a man his God-given right to quit work. What the law really says to a man or to a group of men is: "You may quit work whenever you wish, but you cannot come here tomorrow with your pockets full of dynamite, to keep from working this group of men who wish to continue on the job." The right to work is just as sacred as the right to loaf. The court holds that the basis of industrial business is founded upon collective bargaining, and when there is any effort to get together through conciliation and arbitration, the court encourages it. But when a strike threatens the public, then the court steps in with its substitute for the strike, and for the protection of the public it says that these industries shall keep functioning while the justice of the matter is being determined. That is all there is to it.

A man representing railroad labor asked me the other day: "Why don't you put on the court a representative of organized labor?" I answered: "For the same reason that we did not put on the court a representative of the employing capital." If a representative of organized labor, a representative of employing capital and a so-called representative of the public had been put upon this court should we have had a court of justice? No, we would have had a board of arbitration. We have discovered in the last sixty years of trial that arbitration does not work; or if it does work, it does not do any good. A board of arbitration does not properly care for the rights of the public, which in all essential industries is justly concerned in a quarrel which it was not responsible for bringing about. We have discarded arbitration and established a court of adjudication, comprising men appointed because of their impartiality, their justice, their honesty. Their justice, honesty and integrity are guaranteed by a responsible government. We have appointed them upon the broad principle that the public, labor and capital are entitled to protection.

They say our plan is regulative. Well, we are all regulated, or ought to be, but we never realize it until we come to the point where regulation hits us and we realize we are in a government of law and that liberty does not mean license.

Why, government regulates us from the hour we are born until the day we are buried. How absurd it is to presume that government may not also find justice for labor and capital in the quarrels of which they have made the public the victims during the last fifty years in the United States.

As I see it, we have based our law upon the oldest principle of state government and there never was any question as to whether we could do this. There is no difference in the classes of quarrels; there is merely a difference in their names. There has never been any reason why government should not supply justice for the laboring man and for the employer in those quarrels. The reason why that action has never been taken is that statesmanship has not dared to brave the wrath of the classes on either side. The fundamental principle has been there since there has been an organized society.

COURT HAS DECIDED SEVERAL RAILWAY CASES

If we are going to have protection, there must be a guarantee that justice shall go with that protection. In Kansas, where we have substituted impartial adjudication for the strike, or arbitration that precedes the strike, we are getting good results. The court has been in operation four and one-half months. We have decided over a dozen cases brought by the heads of organized labor. We have decided some cases brought by capital, but organized labor has made more use of the court than capital has.

Our first one was an electric railway case.* The interurban system known as the Joplin & Pittsburg Railway had two expensive strikes in the last three years. In 1918 there was a strike that brought the company to the verge of a receivership, and cost the public untold millions. At the end of ninety days the strikers came back and solicited from the employers the privilege of going back to work under the old wages and under the old conditions. When the court had been established, the president of the Kansas Federation of Labor asked for a living wage for the men. Then the presiding officer of our court called his attention to the fact that that is a line of language which we do not use in the Kansas Court of Industrial Relations. The law says that every such man is entitled to a fair and just wage and wholesome place in which to work. What is a living wage? It is a wage sufficient to meet the costs of subsistence. What is a fair and just wage? It is a wage sufficient to meet the cost of subsistence, plus sufficient to give the laboring man an opportunity to enjoy for himself and his family some of the various forms of modern civilization, plus sufficient to enable him with reasonable frugality to build up a safeguard against sickness and old age. The court awarded a fair and just

*See article in issue of ELECTRIC RAILWAY JOURNAL for May 15, 1920, page 1013, for details of this case.

wage, but the railway said that while it would have to grant this wage it would not have enough money to pay it." The court, then, after analyzing conditions in the district gave to the railway sufficient increases in freight and passenger rates to enable it to meet the obligation of the new order. The public, which would not have been satisfied with the results of a strike, the public, whose attitude probably kept the railway from raising rates, accepted the order with satisfaction.

In the case of the Topeka street railway there had been strikes without effect. When the Court of Industrial Relations was created the motormen petitioned for an increase. The increase was given them and they were satisfied. The street car company officials said that they would try it for three months, but thought they could not carry the burden. Later the court, taking their condition into consideration, increased passenger fares, and now nobody is opposed to the arrangement. The organization is functioning and the public is satisfied.

The following incident shows the curative effect of the court. At Goodland there was an open car shop. For thirteen years the employees had been trying to get the Rock Island Railroad to inclose it. It was out on the plains where the wind blows violently at times. It was no place to have an open shop of that kind.

In 1905 the railway employees got a bill through the Kansas Legislature requiring every railroad company to inclose its repair shops, but through a technicality it was not effective. Then the Court of Industrial Relations was created, and after considering that every man is entitled to a healthful place in which to labor it took up this case on application of the employees. It took just a week to try the case, and the railway was ordered to inclose the roundhouse and have it ready by a certain date.

Some Opposition to the Industrial Court

Society is formed in three layers. At the top 2½ per cent represents the employers, at the bottom 5½ per cent represents the employees, and in between 92 per cent represents a good-natured protoplasmic mass, having no power of self-defence except the good-natured powers of natural resistance, and then at the top and bottom begins this economic pressure. Out in Kansas the 92 per cent have come out and said the hitherto submerged nine-tenths of the population is going to fight for itself under the protection of government.

Out in our state some labor leaders are advising the defeat of every candidate for the State Legislature who voted in favor of the industrial court bill, and the support for Congress of the men who will represent the cause of labor. Do we want that sort of Congress, a Congress of men not representing the country, but representing the group? If not, the challenge to America at this hour is to hold fast to the political type of government and to meet the challenge of any class that thinks it can live above the law. Why do the labor leaders fight these laws? They fight them because labor leadership realizes that if government may find justice for the laboring man in his quarrel with capital then there is no need any longer that the laboring man should pay out of his pockets every week a share of his wages to support those who live off labor.

It is my belief that this law will give a new atmosphere, a new moral tone and functioning power to organized labor. In the first place, it removes that which is the very worst thing about organized labor, its feature of compulsory unionization. It leaves the laboring man free, and that is what we want. It only takes away the power to start a civil war when he does not get what he wants, or when somebody else does not get what he wants; when somebody in Seattle falls off a dock and Seattle goes on a strike and a group of men strike in Atlantic City through sympathy.

It does away with the far-flung system of making class war upon the public, and it leaves to them the power they may use through their solidarity when they come into what they call collective bargaining. We say to labor: "You shall have your solidarity for proper purposes, to increase the good of those who labor with you. But when you come into certain communities that are 100 per cent against you you realize in those communities that you have not secured the best expression of brotherhood."

A poor woman came to me to my door with all the earmarks of hopeless poverty. She said, "I spent all the money I had to come in here from Weir City to tell my troubles. My husband is on strike and has been on strike for six months, but he does not know what the strike is about. We have tried to keep the family alive on the strike benefits of $8 per week, and when your volunteers came down to the mine I went to see if I could get some mending to do for the men. I brought home a lot of it, but last night a committee from my husband's union called on me and said that I was not to do that work and could not go back to the mine." I said, "Go ahead with your work, and I will see that they do not molest you." She said, "I cannot do that because when you go away they will burn down my house." Surely a government may foster a better spirit of brotherhood than that.

What we are hoping to do in Kansas is to give to labor a new hope and to the public a new sense of protection. The temper of labor is growing mellower over the operation of the court. The other night I spoke in my State in a great railroad center. Many of the public men were nervous about the attitude of labor, but we had a wonderful meeting, and I explained to these railroad men what this law will do for them. All reasonable men, whether they belong in the ranks of capital or labor, realize that we are working under modern conditions and that all the elements of manufacturing, production, transportation and distribution are mixed together in a common machine; that a break in one part of the far-flung machinery breaks down the whole public relations.

I hope the railway men, who represent powerful interests in their communities, will get acquainted with the members of their legislatures and insist upon the provision of industrial courts by the legislatures of their states. This legislation is bringing forward that day which will place in the right relationship the whole body politic, the subject of industrial quarrels. Several states plan to have industrial courts and the movement is spreading.

The day is here for this legislation. The program is simple and the foundation ample. All that is needed is to get the politicians away from their dread of the labor leaders.

The Problems of Coal Supply*

By Eugene McAuliffe
President Union Colliery Company, St. Louis, Mo.

Storage at Point of Consumption Will Improve "Load Factor" of Fuel Production and Distribution—National Legislation Providing for Seasonal Variation in Coal-Haulage Rates Would Encourage Uniformity of Demand for Coal and Reduce Mining Costs

AS A people we are slow to see great changes in the making. We long ago came to the conclusion that coal was plentiful and cheap and classified the fuel problem as one easily to be disposed of. Of late, however, the job of fueling an electric railway, a power plant or even a modest household seems to offer some difficulty. The unexpected and grievous interruptions in supply and the startling increases in the cost of coal experienced during the past three years have aroused greater attention and have forced some measure of understanding of the vital importance of the coal industry. Appreciation of the problems of coal production and distribution must become still more general and the co-operation and interest of all users must be obtained if we are to secure a solution of these problems and any permanent improvement in the conditions that surround our coal supply.

In 1870, five years after the close of the Civil War, our annual coal production of all grades was 0.857 ton per capita, while in 1918, less than half a century later, it had increased to 6.44 tons per capita. During 1919, notwithstanding the falling off in business after the armistice and the loss in production due to the five weeks' strike in the fall of that year, our per capita consumption was 5.17 tons. To this extent and at this rate has coal grown into our national life. Any interference with the production of coal, however occasioned, is reflected immediately in the activity and earnings of the thousand lines of endeavor dependent upon it. To men so thoroughly aware of the facts as electric railway men are it is unnecessary to enlarge upon the magnitude and the fundamental importance of the coal industry, nor do I need to emphasize its vital relation to their own business. Electric railways use a large and growing proportion of all the coal produced and its cost to them is a very heavy share of their operating expenses.

The Situation as It Exists Today

Our present chaos is due to causes which are always at work in the coal business, but which have operated in aggravated form during the last twenty months—a depressed and waiting market, with coal stocks deliberately allowed to become exhausted, followed by (and in large measure the cause of) the most protracted and widespread strike that the industry has experienced since 1910, when 215,640 out of a total of 555,553 men employed in bituminous coal mining lost an average of eighty-nine days each, or 19,234,785 man-days. The facts are so little understood as to warrant their brief review. Let us therefore go back to the bitter experiences of the winter of 1917-18, now largely forgotten, when the Fuel Administration found it necessary to issue orders partially suspending the use of fuel. From this experience and the urgency of the war demands came a vigorous campaign to increase coal production, in response to which the mines of the country during 1918 produced 579,385,820 net tons of soft coal and 98,826,084 net tons of anthracite—by far the greatest tonnage ever turned out in twelve months. Of this amount, 550,000,000 tons of soft coal were consumed or exported and about 30,000,000 tons surplus were added to storage stocks.

After the signing of the armistice in November, 1918, and during the mild winter which followed, the demand for fuel slackened and the coal industry entered a six months' period of poor market and low production, from which we have not yet recovered and which laid the foundation of our present shortage and confusion.

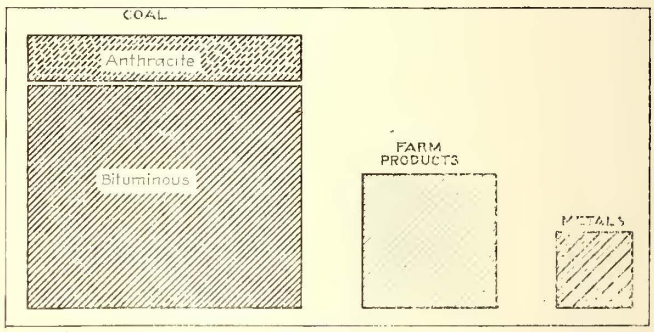


FIG. 1—COMPARATIVE WEIGHTS OF SEVERAL BASIC COMMODITIES PRODUCED IN THE UNITED STATES

We entered the year 1919 with about 30,000,000 tons of bituminous coal in reserve and with the opinion prevailing among buyers that prices of coal and other commodities would at once decline. During the spring of that year the Railroad Administration unfortunately entered into a controversy with the coal operators over contracts for the ensuing year, the former insisting upon a lower price and the re-establishment of the policy of "assigned cars," and the operators demanding the prices previously fixed by the Fuel Administration, while public utilities and other buyers awaited the outcome of the controversy. Meanwhile the railroads and other consumers were using up their reserve stocks, 250,000 open-top cars stood idle on sidings for lack of traffic, and the coal miners became daily more and more restive, due to the fact that in many instances they could work but one or two days a week. This was the gestation period of the strike of Nov. 1, 1919. Toward the middle of the year, as mutterings of the coming mine-labor storm became audible, every consumer sought to buy; by July 15 the car surplus was exhausted and in August a car shortage existed from southeastern Kansas to Roanoke, Va. This outcome had been clearly foreseen by the operators, and their national association, in good

*Abstract of address delivered before the American Electric Railway Association, Atlantic City, N. J., Oct. 12, 1920.

faith, outlined and attempted to carry on an advertising campaign to stimulate buying, which, however, was discontinued early in the summer largely because of the criticism leveled at it by officials of the Railroad Administration. In July, for the first time, orders became available and the mines worked steadily for three or four weeks until the car shortage developed, this shortage continuing until Sept. 15, when cars in adequate numbers were again furnished preparatory to the strike.

On Nov. 1, 1919, came the coal strike which lasted until Dec. 12; during this time soft coal production fell behind about 42,000,000 tons and the 30,000,000 tons in reserve at the beginning of the year had been largely consumed. The year 1919 closed about 30,000,000 tons short of a safe supply, or about 6 per cent of the estimated consumption for the current year. During the first six months of 1920 we fell still further behind, chiefly because of a continued shortage in car supply, which was greatly aggravated by the strike of railroad switchmen. I do not hesitate to say that the publicity given to the quarrel between the Railroad Administration and the coal operators, which encouraged the general public to refrain from purchasing fuel and to burn up their reserve stocks, was the last pound which sunk the industry in the morass of strikes, with their attendant disregard of contract obligations, defiance of law and economic loss, from which we are still suffering.

As intimated above, the present situation had its origin in adverse conditions which are inherent and chronic in the industry, and it is to these conditions that I wish chiefly to direct attention in this paper. They are fundamental and general and they cannot be cured without the assistance of the entire buying public. The operator by himself can do little. The permanent remedy of these conditions will require the co-operation of the operators, the railroads, such large buyers as the members of the American Electric Railway Association, and some governmental or other agency to correlate their efforts.

The Job Is a Big One

The magnitude of the coal problem has always been underestimated. A comparison of the coal requirements of the nation with the aggregate tonnage of small grains—wheat, corn, oats, rye and barley—plus our potato crop, presents this vital subject in a new light, and comparison with the tonnage of our basic metals also offers food for reflection. The relation of the weights of these products is shown in Fig. 1, herewith.

The coal tonnage amounts to 310 per cent of the combined weight of the grains, the potato crop and the basic metals. The data serve to reveal the enormous physical proportions of the coal business and to give us some idea of the task which the transportation of coal imposes on our railroads. The movement of coal is the largest job confronting them and it constitutes more than one-third of their total ton-mileage.

The coal industry produces an essential commodity for which the year's demand can be fairly well predicted, and it has always attracted sufficient labor of good grade. Why then has it suffered such frequent disruption and difficulty? Chiefly on two accounts: (a) The demand is extremely variable and the mines run under an exceptionally bad "load factor," (b) the industry cannot store any considerable portion of its product and it must have, day by day, an adequate supply of cars to take away the coal as it is produced.

From these two conditions arise all the other difficulties of the industry — overdevelopment, unattractive labor conditions and strikes, unreliable supply, high and variable production costs and unstable prices.

While, of course, demand and production are interwoven as they are in all business and react on each other to some extent, there are inherent seasonal variations in demand which have no relation whatever to the ability of the mines to produce. The mines of the country could work at a fairly uniform rate throughout the year provided their product were regularly taken away. What actually happens year after year is illustrated in Fig. 3, which applies to the four years preceding our entrance into the war and in which the wide seasonal variations are clearly shown. The conditions during the two pre-war years, 1913 and 1914, are the most typical. The conditions prevailing during the following four years are illustrated in Fig. 2. It may be noted that in 1914 the production for March is 123 per cent of the average, whereas the minimum production immediately follows in April and reaches only 68 per cent of the average, and speaking generally for the whole industry the minimum monthly demand is only two-thirds of the maximum demand.

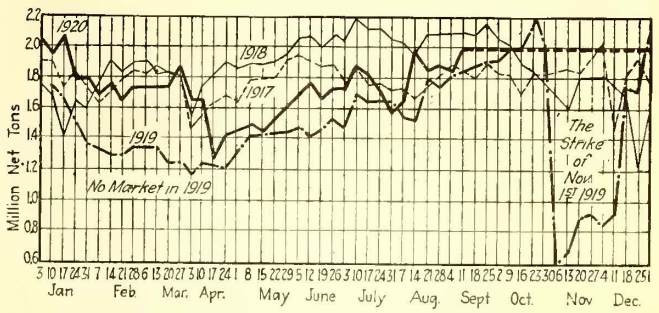


FIG. 2—RECORD OF COAL PRODUCTION IN THE UNITED STATES

Storage at the Mines Is Out of the Question

Storage at the mines is frequently suggested as a remedy for the poor load factor, but there are few mines provided with storage and rehandling facilities for even a few days' supply. Storage at the mines on any large scale is out of the question, quite aside from any consideration of the cost of providing storage facilities. It would entail the storing of enormous stocks of coal at a few points, and the danger and expense arising from fires would be vastly greater when in relatively small storage piles at the numerous points of consumption. Furthermore, mine storage would result in the degradation through weathering and rehandling of a far larger proportion of the country's coal supply than is entailed by storage at destination. With mine storage piles in general use, the mines would inevitably pass through them more than just the amount necessary to even off the peak of the load, for instead of loading from storage only during the time of maximum demand, they would undoubtedly have to do so to a considerable extent at other times in order to minimize undue weathering and fire risks. Again, there are hundreds of mines throughout the country at which there is not adequate space for storage.

Serious as are these objections, they are less important than the fact that storage at the mines would in no sense solve our present transportation problem.

The railroads suffer as much as the mines from their present badly distributed load; the number of open-top cars, the capacity of tracks and terminal facilities are all inadequate for their winter peak load, nor would it be sound economics to require them to provide facilities adequate for four months' maximum traffic, a large share of which would have to lie idle during the remainder of the year. We should, if possible, try to

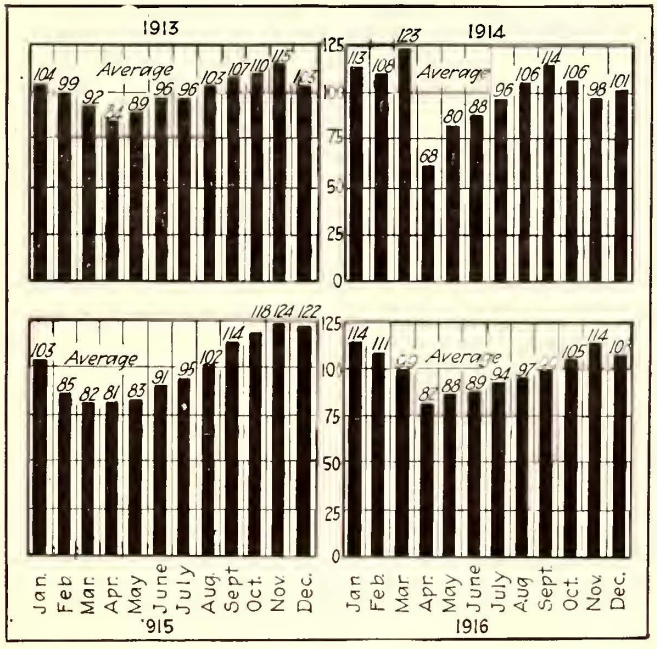


FIG. 3—DIAGRAM INTRODUCED TO SHOW SEASONAL VARIATIONS IN COAL SUPPLY CONDUCING TO HIGH MINING AND DISTRIBUTION COSTS

move more coal during the summer than in the winter, for the summer is not only the time of low transportation load, but the cost of train operation is very much less under the favorable weather conditions which then prevail. These considerations constitute by far the most serious objection to the widespread storage of coal at the mines. Coal production and transportation are inseparable and the permanent remedy lies not in producing and *storing* during the summer months enough coal to provide for the peak of the demand, but in producing, selling and *transporting* during these months enough coal to supplement normal production during the four months of the winter.

If we admit the impracticability of general storage at the mines, it follows as a matter of course that they must have day by day enough cars to carry off their day's production. Car supply is therefore the determining factor in coal production. There are always periods of the year when cars are unavailable in sufficient numbers and there are frequently periods when car shortage is serious and widespread. This chronic deficiency in car supply has been for years the subject of mutual recrimination between the operators and the railroads. We shall never have a steady and adequate car supply until we get a proper conception of the magnitude of the coal tonnage and lay down a definite program for leveling up the general load on the railroads.

Another factor in the situation, closely related to car supply, which still further impedes mine output, is the coal-car distribution rules which prohibit a mine from loading coal during more than one shift per day, even during the mine's development period. These rules, promulgated by the United States Railroad Administration, were originally advocated by mine owners whose properties were being strangled by labor union legislation and who sought to deny double-shift working to competitors in non-union fields. I know of no other industry which suffers under such a disability, and I do not believe there is sufficient warrant for transportation authorities to deny the producer the privilege of loading coal during any hour of the twenty-four, if the demand is heavy enough to warrant working two shifts.

IRREGULAR WORKING INCREASES MINE COSTS

Superimposed on the loss of output due to variable demand and the lack of cars is the loss occasioned by the voluntary absence of the mine workers at times when cars are available and when the opportunity for work exists. This loss—one of the internal problems of the industry—is a serious obstacle to low mine costs and to the welfare of the individual miner. There are very few mines in which the average number of men absent does not amount to 10 per cent, and at many mines this average ranges from 16 to 30 per cent. This bad habit arises, in part at least, from the example and influence of irregularity of operation due to causes beyond the workers' control, and it constitutes a serious drain on output.

The cost of production is increased by such irregularities in working time and output as have been cited above. As in any business, the heavy fixed charges run on, and there are important items of operating expense and maintenance which must be incurred whether the mine is producing or standing idle. The amount by which lost time increases the cost of production is strikingly shown by a study of this matter made during 1917 by the engineers' committee of the United States Fuel Administration. This dealt with cost data covering a period of twelve months and derived from seventy-three mines located in the New River district of West

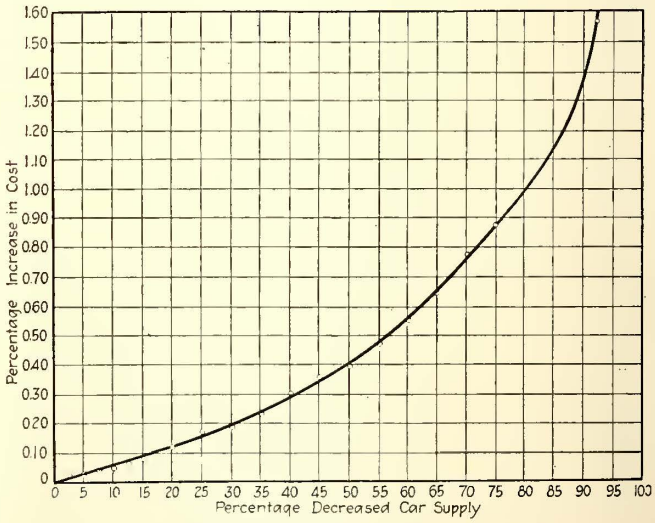


FIG. 4—RELATION OF RAILROAD CAR SUPPLY TO COST OF COAL

Virginia. It discloses the increases in the cost of producing coal occasioned by an insufficient car supply, shown in Fig. 4.

Irregularity in working time due to variations in demand and deficient car supply is chiefly responsible for the unsatisfactory conditions of mine labor. There is no other great industry in which the workers are so constantly subjected to such variations in the oppor-

tunity to work and in their earning capacity. The number of working days lost each year from 1913 to 1919 for each of the mining regions of the country is shown in Fig. 5. The days lost include the idle time due to lack of demand, lack of cars, and all other causes except voluntary absence on the workers' part; that is, the chart shows the number of working days that the miners were compelled to miss. For the whole bituminous industry, during these seven years, the least number of days lost in any field was thirty and the maximum 145; conditions in the anthracite region were better.

The economic and sociological effects of such conditions are obvious. They lead to periodic hardship, they foster discontent and exorbitant wage-scale demands, and they are the basis of most of our mine strikes. They are responsible for the fact that mine workers are migratory and unstable; forced to be idle a quarter of their time, they seek other fields or leave the industry. Mine workers as a class are renters, rarely establish permanent connection and eat up their income in moving, rents and perpetual buying on expensive installment plans.

The frequency with which mine workers resort to the strike weapon has become appalling. There are two distinct forms of striking; one the result of orders emanating from the general officers of the union, such as that which took place on Nov. 1, 1919, the other the lawless strike at individual mines, more recently camouflaged as a "vacation." There is a grievous lack of integrity and discipline within the ranks of the mine workers, and the internal workings of the individual local union, as well as of the parent body, are not infrequently dictated by a few individuals of American nationality or British origin who ruthlessly overwhelm the more staid foreign element, which is frequently unjustly reported as lawless and lacking in the qualities that make for good citizenship. I speak plainly when I say that the rivalry for office that exists within the union's ranks has not only menaced all organized labor but has not hesitated to threaten and menace society. The complacency with which this situation has been viewed by the public at large largely absolves the coal operators from the charge of indifference to the evils that flow therefrom.

As a people we know too little of the industry and its inner workings; we do not adequately sense its vital relation to our economic welfare; we have been little concerned with the causes that inspired the building up of the strongest single labor organization in the country, the United Mine Workers of America. This union, which in 1897 had a scattered following of only 9,737, now has a membership upward of 615,000 men of diverse nationalities and varying degrees of intelligence, who carry out the orders of their officers with an obedience sometimes worthy of a better cause. Its strength has not always been used unselfishly and wisely, but many of its acts have arisen from indefensible conditions within the industry, some of which still persist, and the responsibility rests with the operators, the heads of our transportation companies and the public to remedy these conditions.

The Mining Industry Is Greatly Overdeveloped

Some of the conditions thus far outlined have encouraged an overdevelopment of the industry and the mining of much coal which would better have remained in the ground. The bituminous mines of the country have a potential annual capacity of from 675,000,000 to 700,000,000 tons, which is about 125,000,000 or 150,000,000 tons in excess of our present needs. The bulk of this capacity is in permanent mines of good size. The overdevelopment is largely in permanent facilities which represent an investment in excess of $2.50 per ton of annual output.

The conditions have encouraged, also, the development of so-called wagon mines, the operation of most of which may be characterized as a public nuisance. While they constitute nearly a third of the whole number of mines in the country, they produce less than 2 per cent of our coal, and they not only disturb labor and market conditions but they also pour out in times when demand is brisk a product which is largely unfit for use.

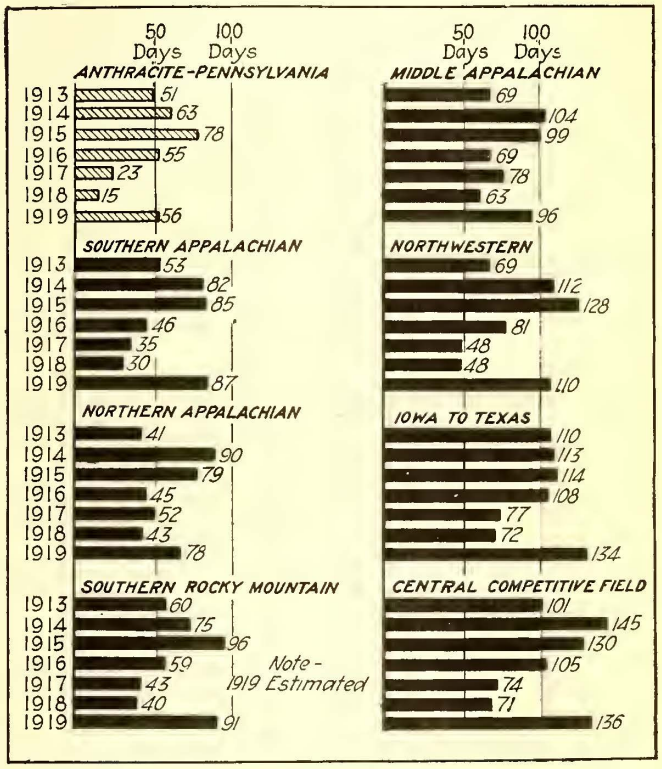


FIG. 5—LOST TIME IN COAL REGION FROM 1913 TO 1919

Less complete statistics compiled by the Geological Survey indicate that during 1918 production reports were received from 2,719 small mines (very few of which were equipped with tipples) whose total contribution to the coal production of the country was 1,108,000 tons, or an average of 406 tons each, per year. A summary of the 1918 reports shows that there are not less than 3,300 small so-called country banks and local commercial mines, producing less than 3,000 tons each per year.

The 5,888 small mines producing less than 2 per cent of the nation's bituminous coal in the year 1917 can be best compared to the jitney competition from which the electric railways suffer. These small openings, like the jitney, come out of their hiding places only in times of coal shortage and excessive prices. Instead of relieving the situation, they aggravate it by offering, for short periods, high rates of wages, which draw the migratory element in mine labor away from competent and well-equipped mines where their output would be more than twice as much per man. These small mines also make a demand on railroad facilities out of all

proportion to the number of loaded cars which they ship each day. Their cars, placed one at a time, frequently absorb the limited space available on congested team tracks, delaying the placing, unloading and removal of general freight for which such tracks were built. With the disappearance of coal famine and high prices, the wagon mine operator takes his team or truck to the barn, balances his accounts and seeks new lines of endeavor.

Not only do these small mines absorb an undue share of our labor and transportation facilities, but they turn out a grossly inferior product, containing often a non-combustible content reaching 40 per cent. Improper preparation of coal is one of the great sins of the industry and the wagon mine is not the only offender. The bituminous coal produced in 1917 showed that about one-third of it contained 5 per cent of non-combustible material that could readily have been removed. An improvement in preparation took place during early 1919 when the demand was slack, but quality deteriorated again during the six weeks preceding the strike of last fall, and this unnecessary tax on transportation and the industries continues unabated at present.

Conditions of Mining Are Undergoing Changes

State and Federal enactments, resulting from the growing demand for better mine labor conditions, have multiplied the cost of developing a permanent and dependable coal property. Furthermore, notwithstanding the enormous tonnage computed as still remaining in the ground, the opportunities for securing a location for a coal mine which will stand competition are rapidly diminishing.

During the twenty years preceding 1917 the coal industry presented a sorry spectacle. It was overdeveloped, its employees were underpaid and mines were opened and operated without due regard to the safety of the workers. The record of disastrous explosions and accidents is a dark page in the history of mining. The sharp competition invariably existing between individual mines and between mine districts was largely responsible for such conditions and for their continuance. When the operator decided that a certain tonnage was necessary to enable him to run, he frequently accepted orders for it at less than the cost of production, and then went back to his employees with the request that they consent to a cut in wages—already too low—to enable him to break even. Such an arrangement, when put into effect, was frequently followed by a secret freight rate agreement through which the operator received rebates that represented his total margin of profit. After the Mine Workers' Union became strong enough to enable it to refuse these temporary wage reductions and anti-rebate legislation closed the door to relief in that direction the operator turned to the "recurring strike," frequently prearranged for a definite period, in order to create the return that would enable him to pay interest on his paper, which the banks were carrying to the point of saturation.

I am reviewing this period to illustrate the ways in which instability of the industry operates to the disadvantage of all concerned and to emphasize the point that coal should be produced and marketed under conditions which promote the health of the industry, justice to the public and the welfare of the workers and their families. Every ton of coal produced should bring in a margin above the cost of production sufficient to create an adequate return on the investment, with due regard to the hazards of the business. With such a return assured, exorbitant prices should be discountenanced and prohibited.

The limits of the area underlying the so-called smokeless coals are now well defined, and this coal, which under former freight rates and low costs of production was shipped far afield, must now be conserved for a market located east of the Appalachian range, including the navy and the merchant marine. The Northwest, which heretofore has absorbed a large tonnage of smokeless coal, has definitely and permanently turned to bituminous coals produced nearer the points of consumption. England, which hitherto has enjoyed the world's coal export trade, has suffered an extraordinary loss of production and increase in unit production costs as a result of conditions largely chargeable to the war and a large share of her former trade is bound to come to us. We must, therefore, prepare to supply a material portion of the Western Hemisphere with coal. The South American republics are practically without coal of their own; they are growing rapidly in wealth and population, and it is not unreasonable to suppose that their consumption of fuel will increase at a rate comparable with the growth in consumption in our own country during the past fifty years.

Some Remedies Are Available

While I am not prepared to offer remedies for all the ills found in the foregoing diagnosis, I wish to offer my opinions as to what should be done to cure the more fundamental troubles. There is much to be done within the industry itself, but the more important defects require general and national treatment.

The purely mechanical problems of coal mining have not reached their final solution; while we have a considerable proportion of finely equipped properties operating under modern methods, there is room for improvement even in them. We should have larger individual mine openings, hand mining should give place to mining machines, electric drills and mechanical loaders and heavy underground tracks, cars and electric locomotives should, as far as possible, replace animal haulage. The economic and social aspects also need improvement. The men must have more regular employment; their lives must be adequately safeguarded, and they must be given the opportunity for, and be taught the advantages of, better homes, a more liberal education, industry and thrift.

Under old freight rates and the play of unrestricted competition between mines and among railroads there has grown up a system of coal distribution which places an undue burden on our transportation facilities and an unnecessary tax on the public. A large proportion of our coal moves long distances over the country, without regard to the relative location of the consumer and the mines.

This practice is a great tax on our railroad capacity and a drain on railroad income. Freight rates have frequently been made for coal which do not reimburse the carrier for the cost of hauling it and the deficit of course has to be added to the general freight rates. The public suffers not only through the unnecessary clogging of the railroad machine, but through this increase in the general rate level, and under our new railroad legislation no one can escape some share of the general increase in the cost of transportation which this haphazard scheme of distribution causes. We have recently had two radical increases in coal freight rates,

one of 25 per cent and the second of about 40 per cent, making a total of approximately 75 per cent. These increases, because they are on a percentage basis, will of course automatically operate to diminish the evils of excess haul, and they will force many consumers to consider carefully the coals near at hand, but the radical cure can only come through some general plan of distribution and control of freight rates. Gradually and without violence to establish business interests a system of coal market zones should be built up through the medium of rate control. Excessively long and overlapping coal hauls should be penalized; the last two or three hundred miles should bear a prohibitive rate instead of being given away, as the carriers have frequently done in the past.

Legislative Aid Is Necessary

By far the most important problem in coal supply is the equalization of the load on the mines and on the railroads, and its solution can only be effected by the consumer, who will have to equalize his demand. Just now the consumer is aroused, but he will quickly forget his present experiences. The summer of 1921, with probable decreases in the cost of living, will perhaps see mine labor tranquil and willing or even anxious to "maintain the integrity of wage contracts"; strikes will become less frequent and the public will quickly forget the experiences of the last few months. Some way must be sought to keep consumers alive to the necessity of foreseeing their needs, equalizing their demand and storing a portion of their requirements. I believe this can only be done by offering them the inducement of lower freight rates during the early months of the year.

Such a remedy requires, of course, legislative action, and to be effective this action must be taken for the nation at large and not locally. What we need is a federal law providing seasonal variations in coal freight rates. A bill establishing such variation in rates was introduced in the Senate last spring at the request of a committee appointed by the American Institute of Mining and Metallurgical Engineers. This bill, which is given in full in the appendix of this paper,* provides for increases and reductions in the schedule base rates per ton as follows:

Increases		Reductions	
Month	Amount Cents	Month	Amount Cents
August	5	February	10
September	15	March	25
October	25	April	25
November	25	May	25
December	25	June	15
January	10	July	5

The bill did not get out of the hands of the committee to which it was referred, although it held protracted hearings. I hope that it, or some equivalent measure, will be introduced and passed at the next session, and I bespeak for such legislation your support. Similar variations in cost heretofore locally applied have failed of their full effect because the consumers did not have confidence in their persistence. We have faith in our government, however, and with such a law in force throughout the country consumers would be encouraged to buy during what is now the period of low demand on the mines and railroads and to store enough of their coal to lower the demand during what is now the period of the peak load on both industries. Except in rare instances the general annual cost of their fuel supply would not be increased under the terms of such an act.

Information Concerning the Industry Must Be Disseminated Also

Comprehensive treatment of the problems of an industry so fundamental and so national in scope as coal mining must proceed from a full knowledge of the facts, which must obviously be authoritative and above reproach.

For some years the United States Geological Survey has compiled statistics relating to production which have proved of the greatest value to the industry. This work of collecting the facts should be placed on a permanent footing and its scope should be greatly enlarged, so that the country will have available a full knowledge of the fundamental facts for the solution of all problems of supply, costs, labor and transportation in the industry.

Looking toward the establishment of an agency for doing this there was presented at the last session of Congress another bill, likewise suggested by the American Institute of Mining and Metallurgical Engineers. It provides in substance that the Secretary of the Department of the Interior shall "in person, or through such agency within his department as he may designate":

(a) Investigate from time to time the wages, working conditions and practices, terms of employment and the living expenses of miners and other workmen employed in the coal and its collateral industries.

(b) Investigate methods and processes for the storage of coal and conduct such research work as will conduce to the economical use of coal.

(c) Investigate methods employed in the consumption of coal, including the distribution of coal cars.

(d) Investigate the desirability of a central governmental coal purchasing agency for all coal used by the Federal government.

(e) Investigate the desirability of establishing a statutory coal zoning system.

(f) Examine the mines, etc., and have access to and copy any book, record, paper or correspondence relating thereto.

(g) Subpœna witnesses and require the presentation of all documents used in connection with the coal mining industry, and invoke the aid of the United States courts in enforcing such demands.

(h) Require operators and dealers to file statements as to costs, prices, profits, etc., and place at the disposal of any private or public board, commission or other group engaged in the arbitration, conciliation or settlement of any wage dispute such information so secured as in his opinion relates to the controversy.

This law if enacted would put the coal industry and all the facts relating to it under the close supervision of a cabinet officer, would insure their permanent collection and would place at our disposal dependable information which could not fail to contribute to the stabilization of the industry and the general welfare of the nation. With these facts in the possession of the public few issues would go to dispute, coal earnings and prices would be steadied and the way would be paved for the solution of most of the industry's labor problems.

I trust that this bill also will be introduced and passed by the next Congress, and that it will have the support of such organizations as the American Electric Railway Association.

*Mr. McAuliffe appended to his paper the full text of this bill, S-5278, and also that of Senate bill S-4080, referred to later in his paper. On account of space limitations these have not been reproduced here, as copies are obtainable through official sources.

Utility Regulation and Rate of Return*

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The Dual Standard of Commerce Regulation Which Affects Utilities, but Exempts Other Industries, Has No Justification on Historical Grounds or as Matter of Public Policy—Effect on Financing of Utilities Analyzed

THERE is every reason why utility securities, in the absence of undue influences, should command a wide measure of public favor. They are issued by merchants whose wares are a public necessity. The demand is, in general, less liable to capricious fluctuation than almost any other department of commerce. In the great majority of states utilities are subject to regulation by public service commissions and these commissions openly express an intent not merely to safeguard the interests of the public but to promote the stability of the utility concerns which are to give that public a high standard of service. Nevertheless, utility securities do not reflect optimism as a result of these expressions of good will. The present paper is an effort to find out why. It is not directed, in the main, to the work of the public service commissions. Rather, it is an effort to go deeper, to analyze the underlying causes of the present state of the industry.

It is infrequently observed, but nevertheless true, that utility men are today so much in a class by themselves that most of them scarcely realize how different is the authority to which they are subject compared with the control exercised over almost any other form of business. The public service commission is their court, distinct from the courts to which all other citizens may have recourse. They have an extensive and varied literature of their own, and it is interesting to note how this literature tends more and more to take present methods of regulation for granted. Methods of regulation which have just come into existence are spoken of as though centuries of precedent stood behind them.

This paper will have served a useful purpose if it leads some utility men not to assume that whatever is customary today in the public utility business is right; if it leads them to take note of how far they are subjected to treatment—especially economic treatment—different from that accorded to the general body of citizens, and to investigate, in a broad spirit, the grounds for such discrimination.

A Dual Standard of Commerce Regulation

There exists in the United States today a dual standard for the regulation of commerce. On the one hand is a well-defined and compact body of precept and practice put into force by public service commissions and applied solely to those few businesses known popularly as "public utilities." On the other hand is a lack of regulation applied to every other branch of commerce, including businesses so vital to the public welfare that a serious breakdown in them might prove a national tragedy. That the public, if fully informed, might regard a dual standard of commerce regulation as equivalent to a dual standard of morality is not too much to assert. And, upon the single occasion since the evolution of the dual standard that public interest in commerce regulation became intense—during the war period—the dual standard was swept out of sight without ceremony and literally almost overnight. In an incredibly short time, with rough but effective governmental machinery, all commerce in which public interest was vital was placed under control. No distinction was raised as to whether the commodity was or was not controlled by a monopoly, or whether it could or could not be defined as a public utility. Unlimited technicalities and legal questions might have been raised, but no one ventured to raise them.

How, then, has the dual standard of commerce regulation been justified or condoned? It is defended on three main grounds:

First—That the commodities dealt in by utilities are a public necessity.

Second—That utilities are, in a measure, monopolies, and inferentially, that other businesses are not.

Third—That utilities are possessed of valuable franchises derived from the public.

Each of these reasons is open to attack. If the rule of public necessity is to be our guide, why overlook bread and meat, and coal? If monopolies are the only business to be regulated, why select this limited group when so many other unregulated but equally powerful monopolies exist? If the value of franchises be the test, have public utilities been excused from regulation where the franchise is not merely valueless but a liability?

Mistaken Impressions as to the History of Commerce Regulation

In justifying the regulation of utilities, authorities usually, and properly, appeal to the body of legal enactment and of unwritten law evolved in England during the Middle Ages, yet the commercial history of the Middle Ages does not bear out their claims in the slightest. Not only was the commercial world of the Middle Ages entirely clear as to the economic principles upon which commerce regulation should be based, but public opinion sanctioned and demanded a much more comprehensive scheme of regulation than is even contemplated today. The principles underlying such regulation may be summarized as follows: (a) All commerce was a fit subject for regulation; (b) not only sellers were regulated, as now, but both buyers and sellers were held equally fit subjects for regulation;

*Abstract of address presented at annual meeting of American Electric Railway Association, Atlantic City, N. J., Oct. 12-14, 1920.

(c) the regulatory duty regarded as foremost was regulation as to the quality of merchandise, *i.e.*, the principle that quality of service is more important than its price; (d) it was understood that fluctuations were natural and must be looked for and given prompt recognition.

In Colonial days, especially in the New England colonies, there was little question as to the right of the state to set prices for commodities. Examples of general regulation of commerce during the first half of the Nineteenth Century can also be given. Such is the power conferred by Congress in 1820 upon the city of Washington: "to regulate . . . the rights of wharfage at private wharves . . . the sweeping of chimneys, and to fix the rates of fees therefor . . . and the weight and quality of bread." In 1841 the Supreme Court of Alabama decided that the city of Mobile had the power to regulate the weight and price of bread. In 1876, in Munn vs. Illinois, and again in 1891, in Budd vs. New York, the United States Supreme Court upheld the right of a state to fix rates for warehouse and handling charges upon grain. In both cases there were dissenting opinions, but they were not based upon the question of whether or not grain elevators were a "public utility," but upon the emphatic ground that price regulation of any kind is not within the powers of any Legislature.

Recent Commerce Regulation in the United States

In the period which has elapsed since the case of Budd vs. New York court decisions have done little to clarify the entire question of the rights possessed by the states or the United States to regulate prices of commodities. In large measure this has resulted from a development which set in about the time this decision was rendered, and which forms an outstanding feature in latter-day commercial history. This was the formation of the so-called "trusts," the popular demand for their regulation and control and the legislative and judicial efforts to give effect to this demand. The court decisions of the last generation have, in general, not been upon the direct question whether prices should or should not be regulated. The essential question has been whether the defendant was or was not a monopoly. At first sight this appears an eminently practical question, yet the great monopoly cases before the courts in recent years have taken on a curiously theoretical aspect.

The Sherman act was passed in the year preceding the Budd vs. New York decision. Its provisions were aimed at preventing the formation of monopolies rather than in punishing commercial and economic malpractices in which they might be expected to indulge. The issue thus raised before the court being essentially a theoretical one, the action of the court in each case and the penalties imposed have been little better than theory.

Elaborate dissolutions and reorganizations have been ordered, securities have been ordered distributed, properties have been made to go through the formalities of compulsory sale. But no practical step whatever has been taken toward preventing exactions or inflated prices. The law enjoined none, the court could take none. Not a line in these important decisions makes an effective step in this direction. The court could merely harass and fetter the scheme of financial or intercorporate relationship. It is fair to say that no action taken by the highest courts within the last quarter of a century has borne fruit in lower commodity prices or had the slightest real promise of doing so. And yet this is the only tangible result in which the public has the slightest real interest.

Out of this latter-day concentration on the abstract question of monopoly, together with a general acceptance of pseudo-history and incorrect statements regarding commerce regulation in the past, there has arisen a distinctly novel and modern notion. This is the idea, prevalent among utility men, and creeping, to an extent, into recent court decisions, that there is an immemorial distinction between "public business" and "private business" and that "private business" is something sacred.

The idea is, of course, utterly at variance both with public opinion and public practice during the war period. Price regulation, under the urging of overwhelming public opinion, was distinctly and clearly enforced in the first instance, as against those very commodities, such as meats, upon which the life of the community depends. They were then and there treated as true public utilities. Public opinion was infinitely more concerned about their regulation than about some of the admitted "public utilities" of today.

In spite of the fact that this phase of regulation had behind it a degree of popular approval seldom accorded to governmental acts in any land, there are not wanting those, even in the legal profession, who feel that no such "power to govern men and things" resides within the people, the ultimate source of all governmental power. These timid brethren justify such regulation to themselves only on the ground of emergency, of its being a life and death matter. When, in December, 1919, at Indianapolis, a Federal injunction was employed to balk a strike of coal miners, they could not concede, in any broad sense, to the whole body of the people the right to take any action which, even if technically improper, might be necessary to avert widespread calamity, suffering and death. Such technical minds, when sympathetically seeking to justify so broad an exercise of public authority and public will, can only do so upon the polite fiction that this country, a year after the armistice and with its great war machine disbanded, was still technically at war.

Results of the Dual Standard

The dual standard of commerce regulation, therefore, centers almost entirely around present-day efforts to curb monopolies. There is no question as to the public desire to see them controlled. Where public opinion recognizes that conditions make monopoly essential, it is permitted only upon sufferance. Public action in giving effect to this sentiment took two forms. It passed the Sherman act. It evolved public service commissions, including the Interstate Commerce Commission.

The first of these steps has proved, upon the whole, a sorry failure. In the only direction in which such a monopoly really affects the public it may not, under the present system, be restrained at all. The second step, by the very vigor of its application, has gone a long way toward the evolution of the dual standard. No one disputes the correctness of the view that electric light or gas or transportation are "public utilities" and, as such, have a vital public interest. It is entirely fitting that they be controlled and that public interest be safeguarded, but street car lines and telephone systems,

electric light or gas, important as they are, are far from being the only commodities by which we live. There are many who manage to exist without either electricity or gas. There are those to whom a street car ride is an unusual event. But to all, bread, meat, fuel and clothing are truly essential. Nothing in our economic life today justifies vigorous regulation of the purveyor of electric light on the score of being a public necessity while, at the same time, the baker is to be under no other restriction in regard to his prices or terms of business than his fancy may dictate. Neither can it be said that this anomaly corresponds to some expressed and general public opinion.

Investment Issues—A Well-Meant Legislative Bungle

Out of the great concentration of capital into trusts and other combinations in the '90s and the first years of the present century there grew a spirit of unrest against indiscriminate increase of capitalization. How far the movement was justified by fact is a subject which space forbids us to consider. Let us assume for the purpose of this article that there were abuses and that it was the part of legislative wisdom to check them. Be this as it may, the fact is that an almost country-wide movement ensued, with legislation in most of the states, in regard to the issuance of capital stock. The intent of practically all such legislation is to compel a dollar of capitalization to represent a dollar of cash investment.

The laws regulating capital stock issues at first blush apply equally to every corporation. But since there is, in effect, supervision and control of utilities through public service commissions, and little or no control by anybody over other corporations, these statutes, in their working, operate to the peculiar disadvantage of utilities. Commissions have no choice but to enforce the law against a utility company and insist that capital stock issues shall represent cash investment at par. There is, generally speaking, no similar body to compel equally rigid obedience to law by other corporations.

Further, the legislation in question affects only capital stock. It does not prevent the sale of bonds or notes at a discount. The investing public naturally enough will not pay par for offerings of second quality where investments of the first class are available for less. Out of this condition has come the present state of affairs where utilities are forced, against their will, to secure capital necessary for their growth by the unhealthy device of increasing the ratio of bonds to stock.

The net result of this legislation and its enforcement has been that the only corporations effectively compelled to its obedience—*i.e.*, public utilities—selling their bonds or senior securities at a discount, as they often must, are practically debarred from selling their junior and speculative securities since they must sell them at par.

Now, however wise or prudent the regulation of public utilities or steam railroads may be by the commissions charged with this duty, the purchaser of securities has become aware that in buying the stocks or bonds of these enterprises he is adventuring his savings into a highly restricted and regulated form of commerce. In the meantime there are presented to him a great range of other enterprises in which he may invest, and as to which regulation of any kind is either nominal or substantially non-existent. All regulation operates, in his mind, substantially as a limitation or a check upon commerce. The security quotations of the day give us the answer as to which of the two groups the investor is favoring at the present time, and frankly it is difficult to see why we should express surprise at his choice.

Public Utilities in the Investment Market

Public utilities labor under three important handicaps when entering the money market as compared with other seekers after capital.

The first of these applies to issues of capital stock. The investing public, being free to place its money where it will, takes note of the fact, as set forth above, that the profits of the utility are subject to regulation, whereas the profits of other enterprises are not. For years the bulk of such regulation had the effect of reducing rates, thus curtailing earnings. Within recent times rate increases became inevitable; nevertheless, the spirit of the regulation remains unchanged. It is essentially directed toward making certain that utilities shall earn no more than a certain maximum and usually quite a modest one. The investing public further recognizes that while commissions may restrict the maximum earning, they have neither the power to guarantee minimum earnings nor funds with which to make such a guarantee good.

The second handicap applies to sale of short-term obligations, *i.e.*, notes. Lenders of capital and credit show a marked preference for borrowers who speedily liquidate their loans and a reluctance to accommodate those unable to wipe out their indebtedness in a reasonable time, even though interest payments are certain and there is no question as to the safety of the loan. Where utilities seek this class of assistance, it is recognized that they have scant prospect of rapidly amortizing the loan, and often no sure prospect of repaying it when due. Further, they have usually little in the way of attractive conversion privileges to offer.

The third disadvantage from which utilities frequently suffer is an unhealthy relation between bonds and stock. The investing public is quite properly accustomed to favor a low ratio of funded debt, including notes, to capital stock. Due in part to the above-mentioned features, in part to state legislation as to the issue of capital stock as already mentioned, an undue fraction of the entire growth of utilities in the last decade has had to be financed by issues of bonds or notes. A healthy balance between bonds and stocks is needed in the best interest of all; the lack of it adversely affects those seeking new capital. Changes in the legislation which brought about this condition or changes in its unequal application will be a public benefit.

Present Yield on Investments—Interest Rates

The investing public ranges in character from those buyers whose chief, indeed sole, preoccupation is security of their principal to those whose prime demand is a high rate of return, even at the expense of safety. The problem before the public utility manager is to determine the form his securities must take in the way of both safety and yield, so that he will make a sufficiently wide appeal both to the conservative as well as to the somewhat more speculative elements in the investing public. The support of both classes in due measure is essential to the successful financing of any enterprise.

Considering first the investor who places security before all, the highest form of investment available to

him consists of bonds of the United States Government. These are secured not only upon the property of the body of citizens in the United States but, in the last analysis, upon the life and honor of every individual citizen. We are unable to conceive of a higher form of security which can be offered to an investor. For securities of this character, which in past years commanded rates as low as 2¼ per cent, 5¾ and 6 per cent are now being offered. This would appear to establish a minimum figure, to be exceeded by all other security offerings in measure based upon their lesser reliability as compared with this maximum of safety.

Taking next the yield upon investments, the security for which is more speculative, but upon which the investor seeks for high dividends, it is more difficult to specify an exact figure. Very high figures are often quoted and frequently earned, not only in enterprises of purely speculative character but also in businesses of a solid and conservative type. From published statements of bankers and others it would appear that a yield of 25 per cent is not regarded as excessive where the investor subordinates security to the prospects of profit. These two figures, the former definite and the latter somewhat elastic, may be taken as indicating the limits of the investing market in either direction as it must be faced by the public utility manager.

As to interest rates, all money borrowed at the present time is being loaned at far higher rates than have heretofore prevailed in the money market. Time money, borrowed on commercial and other paper, which formerly commanded interest rates of 4 and 4½ per cent, today fetches 8 and 8½ per cent. Weighty testimony has been given before public utility commissions by bankers and others to the effect that public utility bonds, where salable at the present time to investors, must net to these investors not less than 7½ per cent, and will, therefore, cost the borrowing utility 9 per cent and over.

Any one who consumes midnight oil reading decisions in rate cases might fall into the error of thinking, as a result of extended treatment therein of the subject of rate of return, that commissions actually awarded and set aside a certain definite rate of return to the utility whose rates are adjudicated. In point of fact, this is not what happens. All that is definitely decided upon and awarded is a schedule of tariffs which the utility may charge for the service it renders. What rate of return will accrue to the company's investors therefrom is little better than a guess.

If the commission's guesses as to the future business and its guess as to the future operating expenses, together with the tariff schedule awarded, produce the rate of return stated to be desirable, well and good. If it fails to produce this rate of return, the company stands the loss. In spite, therefore, of any language in rate decisions specifying a desirable or permitted rate of return, this does not insure the company any such rate of return.

Assuming, however, that some rate of return has been earned and that the sum, large or small, is available for distribution, the following are the purposes to which it is devoted:

1. To meet interest requirements upon funded and unfunded debt.
2. To amortize or discharge maturing obligations.
3. So to compensate the owners of the utility for (a) their services, (b) the use of their property as to deal justly with them as merchants and public servants, and to make their enterprise sufficiently attractive so that investors and operators shall be attracted to the field of public utilities.

It will be well briefly to glance first over each of these in turn.

Interest on Debt and Amortization of Obligations

The item of interest on funded and unfunded debt involves a recognition of the conditions affecting not only public utility operators but every business man who has occasion to borrow money or make use of credit facilities. Such a business man must have regard, among other items, to the following features: (a) Actually meeting his interest requirements; (b) maintaining such a margin of net earnings above mere present interest requirements as will not impair his standing among borrowers and users of credit as a class; (c) knowing the present, and intelligently anticipating the probable future money market, in order to make the best possible adjustment both in the quantity and method of his borrowings.

Failure to meet interest requirements when due requires little comment. Such failure involves not merely a collapse in the credit of the enterprise, but its financial ruin.

One of the financial customs which prudence has dictated is that the borrower shall show a margin of earnings over and above interest requirements varying in extent according to the hazards of the business. Public utility enterprises, based upon past experience, appear to require a margin of not less than twice the interest requirements. In spite of much that has been written upon this point, this margin, whatever its extent, does not form a proper criterion for computing the proper return upon the property as a whole. It is merely one of several elements which must be considered and given its due weight in arriving at a fair conclusion. If, by misfortune or poor judgment, a large fraction of its funded or other indebtedness falls due, to be refunded at a time when money rates are high, the company will suffer in consequence.

Amortization of debt is a duty, the discharge of which is only second to and almost equally essential with the meeting of interest requirements. Failure to meet this requirement subjects the utility to the same penalty of bankruptcy visited upon a failure to meet interest requirements, with the exception that, where amortization is not compelled by the terms of a mortgage or similar instrument, relief is frequently had by the renewal or refunding of the indebtedness. This is usually open to the following two objections: (a) An increase in the cost of such borrowed funds by an increase in the interest rate for money, or, what amounts to the same thing, a renewal of the load at a discount, and, (b) the distaste evinced by bankers and financial institutions toward borrowers whose loans are constantly renewed and must be carried continuously, as compared with borrowers, such as industrials, whose loans are liquidated within a reasonable time, thus releasing funds for other enterprises.

It must be recognized as a quality inherent in public utilities, as compared with other enterprises, that, where successful, there is ordinarily little prospect of a reduction in the total investment in them. A healthy utility shares in the growth of its community and is usually an important factor in producing that growth. The larger communities could not exist upon anything approaching their present scale without electric railways. The utility, and the investment in it, is, therefore, continuously growing, and this fact, which on its

face should be a strong factor in its favor, may actually place it in a relatively disadvantageous condition in the money markets of the world. It may be unfavorably compared by certain bankers or investors with industrials and other enterprises in which accruing earnings may at any time be diverted to the extinguishment of debt or retirement of invested capital. Recognition of this disability is an important present need.

Return to Stockholders of Public Utilities

It is essential to realize that none of the items covered in the previous section in any way compensate the true owners of the public utility. Regulation of public utilities which fails to protect bondholders and creditors will, of course, lead to ruin. Nevertheless, regulation carried out solely with an eye to protecting the lenders of funds can never bring about real success or a healthy condition in the utility business. The vast wealth of the United States, the whole fabric of its present-day civilization, did not result solely from the availability of funds for investment.

Success has sprung in large measure from the leadership of great captains of industry, ably supported by loyal organizations of copartners and workers. All of these men are free agents, able to devote their efforts, their enterprise and their capital to whatever line of activity they may elect. If in the public utility field they are cut off from prospects of gain commensurate with those which they can anticipate in other lines, it is inevitable that they and their associates will desert public utilities and betake themselves to those avenues of progress where they will obtain adequate reward. Such a result will be a lasting disaster not merely to the industry, but to the entire country.

Present Regulatory Methods

Comment has been made above as to the present-day interpretation by the public of the powers of public utility commissions as intended for use solely in a quasi-judicial or restrictive sense. A public benefit will result from drawing attention to the fact that there is little or nothing in the laws creating public service commissions which compels action solely in such a sense. Further, this method of regulation is inherently defective in that it creates a divergence of interest between a utility's investors and its public. The public is led to regard every payment of dividends to the investor as a burden upon the price paid for service, while the investor sees in every reduction of rates an elimination of anticipated earnings. This divergence of interest does not exist. Perhaps the most revolutionary step in the history of public utilities will occur when the public recognizes that neither the spirit nor the letter of the laws creating commissions in general compels the adoption of any such methods.

Just as soon as regulation passes from the stage of merely limiting earnings to the wholesome stage of offering continuously expanding earnings in return for continuous improvement in service, including rates, public utility securities will begin to command a high degree of public favor. With regulation of this character they will deserve this favor, because they will combine the solidity and conservatism inherent in the public utility business with that prospect of reasonable increase in earning power which every healthy business must have, and these two qualities will make them ideal securities in the eyes of investors.

It is to be clearly understood that nothing in this section, or anywhere in this entire paper, in reference to public utility commissions, or their practices, is written in either a critical or a hostile sense. Everything contained herein is offered solely in a spirit of constructive criticism and with a full recognition that these bodies are acting fairly and with wisdom in dealing with the difficult task before them today. Some may feel that the commission might have been more indulgent to the utility companies, but plenty of others will be found to regard them as having been, if anything, overindulgent. The truth is that they have acted wisely and with intent to be fair. Our troubles lie, in considerable measure, beyond their reach. Only an enlightened and instructed public opinion will cure them.

Conclusions

The extensive ground covered in the foregoing pages may be summed up as follows:

1. Setting aside commerce regulation during the war period, utilities are today completely regulated, and practically all other industry is unregulated. The grounds alleged to justify this are wholly unsatisfactory.

2. Educational specialization, the existence of separate tribunals for utility matters, and other elements tend to make many utility men ignorant of or indifferent to this discrimination against them.

3. Wartime universal regulation of commerce, including prices, had hearty public approval. Some find it necessary to invent technical excuses for this regulation; the general public does not. The policy had the public's hearty support and so would a continuation of it.

4. The present custom of regulating only utilities is defended on alleged historical grounds, particularly as to commerce regulation in the Middle Ages and the practices sanctioned by common law.

5. Actual research into this period proves that much of this pseudo-history is directly contrary to the fact. Commerce regulation was then complete, nation-wide and highly developed. Regulation in this country in the seventeenth, eighteenth and first half of the nineteenth century has followed the same general lines.

6. Present-day practice in the United Staates is not in accord with historical precedent. The change is contemporary with the great body of ineffective anti-trust litigation under the Sherman act.

7. What the public desires is a protection from possible extortion or abuse. Sherman act litigation, successful or otherwise, never could protect the public along these lines.

8. State legislation in regard to capital security issues has not achieved its purpose and is a source of hardship and inequality. Utilities are especially and injuriously affected.

9. Utilities are regulated, but the money market is not. Utility commissions have no power to compel investment. Utility security offerings must attract investors on their own merits or they will fail.

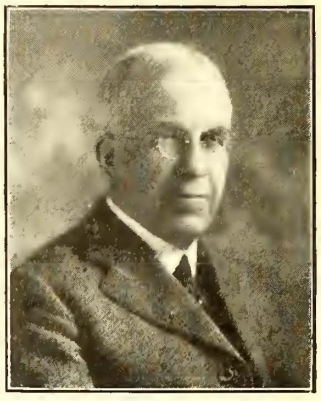
10. In rate decisions, though the commission may approve and specify a rate of return, the utility has no certainty of receiving it.

11. In regard to rate of return and regulation generally attention is often centered on the bond and note holder and not enough recognition given the stockholder —the true owner of the property.

12. Present regulatory methods might well give place to others offering progressively greater profit for progressively improved service to the public. There is every opportunity for the development of this special feature.

Service-at-Cost Accounting in Cleveland*

By H. J. Davies
Secretary-Treasurer Cleveland (Ohio) Railway



H. J. DAVIES

Practical Difficulties Encountered Are More Frequently Questions of Interpretation and Operation of the Ordinance Rather than Technical Accounting Problems — Specific Examples of Difficulties Encountered Under Cleveland Agreement Are Explained

ALL service-at-cost franchises provide for accounting in accordance with the standard classification of this association, or the classifications of state commissions or the Interstate Commerce Commission, based upon the standard classification of the American Electric Railway Accountants' Association. What better scheme of accounting could be asked? But the franchises are not perfect. Even then the principal trouble in Cleveland is not so much with the franchise itself as with the failure to carry it out or to understand it. 'Tis a contract more dishonored in the breach than in the observance. May I point out some of the respects in which it requires amendment, some in which it has been misinterpreted and which may be corrected without amendment, and others which are not understood?

We have been unable to convince the City Council of the necessity of adequate reserves for depreciation and renewal, for accident liabilities, for other deferred obligations, for the amortization of the cost of pavement owned by the city, for the amortization of all capital value in excess of the value of the physical property. Such reserves are desirable in the interest of both parties to the contract; of the stockholders, because, if the property is worth the capitalization, their investment is secure; of the car riders, because, first, if the capitalization does not exceed the value of the physical property, interest, and probably taxes, will be less per car-mile and per passenger than if the capitalization is excessive, and, secondly, the purchase price, if the city elects to buy, will be somewhere near the real value of the property.

One of the inadequate provisions of the Cleveland grant, as it has been interpreted, is that the physical property of the company, including a reserve for maintenance, depreciation and renewal, shall be kept in such a condition of repair that its value shall be 70 per cent (not 100 per cent) of its cost. As the physical property in existence at the time the contract was made was appraised and capitalized at 70 per cent of the cost of reproducing it new on Jan. 1, 1908, the provision for its maintenance in that 70 per cent condition was proper. It was provided, however, and properly, that all additional property should be capitalized at its actual cost. But it was also provided that this new property, as well as the original property, should be maintained at a value equal to 70 per cent of cost. There is no requirement for the amortization of the difference between cost and 70 per cent of cost.

Theoretically, the company is expected to limit its expenditures for expenses to certain amounts per car-mile, fixed in advance, as a budget. The original allowances were 5 cents per car-mile for maintenance expenses and 11½ cents per car-mile for operating expenses. In practice the allowances have not been sufficient to provide for the expenses. The reason for this has been, not that the company underestimated its expenses, but that the Council, in the hope of keeping the cost of service as low as possible, refused to "allow" enough to meet the actual necessary, legitimate expenses.

At the close of August there was a debit balance in the maintenance reserve account of $20,114 and a debit balance in the operating reserve account, accumulated since March 1, of $332,582, and there was a further deficit in the operating reserve of $60,000, for expenses incurred before March 1, a total of $412,696.

RESORTED TO "SPECIAL ALLOWANCES"

It has been the practice to provide for such deficits by what are called "special allowances." For illustration, on Feb. 29, 1920, the last day of the last ordinance year, there was a debit balance in the operating reserve account of $237,530.73. Of course, the balance in these reserve accounts should always be on the credit side. In order to start the new year without a deficit in the operating expense reserve account the $237,530.73 was charged to a "suspense account" and credited to the operating expense reserve account, wiping it out. This was reduced by a special allowance of $77,530.72 in March, leaving a balance in the suspense account of $160,000, which we are reducing at the rate of $20,000 per month by a "special allowance."

These suspense accounts are a method of transferring by bookkeeping entries the accumulated allowance deficits of past months or years to future months and years and assessing upon the car riders of the future a part of the cost of the service rendered the car riders of the past. The allowances should be sufficient to provide for the estimated expenses. A maintenance reserve is absolutely necessary for the protection of the investment of the stockholders. How can the company hope to sell stock at par on a 6 per cent interest basis, or even on a 7 per cent basis, when it has no such reserve, and no prospect of one? Yet such a reserve must come. And, in my judgment, no amendment of the franchise is necessary for it; it is already provided for, although not imperatively required, by the franchise. But the Council seems to have a right to refuse a reserve larger than the difference between depreciated value and 70 per cent of cost. The present value of the physical property, by the way, disregarding the high prices due to war conditions, which are, to a large extent, if not entirely, temporary, and disregarding also overhead charges, interest during construction and taxes during construction, is now less than 70 per cent of its cost. Other companies have reserves of millions of dollars and

*Abstract of address presented at annual convention of the American Electric Railway Accountants' Association, Atlantic City, N. J., Oct. 12, 1920.

surpluses of other millions. The Cleveland railway is not permitted to accumulate a surplus. If a surplus should be earned it is to be absorbed in reducing the rate of fare.

A substantial accident reserve should be accumulated from current earnings and not wiped out at the end of the ordinance year. There should be money on hand to meet all unadjusted liabilities when they have been determined. Future customers of the company should not be expected to pay today's liabilities.

More than $2,000,000 of the Cleveland Railway's capitalization has been issued for pavement. The city's representatives claim that the pavement belongs to the city. If this is so, the value of the pavement should be amortized and the capital stock representing it should be retired. This would mean another saving in taxes and interest, thus benefiting both car riders and stockholders.

Old Franchise Values Capitalized

Another respect in which the franchise is imperfect is in the carrying of $3,700,000 in capitalization as the so-called value of old franchises. The company does not own the franchises; they were surrendered when the Tayler grant was accepted. That capital represents the present worth on Jan. 1, 1908, of what the net earnings of the company would have been if the company had continued to operate under the surrendered franchises until their expiration. It does not represent any property owned by the company. Instead of providing for the gradual payment to the stockholders of those net earnings, the framers of the franchise ordered that capital stock for the amount of them be given to the stockholders and that interest be paid at the rate of 6 per cent per year upon that capital stock throughout the life of the new franchise and any renewal or extension of it. This treatment of the old franchise led to taxation troubles. The taxing officers took the position that as the capital stock and bonds of the company were worth par or more in the market, the company's property must be of a value equal to the market value of its securities. We argued that the company had no property represented by the capitalized net earnings; that the capital stock of the company was a liability rather than an asset of the company; that if the capital stock in question was property, it was the property of the holders of the certificates of stock, and not of the company, and that, if capital stock were taxable in Ohio, those certificates would be taxable as property of their holders, not as property of the company. The franchise should be amended so as to permit the amortization of that liability or the retirement and cancellation of the stock. This would mean a saving in interest of nearly a quarter of a million dollars per year to the car riders, and the value of the physical property would be nearer the capital value. The value of the remaining capital stock would be thereby enhanced. Thus the amendment would benefit both the car riders and the stockholders.

Another imperfection has recently developed—the difficulty of financing needed extensions and other betterments because of the inflexibility of the rate of interest—not more than 6 per cent on bonds, floating debt or capital stock. Negotiations begun more than a year ago for an increase to 7 per cent have so far failed. We find it impossible to sell 6 per cent stock at par, and so have been compelled to stop all improvements.

I am optimistic enough to believe, however, that all these defects and difficulties will be corrected.

The city has complained, in past years, of the provision in section 26 of the franchise for the capitalization of the difference between the cost of renewals of property and the reproduction value new of the superseded property, claiming that we should capitalize the difference between the cost of the renewals and the capital value of the retired property, that capital value being about 70 per cent of original cost or reproduction value. This provision, it was said, was in the interest of the company, and we admitted it, but said we were willing to have it changed if the city would also amend the franchise so as to provide for a reserve equal to the difference between capital value and depreciated value. To this the city has been unwilling to agree, although the amendment would be to the advantage of the car riders as well as of the stockholders. The cost of reproducing new the physical property that was in existence Jan. 1, 1908, has until now been greater than the capital value of that property. But if the provision of section 26 is to remain in effect and to be strictly complied with because the city fails to see clearly its own interest and still has the idea that what is bad for the company is good for the city, then it will work to the disadvantage of the company in the future, because prices are coming down and the cost of reproduction new five years from now, or ten years from now, of property acquired in the past five or six years will be less than the capital value of that property. Neither is arithmetically and exactly right. To retire at 100 per cent of the cost of reproduction, new, property that was capitalized at 70 per cent of its cost is of advantage to both parties, although the other party cannot see it. To retire at reproduction value in 1930 property that in 1920 cost 150 or 200 per cent of that value will be of disadvantage to both parties to the contract, because the remaining property will not be worth its cost, and so the investment will not be backed by assets worth the capitalization, and the cost of service will be more than it ought to be by the amount of interest and taxes on the overcapitalization.

Variable Dividends Are Dangerous

There is a provision in the Cincinnati franchise for variable dividends, but it is of doubtful advantage either to the car riders or to the stockholders. It is a provision that if the company's expenses in any period are less than its annual budget or estimate a larger dividend than 6 per cent may be paid to the stockholders. This provision is likely to tempt both the managers of the company and the representatives of the city to charge to capital accounts what should be charged to expense. This would result in overcapitalization. If the stockholders of today can increase their dividends, and if the car riders at the same time can reduce or keep down the rate of fare, by this method they will be tempted to do so. When the renewal of our franchise was discussed in the spring of 1919 the City Council offered us what was said to be a similar opportunity to increase the rate of interest on our stock to 6¼ per cent instead of 6 per cent per year. The offer was to amend section 19 of the original franchise by the insertion of a provision that at least thirty days before the first of May of each year the Council, in connection with the city Street Railroad Commissioner, prepare a budget of the probable expenses of the company for the ensuing year; that the company should not be permitted to expend more than the amount of the budget "except for extreme necessity, emergency or unavoidable and extraordinary contingency in the rendition of service demanded, and

then not to the extent of more than 2 per cent of the gross allowances," and "if, at the end of any year, the Council shall find that the company has kept within its allowances, or shall not have exceeded the same by more than 2 per cent under the conditions above specified, then Council shall permit the company to take out of the interest fund an operating bonus of one-fourth of 1 per cent on the total average capital value for that year and distribute the same as interest to its stockholders," but that "if the company shall have spent more than the allowances, and if the Council shall find that the said overexpenditure was unnecessary for or not unavoidable in the rendition of service demanded, and not authorized by Council, then the company shall deduct from its interest allowance to stockholders the amount by which such overexpenditure exceeds the allowances."

We declined to accept the proposed amendment, saying, "It is, as was pointed out years ago by Mr. Johnson and Judge Tayler, inconsistent with the Tayler plan. It is an invitation to scrimp service—to the Council in order to keep the fare low, to the company in order to get the extra interest. In the interest of both parties to the contract, nothing should be written into that contract to threaten either the condition of the property or the quality of the service." The amendment tendered us an ostensible opportunity to pay 6¼ per cent a year to our stockholders, instead of 6 per cent. The opportunity was only apparent, not real, because the Council would not be likely to authorize an expense budget in excess of the cost of operation. Neither would a board of arbitration. Under the best possible management, expenses would probably exceed allowance, and this amendment provided that, if they did, the stockholders should not only not receive the additional quarter of 1 per cent but should suffer a loss in interest of the difference between 6 per cent and the amount of expenses in excess of allowances. It was said in oral arguments before the Council that the Cincinnati Traction Company's franchise contained a similar provision—a provision that, if the company's expenses were less than its annual budget, an increased dividend might be paid to the stockholders above the basic 6 per cent provided for in the grant, and that the greater the saving in expenses the higher the dividend might be. We answered that under the Cincinnati franchise the budget was to be prepared by the company, not by the city, and that we would be willing to accept as an amendment a provision similar to the Cincinnati provision. Then, as the chairman of the committee said at one of the meetings, there would be a great temptation to let the property deteriorate, and perhaps to pay for repairs out of new capital instead of out of earnings, thus impairing the security of the investment of the stockholders, increasing the amount on which interest would have to be paid, permitting service to become unsatisfactory, because of poor track and equipment, leading to increases in the rate of fare. In the interest of both parties to the contract, the road ought to be kept in good condition and the service ought to be adequate for public needs.

At the same time the Council also offered to amend the section which defines extensions, betterments and permanent inprovements, so that it would provide for the retirement of wornout or obsolete property at its capital value instead of at the cost of reproducing it new. We said we would accept the proposed amendment if the Council would amend section 21 correspondingly by substituting the words capital value for the phrase 70 per cent of reproduction value. Section 21 declared:

> The intent hereof with regard to the sum authorized by section 20 hereof to be set aside for maintenance, depreciation and renewal is to enable the company to maintain, renew, replace, preserve and keep its railway system and property, and every part thereof, and all extensions, betterments and permanent improvements hereafter made pursuant hereto, in good condition, thorough repair and working order, the standard of such condition, repair and working order being an average for the entire system of 70 per cent of its reproduction value; and the car-mile allowance provided by section 20 hereof for the purpose of maintenance and renewal shall not at any time be diminished unless the value of the property and the amount accumulated in the maintenance and renewal fund aggregate more than 70 per cent of the reproduction value of the said entire system.

And it has been held—erroneously, I think—that the allowance may not be increased unless the value of the property and the amount in the reserve are less than 70 per cent of the reproduction value of the entire system.

Shall Retirements Be at Capital Value or Reproduction Value?

We were willing that this section should be amended so as to provide that obsolete or worn-out property should be written off the books at its capital value, instead of its reproduction value, but we wished that the amendment should also provide that no property should be retired at less than its capital value. We wanted a provision for a reserve equal to the difference between capital value and the actual or depreciated value of the property, so that the value of the property at any time, plus the amount in reserve, should be at least equal to the capitalization. In other words, we wanted to make the stockholders' investment more secure—secure beyond any doubt or question—by a provision that would make the physical assets of the company worth as much as or more than the amount of capitalization. Such a provision would not harm the city in any way, because the price at which the city may buy the property is fixed in the franchise and the city's bargain in case of purchase will be better if the value of the physical property is equal to or exceeds the option price than if it is below that price. The provision that the maintenance, renewal and depreciation reserve need not be greater than the difference between the depreciated value of the property and 70 per cent of its reproduction value, we argued, was inconsistent with the declaration of the preamble of the franchise, and with the provision of section 47 that the ordinance was to be a contract between the city and the company which would secure to the company unimpaired the capital value described in section 16, and inconsistent with section 16 itself.

Our contract with the city implies a trust. Both parties to it are trustees, the city for the car riders, the company for the stockholders. The city is, in a sense, also a trustee for the stockholders—to the extent, at least, that the property be maintained at a value equal to its cost, so that the capital stock may be always worth par. If it does not owe this duty to the stockholders, it should do this as trustee for the public, so that the company may be able to finance its extensions and other betterments and to finance them at the low rate of interest permitted by the franchise. If the company cannot obtain money by the sale of its capital stock, the public will lose the benefits that would result from the growth of the system as the city grows in population—not at equal pace with the growth of the

city, perhaps, but at a substantial percentage of that growth.

The directors and officers of the company have regarded their duty under the franchise as something more than to pay 6 per cent interest to the stockholders. They have regarded themselves as trustees for the car riders, with an obligation to furnish street railway service at cost, and to make the cost as low as possible consistently with proper maintenance of the property and other legitimate expenses of operation, such proper maintenance being of advantage to the car riders as well as to the stockholders. There has been no attempt on the part of the company to make expenses unnecessarily high, or to urge the construction of extensions not needed in order that stockholders might have the benefit of purchasing additional stock at par, with the hope of selling it to the city at a bonus of 10 per cent. During most of the ten years under the operation of the service-at-cost plan, the stock of the company has sold on the Cleveland exchange at premiums ranging from a fraction of 1 per cent above par to $114 per share.

The management has a responsibility not to let the property deteriorate as a whole—a responsibility to accumulate a fund as the property wears out or approaches obsolescence from which to renew or replace it, that fund being equal to the difference between cost or capital value of the property and its depreciated value, the depreciation being based on the departed years and months of its probable life. In the interest of all concerned, this should be done. Not to have a fund ample for this purpose leads to overcapitalization, to renewal or replacement of obsolete or worn-out property from new capital, increasing interest and injuring credit because of failure to protect the investment by a property worth par of the investment, and so leading to a possible increase, not only in the amount of interest but in the rate of return.

Capitalization Should Be Fair

The city, too, should be diligent to see that the company is not overcapitalized, and that the property, by means of an adequate reserve, is kept in as valuable a condition as when it was new. The city has a right to a good property, in order that it may have good service, and that the company may be able, by reason of the value of its assets, to sell capital stock with ease at par. It should see that there is no deterioration in the property; that the property, including the reserve, is fully equal in value to the capitalization, or, putting it the other way, that the capitalization is never in excess of present value.

It has been suggested that the principal efforts of the directors and officers of the company should be to put out as much capital stock as possible by urging the acquisition of additional property in order that the stockholders may profit by a sale to the city, which has an option to buy at par for the company's bonds and floating debt and $110 per share for its capital stock. Of course, the city ought not to consent to any such program. It should insist that the property be maintained at a value fully equal to the par of the outstanding capital by means of an ample reserve. That reserve may be in cash, may be invested in approved securities or in additional physical property, or may be used to retire bonds, floating debt or capital stock. But the suggestion is a short-sighted one, even from the stockholders' point of view. They should protest against any increase in the difference between capital value and asset value, especially as the prospect of purchase by the municipality recedes. The likelihood of the city exercising its option to buy is less now than it was ten years ago. Municipal ownership and operation are not so popular as they were then; at least, among those who advocated them at that time. That consummation is more devoutly and earnestly wished by the owners than by politicians or public.

It may seem strange that this preachment should come from an officer of the company rather than from a representative of the city. But I assure you I speak for the stockholders.

Why cannot the city see that service cannot be improved, nor fares reduced, except temporarily, by permitting the property to deteriorate without filling, by a reserve built up from earnings, the void created by mechanical depreciation, wear and tear, obsolescence, accidents and the postponement of payment of debts, between the real value of existing property and its capital value or cost? I suppose because they are as short-sighted as the old bachelor pedagogue who, when urged to do something for posterity, asked, "What has posterity ever done for me?" Let the car rider of today pay the entire cost of the service he gets, and not shift any part of it to his children or grandchildren, or any other car riders of the future.

Ten years ago, at the close of the first six months of operation under the Tayler franchise, I prepared a paper for you on some of the accounting features of the franchise and included in it tables showing the earnings and cost of operation in those six months and in the corresponding six months of four previous years. I append to today's paper tables showing the earnings and costs in each year from 1911 to and including 1919, that you may see the variations in fare and expenses. The year 1906 was the last in which the company operated for private profit at the rate of fare fixed in its franchise, *viz.*, 5 cents cash, eleven tickets for 50 cents, free transfers. In 1907 it made experiments with six-for-a-quarter and seven-for-a-quarter tickets, and the Forest City Railway operated two lines throughout the year at a fare of 3 cents. On April 27, 1908, our property was leased to the Municipal Traction Company, which operated it at 3-cent fare until it went into the hands of a receiver in October. During a part of that year no transfers were issued; a person who desired to transfer paid a second 3-cent fare; some paid a third. From Oct. 22, 1908, to Feb. 28, 1910, the road was operated by receivers, at two or three rates of fare. On March 1, 1910, the property passed out of the receivership into the hands of the Cleveland Railway, and ever since has been operated under the Tayler franchise. The tables show the average fare in each year. They show, also, the earnings and the cost of operation, including taxes and interest, per car-mile, and in these respects should be more interesting to you than they are to us of the Cleveland Railway, because each of you can compare them with your own operations and we cannot, except as we have been favored with copies of your annual reports.

Our operating revenue in 1919 was 42.791 cents, our non-operating income 0.5583 cent, a total of 43.3493 cents. Our allowances for expenses, including "special" allowances, were 32.4781 cents, our taxes amounted to 3.4728 cents, and our interest charges, including interest on capital stock, to 5.5450 cents. Our revenue per mile of track operated was $39,200; maintenance expenses were $9,300, operating expenses $20,100, taxes $3,200, and interest, including interest on capital stock, $5,088. Maintenance expenses were 23 per cent, operating

TABLE I—ALLOWANCES FOR MAINTENANCE AND ACTUAL PAYMENTS

Year	Allowances Amount	Allowances Per Car-Mile, Cents	Actual Amount	Actual Per Car-Mile, Cents
1911	$1,390,079	4.95	$1,506,651	5.36
1912	1,438,662	4.94	1,387,427	4 77
1913	1,499,339	4.95	1,775,372	5.86
1914	1,662,397	5.14	2,048,437	6.34
1915	1,676,708	5.17	1,916,712	5 91
1916	2,492,512	7.36	2,303,693	6.79
1917	2,587,519	7.22	2,592,698	7 23
1918	3,137,337	8.94	3,106,717	8 86
1919	3,968,059	10.98	3,667,513	10 15

TABLE II—ALLOWANCES, TOTAL AND PER CAR-MILE

Year	Allowances Amount	Allowances Per Car-Mile, Cents
1911	$3,423,634.40	12.19
1912	3,347,558.13	11.50
1913	3,688,360.13	12.17
1914	4,030,933.82	11.95
1915	4,247,065.22	12.44
1916	4,609,768.52	13.61
1917	5,416,432.89	15.12
1918	6,793,036.63	19.36
1919	7,765,416.00	21 49

TABLE III—INCOME BY YEARS

	Passenger Revenue, Cents per Car-Mile	Operating Revenue	Total Income
1910	22.91	23 57	23.72
1911	22.01	22.67	22.87
1912	22.11	22.84	22.95
1913	22 89	23.55	23 68
1914	23 24	23.80	23.93
1915	25.56	26.12	26.34
1916	27.52	28.11	28.33
1917	27 85	28 41	28.63
1918	34 55	35.17	35 47
1919	42.14	42 79	43.35
	Cents per Fare		
1910	3.48	3.58	3.60
1911	3.25	3.35	3.38
1912	3 15	3.26	3.27
1913	3.14	3.23	3.25
1914	3.25	3 33	3.35
1915	3 44	3.51	3.54
1916	3.42	3.49	3.52
1917	3 42	3 49	3.52
1918	4 42	4 50	4 54
1919	5.21	5 29	5.36

TABLE IV—MAINTENANCE AND OPERATING EXPENSES

	Maintenance, Cents per Car-Mile	Operating	Total
1911	5 36	12.07	17.43
1912	4 77	12.19	16.96
1913	5 86	12.23	18.09
1914	5 97	12.22	18.19
1915	5 27	12.55	17.83
1916	5 66	14 00	19.66
1917	5 77	15 34	21.11
1918	6.74	18.21	24.95
1919	8 44	21.96	30.40

expenses 50 per cent, taxes 8 per cent and interest 12.79 per cent, of revenue. We furnished ten and one-half rides (fares, transfers and deadheads) per car-mile.

Trailer car-miles are calculated at 60 per cent of the actual number of car-miles run by trail-cars. Of the 38,000,000 miles run in the year 2,000,000 were run by trailers.

Today our allowances are 11 cents for maintenance and 29 cents for operation, plus "special" allowances of about 2 cents per car-mile, a total of 42 cents. Compare these allowances with your expenses.

Table I shows the regular and "special" allowances for maintenance, and the actual expenditures for maintenance, in the past ten years, and the amounts per car-mile.

Table II shows the regular and "special" allowances for operating expenses and the amounts per car-mile in the past ten years.

The Accounting Profession*

By George L. Vannais
Certified Public Accountant, Hartford, Conn.

Opportunities Are Unlimited, but High Class Training Is Necessary to Make the Most of These Opportunities. Accountants Make Possible Present Business Systems

TO TREAT this subject comprehensively we must consider some definitions: First, What is accountancy? I am pleased to call it the "Science of Business Control." Let us contemplate this definition for a moment. A generation ago there were many business successes controlled by the genius of a single man or group of men. Such an organization usually had a pioneer field, and by virtue of its patents or its superior service maintained its commercial supremacy. But as time went on new inventions were made, old patents became obsolete, competition set in and the necessity arose for more accurate records which would show the cost of production and the expense of distribution. The rule of thumb gave way to the significant per cent sign. Successful business control became possible only through the use of comparison sheets.

Many trade associations were formed, and where once petty jealousies existed between men in the same lines of endeavor there came about mutual friendships and the interchange of confidences and comparisons that were to benefit not only the producer but the consumer. These comparisons could only be made when the records were uniform; standards had to be set.

You men before me and all the interests you represent are to be congratulated on the foresight of the men in the street railway business who, from the beginning, saw the necessity for uniform accounting and appreciated the benefits of standardization. If your industry, which has been so potent in the development of the industrial, educational and social life of America, fell on evil times, you have the satisfaction of knowing that the general managers of the street railway systems did not go ahead blindly.

The keeping of records is an art; the creation of them a science. Ten thousand men are busy with the art in your one line alone. A few hundred of you men are developing and perfecting the science.

This leads us to another query: What is an accountant? And I venture this definition: An accountant is one who, by natural aptitude, extensive study and wide experience, is able to analyze accounts, correlate them, reconstruct them if necessary, and then, from

*Abstract of paper presented at annual convention of the American Electric Railway Accountants' Association, Atlantic City, N. J., Oct. 13, 1920.

the written record, visualize, for himself and others, a true picture of the condition of a business.

Accountants may be divided into two great classes—the public accountant and the private accountant. The public accountant occupies an important place in business life. To show you the ideals of the profession, let me quote from an address by one of the leading men of the public accounting profession, Edward L. Suffern:

> The public accountant must be trained, not alone in the technical school but through outside observation, practice and knowledge of the affairs of the world. He must learn to observe. In order that he may know how to observe and to observe wisely, he must learn something of the economic conditions and principles which govern the making, handling and distributing of all products. He must know something about commercial law; he must know a great deal about the science of business administration; in fact, he must have a more broad and general training than is at present required in any other profession. But he must have learned something else, without which his other acquisitions are as nothing at all. He must have learned to be honest, truthful and conscientious, so that in no circumstances and for no consideration will he ever do one thing which his best developed, highest conscience cannot approve.

These are the qualifications of an educated man; these are the qualifications of a man of highest ideals; these are the qualifications of the men in the public accounting field who have won for the profession the respect and the confidence of the financial world.

The other class, the private accountant, in my opinion holds an equally important place in the economics of our times. He must have a wide knowledge of his own particular line of business. He must be well versed enough in general business to know the effect on his own particular business of all other industries. But he need not have a technical knowledge of their activities. Usually a private accountant has not made a deep study of the science of accounts. In the majority of cases he was graduated from the college of experience. His first textbook was the office broom and he learned the elements of his profession by doing the detail work. His ambition urged him on to every succeeding step in his upward progress until the day came when he was made chief accountant, and looked back over the long road he had so faithfully followed. Every man in this association who has reached this goal I have just described has found it necessary to develop himself to the highest degree of efficiency as he climbed onward and upward.

But our subject is "The Accounting Profession," and that word "profession" indicates an organization, a collective body, or, as Webster defines it: A collective body of persons engaged in a calling," and I presume, strictly speaking, private accountants would not be included in the profession of accountancy. It is sometimes thought that only those public accountants who are certified are in the profession, but this is not so, for there are many good professional accountants who have never been certified by any state. And again membership in the American Institute of Accountants has been held to be necessary for a man to be in the profession, but this cannot be, for there are also many men who are good professional accountants who are not members of the American Institute. Some of them are certified public accountants and still, for one reason or another, they are not members of the American Institute. However, I think it safe to say that the visible line which decides whether a man is in or out of the profession is found by applying the query as to whether or not the man is in public practice.

Assuming, then, for the sake of argument, that the profession is circumscribed by those in public practice, let us consider for a moment the status of the profession. Nearly every state in the Union has passed what is known as the C.P.A. law. It purports to regulate the practice of accountancy by issuing to all those who can qualify by test a certificate from state officials certifying that these men are of good moral character and are competent to serve the business of the commonwealth as public accountants.

The first C.P.A. law was passed in New York State on April 18, 1896. In 1905 the American Association of Public Accountants was formed. The membership was made up principally of the several state societies of certified public accountants. As each state had a different C.P.A. law, the membership requirements were not uniform, thus reciprocal relations were often denied. To establish the profession on a higher plane, on Sept. 19, 1916, the entire plan of national organization was changed. The name was changed to the American Institute of Accountants; state representation was abolished and individual membership substituted.

The American Institute of Accountants has today a membership of about 1,400. It meets annually in convention, four out of five years in the city of Washington. All members of the old American Association automatically became members of the new Institute when the Institute was established. Now, all admissions to the American Institute are by examinations.

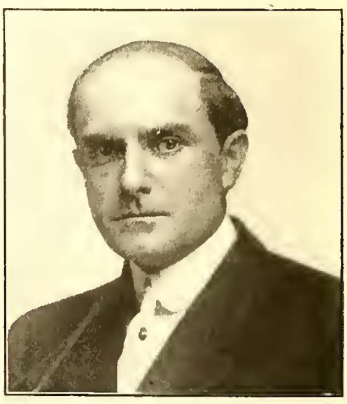
It is estimated that there are at the present time about 3,000 certified public accountants in the United States. Less than half of them, however, are in public practice, and this leads to a peculiar situation in the profession of accountancy. When a man studies law, in nearly all cases he is a lawyer all the days of his life. If he studies medicine, he seldom forsakes the profession, but if he qualifies for the profession of accountancy, and goes out into public practice, he is continually tempted to leave the public field. Everywhere he does a fine piece of work the client looks on him with envious eyes and time and again he is offered such a flattering salary that he turns his certificate to the wall and becomes an executive. Within the last ten years I personally have known many men high up in the profession who have done this very thing. A few of them are today at the heads of great industrial organizations.

This is the reason why the accountancy profession can never be overcrowded. It used to be said that a public accountant was a bookkeeper out of a job. Today I think it is universally acknowledged that the public accountant is the bookkeeper who has grown out of his job, and as proof that this is so I wish to call your attention to the fact that bookkeepers often become public accountants, but men who have been public accountants long enough to have made any kind of start never become bookkeepers again. They may become office managers and executives, but they never go back to the old ledgers.

The accountant, whether private or public, who measures up to the ideals I have outlined occupies an important place in the world's work. He is the right hand of progress; he is the counselor of the captains of industry; his financial reward is such that he can educate his children and surround his home with the comforts and many of the luxuries of life, and before him always is the opportunity for better and greater work.

Transporting Other than Passengers on Interurban Lines*

By Britton I. Budd
President Chicago, Milwaukee & North Shore Railway



BRITTON I. BUDD

An Opportunity Is Presented to a Great Many Roads at Present to Develop a Merchandise Business—Higher Rates than Those Charged by the Steam Roads Are Warranted and Will Be Paid

IF THE electric railroad can increase its usefulness to the communities it serves by the transporting of merchandise as well as passengers it will be more apt to gain and hold that good will which is so essential to success. Moreover, no road can afford to overlook any business which may increase its revenues.

The steam railroads have been so handicapped for lack of equipment that they have not been able adequately to meet the demands upon them. From every city there has arisen a cry for additional transportation facilities. One result of this demand has been the development of the motor truck as a competitor of the electric railroad for the transportation of merchandise. Although the motor truck is neither as economical nor as reliable as the electric railroad and is unpopular with the taxpayer because of the damage which heavy trucks do to public highways, still it is a serious competitor in some sections of the country. In our Northern climate the competition of the motor truck is less to be feared on account of the difficulty and expense of operating on the snowbound highways, while the interurban railroad is dependable every day in the year. Nevertheless, it is a factor which cannot be ignored.

If we admit that there is a field for such business and that the time to exploit that field is opportune the question turns upon two chief points:

1. Is the transportation of merchandise by the electric railroad on a large scale practical from an operating point of view?

2. Can the business be made profitable?

To both questions I would answer affirmatively in a general way, although conditions are not alike on all interurban railways and what might be practicable on one road might be impracticable on another.

The principal function of the interurban railroad is to furnish quick and convenient transportation for passengers. That must remain its chief function, and should a local condition obtain where the handling of merchandise will interfere seriously with the more important business of carrying passengers it would be better for the road so situated not to attempt it. But where terminal and track facilities are such that an interurban road can engage in merchandise traffic without impairing its passenger service I think it both expedient and advisable that it should do so.

To make comparison of conditions easier, I have separated into three classes interurban railroads which are engaged in handling merchandise:

1. The comparatively small road with few passenger cars and limited facilities on which merchandise and passengers must be carried on the same train.

2. The interurban road whose passenger business is of such a character that it must establish a separate operation for merchandise.

3. The electric railroad having connection with steam roads which handles standard freight cars.

Road with Combined Passenger and Express Cars

The first road named in the classification, in spite of its limited facilities, may develop a profitable business and add greatly to its usefulness to the communities it serves by carrying merchandise in an express compartment in its passenger cars. Such a business does not require additional investment in power and needs little in the way of equipment, as the bulkheads can be set at a point in the car which will give a proper balance between the number of passengers and the amount of merchandise to be carried.

The service which a road of this class is capable of giving is frequent and expeditious, and customers will gladly pay rates for it higher than those prevailing on steam roads. Of course, such a service involves an investment in terminal and local station facilities, but as these would be maintained in connection with passenger stations the business which might be developed would easily justify the comparatively small investment.

The point to be guarded against in developing a business of this kind is whether it might hurt the passenger business. The handling of merchandise would necessarily involve longer station stops, due to loading and unloading. Should this result in undue irritation of passengers it might prove unprofitable from every point of view. That is the reason that I say the subject should be carefully studied from every angle.

Operation with Special Passenger and Merchandise Cars

On the second type of interurban in the foregoing classification a considerable investment in car equipment, sidetracks and freight houses is necessary to successful operation. Usually this type of road operates through cities and towns on public streets where the use of standard freight equipment is impracticable, even if it is not prohibited by local ordinances. Freight cars arouse the hostility of the people when operated on streets, so that special express cars are essential if a successful business is to be built up.

In addition to the capital investment in equipment, stations and sidetracks, a complete and capable organization must be developed properly to handle the mer-

*Abstract of paper presented at annual meeting of American Electric Railway Association, Atlantic City, N. J., Oct. 13, 1920.

chandise business. This organization should be made up of men experienced in the handling and transportation of freight, as it is easily possible through inefficiency and inexperience to allow operating expenses to run so high as to make what should be a profitable business a financial failure. In other words, if an interurban railroad undertakes to handle merchandise as a separate branch of its business it should go into it in earnest and not look on it as a side issue. The road must go after the business, not wait for it to come.

To build up a profitable merchandise business is not such an easy matter as it may seem. To begin with, there is a natural prejudice against the electric road. That prejudice must be "sold" on the advantages offered by the interurban, and the transportation department must see to it that all claims of superiority made by traffic solicitors actually are made good by the quality of the service. If the traffic agent assures the shipper that his goods will be delivered within a specified number of hours after being received, such promises should be fulfilled to the letter. The road must make good on everything it claims it can do through its advertising and direct solicitation of business.

A most important part of the organization of which I speak is the claim department. The prompt settlement of claims will go a long way toward obtaining the good will of the shipper. On the other hand, dilatory tactics in the adjustment of claims will drive away desirable business.

The volume of traffic on the electric road is so small in comparison with that on the steam road that the superior quality of its service should be reflected not only in the quicker transportation of goods but in every detail connected with the business. The consignee should be promptly notified on the arrival of shipments. Facilities should be provided at terminals for the prompt loading and unloading of delivery trucks. That is one of the best talking points in soliciting business. To have trucks held up for hours at a terminal is an expensive arrangement for the shipper. Congestion at steam railroad terminals usually is great, and it is possible for the interurban road to relieve the shipper of this expense and gain his good will and business, even at a considerably higher rate than charged by the steam roads. The average shipper wants to get service. This service should begin when the truck carrying the merchandise appears at the receiving station and should follow that shipment until it is turned over for delivery to the consignee. It makes quite a difference in the mind of the shipper if he feels assured that his shipment will be given a personal attention which it cannot get on the steam roads where the volume of business is too great to permit of that.

Higher Rate Is Warranted

The expeditious handling of shipments means a great deal to the shipper and justifies a higher rate for the service. The interurban road as a rule can make delivery overnight, so that orders can be filled from one city instead of carrying a stock in a storehouse in another city 50 or 100 miles distant. This means less capital tied up in transit. I know of an instance where an interurban road receives a carload every night for the reason that double the quantity of goods would be tied up in transit on the steam road because of the longer time required to deliver them.

Another important part of the organization is the accounting department. The cost of handling different classes of merchandise should be analyzed in detail, for the interurban road seeking to build up a merchandise branch may adopt a policy of accepting any kind of business offered and learn later that it has made a grave mistake. There are some classes of business which an interurban railroad cannot handle with profit. It should, therefore, discriminate carefully in its selection of the business it accepts, taking only that where quick handling and superior service warrant a rate that will show a profit. In order to be able to use such discrimination the accounting methods must be up to date. The traffic department must know what it costs to handle every description of merchandise, so that it can be governed accordingly in soliciting business. Shippers are ready and willing to pay a higher rate for such service because it is worth it from a business standpoint. But to give that kind of service the road must have adequate facilities and it must give the strictest attention to every detail. It is a mistake to suppose that a service like that necessarily means such high operating expenses as to make the business unprofitable. It does, of course, mean higher operating expenses than on steam roads, but efficient methods in every department will produce the service without swallowing up the profits in operating charges.

Interchange Operation with Standard Steam Equipment

On the third road in my classification, that which has direct connection with a steam road and handles standard freight equipment, the same methods outlined for the second road largely apply. Real service appeals to the farmer just as strongly as it does to the merchant or manufacturer. That has been fully demonstrated within my own observation.

The farmer has great difficulty in getting cars and service, both in the way of delivery of farm supplies and for the shipment of farm products. If an interurban which has connection with a steam road runs close to his farm it is an easy matter to get him interested in its possibilities. Indeed, it is easy to interest a group of farmers into paying the cost of a siding which will be of service to them. I know of instances where farmers drove past a steam railroad to load their product onto standard freight cars on an interurban and pay a considerable additional price, for no other reason than that the electric line could offer them a faster service and was able to give them cars when they wanted them.

"Merchandise" versus "Freight"

It will be observed that throughout this paper I have generally used the word "merchandise" instead of "freight." The service given by the electric railroad is nothing like the freight service of the steam road. The rates on the electric road are higher than freight rates, because the quality of the service commands a higher charge. Most electric roads cannot give a freight service.

Since neither the service nor the rate is comparable with freight service on the steam road, why confuse the shipper in the use of terms? If you call your service on an interurban road a freight service, how can you convince the shipper that it is different from that given by the steam roads? How can you justify in his mind the higher rate you must charge for your

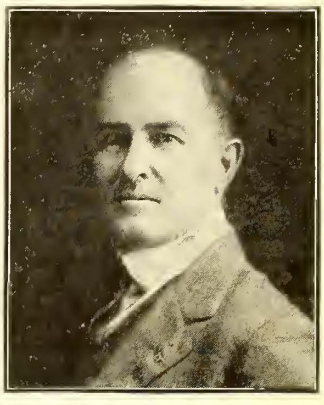
service? The business is more in the nature of an express except that it usually is faster and that it has no pick-up and delivery service. Personally, I am not in favor of a pick-up and delivery service in connection with the transporting of merchandise on an electric railroad. I think it is difficult to conduct it profitably. The railroad should confine its functions to handling merchandise delivered to its stations.

In conclusion I would say there is no question in my mind that the electric railroad should come forward and assist in solving the transportation needs of the country. If it is provided with the proper facilities and furnished a suitable organization I am satisfied that a profitable business can be developed, a business which the electric railroads need and which the shipper will appreciate.

Problems and Principles of Public Safety*

By C. M. Talbert

Director of Streets and Sewers, St. Louis, Mo., and Chairman Public Utility Section National Safety Council



C. M. TALBERT

Experience at St. Louis and Elsewhere Shows that Accidents in Public Streets Can Be Controlled by Organized and Persistent Effort of Public, Insurance Interests and Industries

APPROXIMATELY one-fourth of our population is subject to industrial hazards. Under conditions subject to quite considerable control, both of men and surroundings, practically every man, woman and child is subject to some form of public hazard on leaving the home. A classification of fatalities by a large insurance company covering a period of five years showed 51 per cent public, 14.5 per cent home and 34.5 per cent industrial. Of the non-fatal "claims" 45.1 per cent were public, 17.2 per cent home and 37.7 per cent industrial. This company in 1919 paid $450,742 for personal injuries arising from automobile accidents.

In 1907 the automobile fatalities numbered nine per million population and in 1919, 100, and the number estimated for 1920 is 110. Thus in the United States one death occurs every thirty-one minutes of the sixteen hours commonly assumed to be working hours. Fatalities are not increasing with machines in use, there being a drop from 2,756 in 1912 to 1,282 in 1919 for each million automobiles. Steam railroad fatalities decreased from 178.4 per million of population in 1907 to 105.2 in 1918; street railway fatalities from 43.7 to 28.9, and fatalities from all other vehicles from 36.3 to 27.3.

The total for all vehicular accidents increased from 245 per million in 1906 to 253.3 in 1918, although deaths from all other forms of accidents decreased from 685.3 per million in 1906 to 563.9 in 1918, a reduction of 18 per cent.

These figures are from tables prepared by F. H. Crum and may be taken as accurate. Mr. Crum states in his report:

> In those cities in which the National Safety Council, through co-operation with local safety councils, has been conducting campaigns of public safety during 1919 the percentage of increase in the automobile fatalities is shown to have been far below the average for the thirty-six cities combined, with the single exception of Pittsburgh. In St. Louis, Chicago, Rochester and Detroit intensive campaigns against all accidents, and particularly industrial and public accidents, have unquestionably already resulted in the saving of many lives.

Statistics show that but 10 per cent of the claims originate within the shops or property of the companies and that 90 per cent originate with the general public. It is safe to assume that the electric railway, in common with other business interests, is guarding the 10 per cent of industrial accidents. Its real problem is, therefore, the public hazard of 90 per cent.

Most progressive street railway companies have exerted efforts to remedy conditions and have spent considerable money and worked out campaigns for accident prevention so far as their particular interests are concerned. I do not believe the companies would claim that any great benefits had accrued to them, and we know that at least no such success has been attained as to create a following among electric railways generally. The fact is that public accident prevention cannot be made effective by individual corporations or public utilities. The situation, however, is without hope, but the methods employed are not the proper ones.

PUBLIC SAFETY IS A FERTILE FIELD FOR ENDEAVOR

Within the past ten years or less industrial safety has been thoroughly systematized and established as a business proposition. Public safety, while much more difficult to approach and while probably less tangible in results, is yet just as susceptible of control and has just as definite principles and foundations as industrial safety. The one great cardinal principle to which all others must be made subordinate is education. Force, control or direction, whether by ordinance, the courts, by police force, by signs or by other means, will not be greatly effective nor produce the desired results until the general public is educated to recognize the public hazard, its possible effect upon each individual and the means by which it can be controlled.

It is not possible to detach or isolate any particular public hazard and make any very successful attempt to better it, whether the attempt be made by steam railroads as to highway crossings, electric railways as to public highways, insurance companies as to automobile

*Address delivered before joint meeting of American Electric Railway Transportation & Traffic and Claims Associations, Atlantic City, N. J., Oct. 11, 1920.

collisions or any other of the quite numerous items of public hazard. These interests should see that a particular hazard can be reached better, if not only, through the general effort to secure the vital and powerful aid of public sentiment. Only through a pooling of the common purpose of those who from humanitarian, official or financial interests are interested in public safety can any great and permanent good be achieved.

The meaning of the accident problem to electric railways as a matter of finance is shown by Table I, which contains statistics compiled from the records of sixteen of the largest cities of the United States, widely scattered.

TABLE 1—FINANCIAL ASPECTS OF ACCIDENTS

	1914	1918
Accidents per million passengers	51	48
Accident reports	213,796	208,400
Claims disposed of	62,320	72,304
Percentage of claims to accidents	22	33
Total expenditures for claims	$7,211,968	$9,450,592
Cost per accident	$35	$45
Total cost per claim settled	$139.37	$148.37
Percentage of claim cost to gross revenue	4.5	4.9
Suits pending	13,411	20,203

The total expenditure for claims of the largest seven systems, reported for the year 1918, was $6,300,000, or 4½ per cent of the total gross revenue. The claim agent of the United Railways of St. Louis states his conclusion that 90 per cent of all the claims paid by his company result from accidents in which the public is concerned. The claims costs in two instances, namely, Buffalo and New York, approximate 10 per cent of gross revenue.

Annual Congress Safety Week Notable Success

That accident prevention does react to an aroused public sentiment was first shown conclusively during the 1918 annual convention of the National Safety Council at St. Louis. A somewhat elaborate safety campaign was planned by the local branch, the details of which included a window card for each school child receipted for by the parents, store window decorations and placards, safety slogans printed on fans and held in the hands of traffic officers while discharging their duties, slogans placed on safety zone standards, signs carried on fronts of service cars and placed on trolley poles, placards on automobile windshields, demonstration in one of the principal streets by the fire department, use of Boy Scouts to check "jay walking," etc. The records of the coronor's office for this week showed one fatal accident, as against twenty-four for the same week of the previous year and an average of ten per week for the year before.

During the 1919 convention week at Cleveland somewhat similar methods were employed. The fatalities here numbered five, as compared with fourteen in the previous year. The 1920 convention was held in Milwaukee, closing on Oct. 2. During this safety week there were no fatalities, as compared with seven during the same period in 1919.

The record at St. Louis might have been an accident and the one at Cleveland a coincidence, but that at Milwaukee must surely establish the safety week accident reduction as a habit. In these compaigns the electric railways were very active and were valuable co-ordinating influences. The business interests identified with the automobile industry also were active and efficient workers for public safety, and because of their position they were peculiarly effective in reaching drivers of cars.

As a result of the developments following the first St. Louis experience these conclusions have been reached:

1. An aroused public sentiment is the most forceful influence that can be brought to bear upon accident prevention, and from the nature and psychology of the public no corporation or business interest can do such arousing.

2. Men and women of every walk of life will give freely of time, money and influence if they can be made to feel that what they are giving will be made effective and will form part of a well-developed and consistent plan bearing promise of definite results.

3. Any plan devised must be continuous in its operation and a trained and salaried officer must be placed in charge.

4. The law-making and law-enforcing officials of every community will gladly welcome and co-operate with a public safety committee, when once convinced that it is to be helpful and not merely critical.

5. As public safety is a matter of education, the most fruitful grounds for ultimate results are the public and parochial schools, and principles of safety can just as well be made a part of the curriculum as the principles of grammar, arithmetic or any other of the usual studies.

6. Industries can be made to see that the loss to them of a trained man's time through injury is just as great whether it occurs inside or outside the walls of their plants.

The practical question which must naturally arise in mind is: "What are the details of the plans by which these results are to be accomplished?"

A Definite Program for Public Safety Promotion

Omitting the steps by which the present accepted plan is arrived at, except to say that the first plan was too meager and the second too elaborate, I could summarize the procedure as follows:

1. Form a public safety committee, affiliated with and a part of the chamber of commerce or other comparable body of the city, selecting as sponsors and guarantors for this committee the busiest and most influential men of the city. This has been done during the past two years in sixteen cities, including St. Louis, Cleveland, Rochester, Kansas City, Pittsburgh, Grand Rapids, Milwaukee and Cincinnati.

2. Collect a fund to guarantee expenses until such time as a permanent scheme of financing can be put into operation.

3. Form committees as follows and whose duties will be as indicated by the titles: (a) A police committee, with the chief of police as chairman, (b) a school committee, with the superintendent of schools as chairman, (c) a publicity and bulletin committee, (d) a women's club committee, (e) a Boy Scout committee, (f) a church committee, (g) a motion-picture committee, (h) an automobile legislation and traffic committee and (i) a law-enforcement committee.

The number and character of the members of these should, of course, be given the most careful consideration, with due consideration of the amount of active work that can reasonably be expected from each man as well as the influence to be wielded by him as a leader in the community. It is in the membership and work of these committees that the very great contribution

(aside from financial) can be made by the electric railways. Some of the most valuable men in most of the cities have been the claim agents of the electric railway companies. They, by reason of their long study of conditions, are peculiarly fitted at once to enter into active work. The importance of this fact, and the advantages of the cars and trolley poles as an advertising possibility can hardly be overestimated. The claim agent in St. Louis is, as I can testify, ranked as one of the most valuable of the leaders.

St. Louis Has in Operation a Successful Plan for Safety Education

In the public schools of St. Louis there has been worked out by a St. Louis man within the last two years a system of safety education which has been formulated in a textbook. This has been indorsed by the National Educational Association and the National Safety Council and is coming into considerable use. It is based upon the use of the subject of safety to illustrate, for instance, problems in arithmetic, studies in English, etc., and is co-ordinated with the formation of safety committees of the school children. Among the duties of these committees are the following: To assist the traffic officer in the vicinity of the school and take his place if absent; to watch the younger children at stairs; to watch danger points in corridors; to place, care for and remove "Slow—Drive with Care" signs in the streets at schools, and to do a number of other things of this kind. The plan can be seen in active operation on any school day in schools in St. Louis and a number of other cities. Dr. Payne, the author of the textbook mentioned, has condensed his observations on school children and street cars as follows:

I. This is a big problem because children are not directly under the supervision of parents or teachers when they are on the streets. Moreover, the streets in the school district cannot be policed in such a way that would protect children from the innumerable street dangers and especially danger from street cars.

II. Children have a special fondness for stealing rides on street cars and seek every opportunity to take unusual chances in connection with them.

III. Since these hazards are always present, and it is impossible to exercise direct control by parents, teachers or policemen, controls must be developed within the children themselves that will lead to the elimination of the hazards.

IV. Therefore, the problem of education in safety against the dangers of the street railways is simply the development of controls in the children that will secure the proper results.

(a) These controls are fundamentally a matter of habit, and the habit of care with reference to street cars is merely a part of a group of habits that affect the control of the children on the streets generally. That is, the places and methods of crossing and remaining away from the street cars in motion. The method of developing these habits is to utilize older school children to station at street crossings to direct the children traffic. The direction of the children across the street will not in itself insure correct habits, but it is necessary to develop in the school itself public opinion on the question of care with reference to street cars and other street dangers. This is done by the study of newspapers, newspaper reports of accidents and numerous other sources of accident satistics in the regular class work.

(b) Not only must habits be developed but there must be intelligence or knowledge of accidents that will take care of children in unusual situations and also give a comprehension of the whole problem of their relation to a public utility. This is done through direct instruction in everything that relates to street control and the relation of children to it.

V. The result of this instruction which has been carried on throughout the city this year is one death in street railway accident to a child of school age in St. Louis in the first eight months of the year as opposed to an average of six covering a number of years and an increasing number from year to year.

An electric railway could do no better service to a community nor to itself than to furnish this book to the schools in its locality and see that it has at least a fair trial and chance for adoption.

Some Other Things That Can Be Done

Among other helpful agencies, a properly formed vigilance committee, to report to the proper authorities traffic violations but not to make arrests, is proving a valuable aid in several cities. Chauffeurs' schools, as conducted by local councils and by some of the truck manufacturers, are showing unexpected attendance and are demonstrating that the men who drive for hire, and particularly those who drive commercial vehicles, are as a class far more interested in driving safely and carefully, or at least in making a study of safe driving, than are those who own cars and drive them merely incidentally. The good truck driver who is sure of his ground is himself a valuable traffic officer. The council has worked out a series of twelve lessons, of which more than 60,000 sets have actually been sold before publication.

The placing of bulletin boards in garages and at gasoline stations, changed often enough to keep them clean and presentable; the painting of white lines on the street, establishing of safety zones, placing of traffic lamps and caution signals, are all part of the safety movement, which do not call for any special comment at this time.

One of the most effective measures yet devised was the formation of a "Safe Drivers' Club" in Milwaukee in connection with the recent convention there. Although no organized efforts toward public safety had ever been attempted in that city, the officers of the council, in co-operation with the Association of Commerce and the public utilities of the city, had, within sixty days of its inception, enrolled between 10,000 and 12,000 members at a fee of $1 each, thus combining the value of the personal interest of that number of individuals with a very substantial financial foundation for further work. The details of the methods used are being formulated and will shortly be available for other communities. St. Louis expects to form such a club with at least 25,000 members.

Every city should have a strictly enforced ordinance calling for registration and examination of every individual who operates an automobile and providing for the suspension or revocation of the driver's license for cause.

A Final Word

It is, of course, the desire and the duty of every official of an electric railway to serve the interest by which he is employed and in the furtherance of that duty to use his best endeavor to make the financial accident burden bear as lightly as possible upon the balance sheet, but one who has entered upon a study of the prevention of maiming or death by accident cannot go far without realizing that there are much greater obligations and rewards than those indicated by figures preceded by a dollar mark. It has long been said that "a corporation has no soul." Let not the same be said of those who are given authority in these public service corporations and who may, by a proper exercise of that authority, help to make the highways of our cities safer for our people.

Purpose and Organization of the Super-Power Survey

By W. S. Murray
Chairman Super-Power Survey, United States Geological Survey

W. S. MURRAY

Studies Which Will Lay the Foundation for Allocation of Wastes in Power Production and for the Elimination of These Wastes Will Constitute the Survey

ANY man who knows that the steam freight locomotives of today waste three out of every five tons of coal that they burn and at the same time knows that there are means available to eliminate this disastrous waste of the nation's natural resources cannot keep silence. If that same man knew that a similar waste of fuel was going on throughout the factories of this land, and that this in turn could be corrected, for him silence would indeed be consuming.

These are a part of the conditions that exist. Now, what do they represent in cost to the nation? At the lowest estimate they cost $300,000,000 per annum, which figure will be doubled in four years if the rate of our industrial expansion continues on the order of past progress. But, alas, these very wastes, this improper form of power production and distribution, if continued, will throttle our expansion, and in lieu of progress we shall continue to wallow in our wastes.

The two giant arms that support industrial expansion are power and transportation. The present inhibition of their development is the common knowledge of the nation. When a ton of freight moves but five miles a day and this keeps up for a solid month; when a public utility central station system must refuse an offered load of 100,000 kw., crying "No capacity"; when—but why go on? Were the situation not so paralyzingly serious it would be ridiculous. We are nothing less than nationally negligent to acknowledge such a situation and not act upon it, and with all the world's progress in our hands if we are but moved to action. It would be to betray a trust of national sincerity not to speak thus frankly. I do not fear, but rather detest, the man who says, "Oh, everything is all right; this last year has been the biggest year of my life. I have made more money than I ever made before." That is a man not to be feared, but he is the man to be reached, and the sooner we segregate all of his type the sooner we shall allocate our distressing wastes.

I have been propelled to a conclusion which, if the judgment of engineering is taken seriously, should bring progressive alarm in what is at present a negative and false progress. I hope that within the specific confines of the training of my associates on the super-power survey and myself we may point a way in our report looking toward a power policy which will "kill" the inhibition now controlling the two great adjuncts of our national industrial progress—power and transportation.

Power is the father of all accomplishment; moral, intellectual and physical. High load factor is the measure of successful operation in every business. Its importance of application can find no greater field than in the generation and distribution of power. Good business is entirely dependent upon good agencies. Electricity is the most economic and is the true agent of power. Steam increased the power of man a hundredfold; electricity repeated this multiplication.

Load factor is the ratio of average to maximum load. Conditions exist where load factor may be 100 per cent. The average load factor of the steam locomotive is less than 10 per cent. Even the average load factor of our central stations is less than 35 per cent. The average load factor in the great zone of the super-power survey is 15 per cent. Such a figure comprehends the present operation of the railroads and industries of the super-power zone.

This brings us to the specific problem of the super-power system. What does it portend? In a territory, approximately speaking, between Boston and Washington, averaging 150 miles inland from the coast and comprising withal some 60,000 square miles, such a territory representing 2 per cent of the land area of the United States, there is a demand in machine capacity for 17,000,000 hp., divided 10,000,000 hp. for the industries and 7,000,000 hp. for the railroads.

Through the application of a plan outlined below, the load factor can be lifted from its present value of 15 per cent to 50 per cent. Capacity can be conserved threefold; that is, one horsepower can be made to do the work of three and one pound of coal of two.

AN ANALOGY FROM THE MINING FIELD

Some years ago in the great mining district of Logan County, West Virginia, there was installed in scattered plants some 4,000-hp. capacity in boilers, the steam from which supplied the power mains of the mines. Today the power from a 500-hp. boiler, converted into electricity, takes its place. Here is a conservation of capacity in the ratio of eight to one; a very large conservation made possible by the great diversity factor existing in the mining industry. The example serves, however, as an excellent illustration of what may be done in the great territory now under consideration.

As in Logan County, where the mines now receive their power from one common bus, so in the super-power territory it is proposed to deliver power to a great transmission and distribution system fed by high-power, high-economy, steam-generating stations erected at points on tidewater and at mouths of mines where condensing water and coal storage are available. Added to such a supply of power will be that obtained from the

great rivers of this territory, the Delaware, the Susquehanna and the Potomac. Reaching into this area of 60,000 square miles may come the great water powers of the St. Lawrence, which will supply the New England districts of the zone. Every kilowatt-hour of energy so supplied will conserve in nature's storehouse two pounds of coal which would have been required to replace it. Threading through the super-power zone will be a trunk transmission system which will be common to all of these great sources of power, in which will be included also the great central stations of the character now built at Boston, Providence, New York, Newark, Philadelphia, Baltimore and Washington.

Approximately speaking, there will be some 2,700,000 kw. of new capacity to be added to that of the great stations just named and their function will be to furnish the base load in this great power reservoir for joint use by the railroads and industries. This, it is believed, can be done at an expenditure of from 1 to 1½ lb. of coal per horsepower-hour; the peak loads being furnished from the present stations.

Contrast this with steam locomotives now using 7 lb. of coal per horsepower-hour, and again with the factory use of coal at even a greater rate. With these figures before us it is but a simple calculation in arithmetic to show that a saving of 30,000,000 tons of coal per annum is a conservative estimate for this zone now using 25,000,000,000 kw.-hr. a year and with the demand for power doubling itself every four years.

From information already secured, it appears that the average capacity of a central station in this zone is on the order of 3,000 kw. How can such a station compete in the economic production of power with one one hundred times as large. It is quite possible that the super-power system will justify the installation of 300,000 kw. or more in a single station.

Density of Traffic the Dominating Element in Electrification

The conservation of 30,000,000 tons of coal means a direct saving of $150,000,000 per annum, and there may be added to that figure $150,000,000 more due to the lesser cost of maintenance of electrical as compared with steam machinery. In the latter figure are also included certain savings effected through the reduction of train-miles by virtue of the higher speeds and the higher tractive efforts obtainable in the electric locomotives.

But not all of the steam railroads in this territory are to be converted for electrical operation. Only those where the density of traffic justifies will be electrified. Density of traffic is the prime and true factor in the determination as between the economics of railway operation by electricity or by steam. In the matter of electrification the three great economic components of density lie in the saving of fuel, motive-power repairs and train-miles, these with reference to open-track operation. While the economic considerations are most important in the matter of yard and terminal electrification, here the physical conditions in their relation to outside trackage may be controlling.

A point of paramount importance in this connection is that the present rights of electric public utilities, their entities and their franchises, are sacred. These and their vested interests must be respected. The super-power system is not suggested as competitive with existing power agencies. It is suggested that they carry on in larger degree and to higher economies the work so ably started and now being carried on. They have made possible the super-power system. I have been called the "father of the super-power system" because I visualized the zone of such an application between Boston and Washington. Dr. George Otis Smith, director of the United States Geological Survey, has well said "that no particular man could be considered the creator of the super-power system idea; that it has come as a matter of gradual evolution." I agree with Doctor Smith, but I would go further and say that the electric public utilities are the true parents of such a system.

Let us think for a moment what the saving of 30,000,000 tons of coal a year means. As a miner will do well to average a thousand tons a year, 30,000 miners become available either for other work or continued mining productivity if 30,000,000 tons can be saved. Coal is fighting with the finished and unfinished products in the yards, sidings and on the main lines of the railroads, and it occupies 40 per cent of the total cargo space now used. I shall not attempt to follow this 30,000,000 tons of coal back to the mine from tidewater, but every ton of it will probably average 200 miles in transportation. Think of the release of cars for other service, the saving of coal now burned to haul coal, and the rendering available of train crews for productive rather than wasteful effort.

Water Power a Small but Important Factor in the Super-Power Zone

Let us now for the moment drop coal power and think of water power. Large as are the rivers in the super-power zone, their contribution to the power requirement will be less than 15 per cent of the total. Small as this may seem, yet so great is the value of this water power in its contribution to conservation that every respect must be accorded the power to be obtained from such a source. However, the necessity of addressing ourselves to the problem of producing power with coal at the highest efficiency is the urgent matter, for in four years the proportion of water power to steam will sink to 7½ per cent of the total.

Today we build a plant and a quarter for every one we require, because we place in that plant spare capacity to guard against breakdown. While we are building these little plants, which uncompromising experience has taught us are inadequate to our industrial expansion, we pay twice as much per kilowatt of capacity as would be required in the large super-power stations, which can be built with capacity which not only cares for the present but for the future also.

Recently, Philip Torchio, electric engineer, New York Edison Company, cited a dilemma in which this great company found itself when an unusually black thunderstorm enveloped New York City. So much darkness was substituted for light that with the switching on of the load the great plants of this system were taxed beyond their immediate operating capacity. The steam pressure in the boilers fell to a dangerous limit and the situation was only partially saved by the switching on of some available storage battery capacity. This peak, in midsummer, was greater than any peak during the winter months. Had the New York Edison Company been a part of a super-power system it would have been possible to have supplied not only the 60,000 kw. required but probably twice that amount within five minutes. The power might well have come from Niagara Falls or the St. Lawrence River, to say nothing

of the possibility of it coming from one of our own rivers in the immediate vicinity, such as the Delaware or the Susquehanna. Or still again it might have been supplied from one or two steam turbo-generators located in a super-power station either at tidewater or at the mouth of a mine.

"Facility" a Characteristic of Electric Power

Electricity has long been known as an agent of the highest efficiency in the matter of transmission and distribution of power. We are coming now, however, to a fuller recognition of its efficiency as an agent of facility. Because of the possession of these two elements, electricity is an effective weapon with which to vitalize the fibers of our power and transportation resources. The slogan of this country's future progress is "Produce!" and then "Produce More!" Let us facilitate manufacture and speed up the production of our factories by speeding up the railroads that transport their finished and unfinished products. All the elements of a steam locomotive are conducive to delay. The electric engine has 6,000 out of the 8,760 hours a year available for revenue work; the steam engine but 2,500. The capacity of the electric engine is maximum when we need it the most—in winter. The steam engine during this crucial period offers its minimum capacity for service and is never dependent upon the human arm; the arm behind the electric engine is machine-made.

In a trip throughout the super-power zone to meet the executives of various railways, public utility companies and industrial chiefs, while expecting a sympathetic point of view on their part, I have been amazed at the alacrity of their offers of assistance, backed up by the flood of information pouring in as the result of questionnaires addressed to them. This leads me to describe the organization by means of which we are securing the information necessary to our report.

As to the Survey Itself

The objects of the super-power survey are two: (1) The allocation and valuation of the waste incident to the present improper forms of power production and distribution and (2) the recommendation of a regional plan by means of which this waste can be eliminated. Through President E. G. Buckland of the New Haven Railroad, who has ever had New England's interests at heart, I met Secretary Lane and laid before him the plan of the Boston-Washington super-power system. The plan was indorsed by the Secretary and Dr. George Otis Smith, under whose department, the United States Geological Survey, the power survey is now being conducted. Then followed presentation to Congress, action being delayed on the bill due to President Wilson's absence from the country. On presentation, however, to the Sixty-sixth Congress, Judge Payne, who indorsed the plan, having then become Secretary of the Interior, it passed both the House and the Senate, was approved by the President, and it now forms a part of the sundry civil bill for 1921.

I take this opportunity to express appreciation of the broad-minded policy of Doctor Smith, to whom I report as chairman of the super-power survey. To Director Smith I outlined the engineering policy which I believed should be followed in the conduct of the survey. First I believed that it should be divided into two principal parts; the first consisting of an engineering staff, the second of an advisory board. The engineering staff was to comprise three departments of investigation, one for power and transmission, one for railways and one for industries. Working with these three departments I suggested an engineer-secretary, to co-ordinate and prepare the field data collected by the departmental organizations for the report text. The advisory board was to consist of men representative in the fields of power production and power utilization, who were looking toward the establishment of a national power policy. Doctor Smith approved and accorded to me the duty and privilege of appointing, for confirmation by the Secretary, the members of the engineering staff and the advisory board. The work of these bodies will be better known after the report has been completed and made public.

On our advisory board appear such names as Breckenridge of Yale, Buckland of the New Haven, Hardin of the New York Central, Alexander, executive director National Industrial Conference Board; Edgar of the Boston Edison, Sloan of the Brooklyn Edison, Pardee of the American Electric Railway Association, Little, America's foremost chemist and the author of "Rehabilitating the Estate"; McGraw, the head of technical publicity in this country, and last, but only because he joined last, Herbert Hoover, representing mines.

Throughout the trip from Boston to Washington it seemed as if every man wanted to impress upon me that what we needed most was a sufficiency and a reliability of power. The cry for power seemed to pervade the atmosphere, and when that was not mentioned, coal, or rather the lack of it, took its place. Every one seemed to say, "When the foundation is laid for the super-power system, see to it that you know where your coal is coming from, and how you are going to get it," and "See to it that your power-plant capacity is sufficient not only to take care of this immediate present but the future as well."

The Mining End of the Problem

This leads me to the great mining problem, so intimately related to the super-power system in securing continuity of power. None of the super-power stations should, I think, be erected within the confines of large cities. Around them should be placed ring buses from which power may be drawn, and the new super-power stations should be built far outside the limits of such cities. A prerequisite of as much importance as securing water is that of securing ground for coal storage. Such storage will amount to millions of tons and will be a regulating feature paramount to a continuity of power production, while answering also the fluctuating labor conditions at the mine.

The great coal roads to the mines must be "revamped," and these will offer opportunity for electrification, even outside the immediate limits of the electrification zone, to permit the speeding up of that important traffic. It is patent that if, by the means described, we can make one ton of coal do the work of two, the effect will be simply to accelerate the expansion of our industrialism. Thus these same coal roads will be required to handle more, rather than less, coal.

We are looking toward the establishment of power continuity, among other things, through the selection of a coastal point where three co-ordinated plants may be erected; one a coaling station where the coal can be received in bulk from the mines and loaded into barges for transport by sea to the super-power stations erected at tidewater; another a power station generating its

quota of energy for the super-power system, and a third, a byproduct plant which will extract the gas, ammonium sulphate, benzol, tar and coke. The coke will be used for metallurgical or power purposes as conditions may dictate.

The growth of the power demand in this country is not in proportion to the growth of population, but at a rate much higher. During the last ten years the horsepower per wage earner has increased 25 per cent. The wages of labor in this country have risen far above those of other countries, and therefore it is to machine-made power and not to man-made power that we must look in order that American industry may fairly meet the competition of the rest of the world.

The northeast seaboard, of which the super-power zone forms the most important part, is the finishing shop of American industry. Into it flow the country's raw materials, and when the highly skilled and highly paid American labor has turned them into finished products our new merchant marine, with its building record of 6,000,000 tons in a single year, stands ready to secure our supremacy in world trade.

In conclusion, I desire to outline a few salients which stand out in the consideration of the establishment of a national policy. These are:

1. Power is the father of all accomplishment, moral, intellectual and physical.

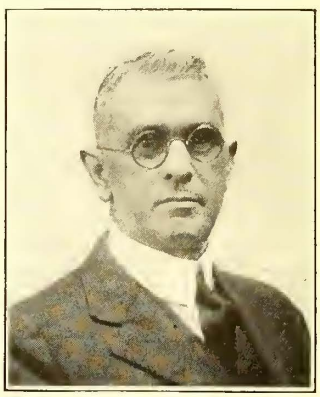
2. Power in the form of coal is maximum in bulk and minimum in efficiency; in the form of electricity it is minimum in bulk and maximum in efficiency.

3. We have spent billions to develop the natural resources of the United States and render them available. Can we now afford to throttle the burst of industrial expansion which is upon us, not only for ourselves but for the world, by refusing to recognize the necessity of stimulating the two giant arms which are supporting it —power and transportation?

4. We have spent billions in destruction for preservation; now let us spend billions in construction for conservation!

Stores Accounting as a Means to Stock Regulation*

By R. A. Weston
Certified Public Accountant
Formerly General Storekeeper N. Y., N. H. & H. R. R.



R. A. WESTON

By Means of Careful Attention to Store Accounting Necessary Stock to Keep in Store May Be Kept to a Minimum—Possible Savings for All Electric Railways Estimated to Be as Much as $7,500,000 to $15,000,000 Annually

BY THE term "Stores accounting as a means to stock regulation," I mean a regulation of the amount of stock to be carried, so that, on the one hand, there will be a minimum delay, or expense due to delay, by not having material on hand when it is wanted for use in repair work, and, on the other hand, there will be a minimum amount of the company's cash capital tied up in the inventory, thus enabling such capital to be put to other uses.

Not only is it disadvantageous to tie up the funds so that they cannot be used, but it is a matter of serious expense to carry surplus material in stock. It may at first be thought that the expense is only the amount of the interest on the capital invested. This is far from all. There is in addition the cost of handling the material when received, and at inventory times, and when rearranging and straightening out the storehouses; there is the loss of the use of the storage space occupied by the material; there are taxes and insurance; there is more wastefulness occasioned on account of having an abundance of material, and a disinclination to make use of serviceable second-hand materials; there is the cost of unnecessary transportation over longer or shorter distances, and finally, and perhaps more important, there are the losses due to deterioration and obsolescence. All this expense has been variously estimated as amounting to from 15 per cent to 30 per cent per annum, depending upon the value of the material.

The storekeeping problems of a railway company are quite different from and much more difficult than those of a manufacturing industry. In the latter case the management determines what the production is to be. The production engineer prepares plans and bills of material and the definite quantities are ordered that are known to be needed and must be used in the manufacture. Within a reasonable time after it is received the material is all used.

With a railway it is quite a different matter. Omitting the consideration of new construction work, the problem is one of repairs and upkeep, and it is not possible to determine definitely and exactly in advance just what repairs are going to be necessary, or just when it is going to be necessary to perform them. These things depend upon the quality of the materials that have been used in the construction and the skill with which the work has been done, the action of the elements, unforeseen accidents and emergencies and the policy, or the ability, of the company with respect to the state of repair in which it keeps its property, or allows it to depreciate. A stitch in time saves nine, but sometimes it is not possible to take the stitch in time and then the nine stitches become necessary.

Experience has proved that in the long run the law of

*Abstract of paper presented at annual convention of American Electric Railway Accountants' Association, Atlantic City, N. J., Oct. 12, 1920.

averages is the best guide to go by in maintaining a stock of material for repairs and renewals; the average of past consumptions when similar conditions have obtained. Such a record, to serve as a basis for ordering, is immeasurably better than the estimates that will be made by shop, track or line foremen of the quantities that are going to be required, in a given period, for ordinary maintenance work. Of course such records need to be supplemented by special knowledge, or special orders relating to character of work laid out to be done, and the tendency of equipment to become obsolete and to be superseded by improved designs must always be borne in mind and considered in determining quantities; but with all such reasonable limitations, past consumption is the best guide to follow.

How Can Accounting Regulate Stock?

This being the case, how shall we shape our accounting tools so that they will afford the guide to assist us in properly regulating our stock? If we can make our records show us in a practical way what the periodical consumption of material is, that will guide us in the quantities to order and maintain in stock.

To take a concrete example. Let us suppose that our record shows that we use on an average 200 trolley wheels per month, and that this consumption has varied between a minimum of 160 and a maximum of 240. Let us further assume that it takes thirty days after placing an order for trolley wheels before they are delivered.

If we regulated our stock so that, in each month, we had available for use 240 or slightly in excess, we then would consider that we were protecting the service with a minimum of stock on hand. If we had an average of 240 available for use each month and an average consumption of 200 per month our per cent of disbursements would be 200 ÷ 240, or 83⅓ per cent. Our stock on hand at times would tend to approach 40, which would be only a six-day supply. If we had to divide our stock and distribute it in several places, and if deliveries were somewhat erratic, we would be working on too low a margin. The storekeeper would be more likely to feel that his average stock balance throughout the month should not fall below a month's consumption, or 200. Working on that basis, he would be always maintaining a stock of 200 and receiving and issuing 200 besides. This would mean that he had available 400 in the month and used 200, and his rate of disbursement would be 200 ÷ 400, or 50 per cent.

With other stock items the case will be different. Let us take the case of a set of armature coils for a large generator in a main power station. A set of such coils is held in stock to guard against an interruption to the service. It may be months before such an item is used. It may even never be used, but must be carried as an insurance against interruption. Here we have an instance where the percent of disbursements will be zero.

With regard to practically every item of material carried in stock, the storekeeper will find that experience will enable him to determine a minimum stock that can be carried with safety. This will vary with different kinds of material, market conditions, time required for delivery, effect of the seasons on consumption, etc. The point I want to make is that experience and good records will show, within quite close limits, the goal to work for or the size of a properly regulated stock.

It is impracticable, however, for a general officer to attempt to govern the regulation of the stock, through lists of all the stock items, and the quantities available and consumed, as per our illustration. There are too many items; the list would be too long; time would not permit. The same relationship can be shown just as well by considering the money value. This gives us a common unit for all items of material, and enables us to group items into classes, and reduce to dollars and cents the aggregate, for the class, in material available, and in material used.

Therefore we may say that the first step in the regulation of stock should be a classification of the materials carried and used. If we can make this classification a standard classification that can apply to railways in general, we will have accomplished a further step of great importance, because we then afford a means of comparison between roads. We can

MATERIAL STOCK REPORT, ALL STORES, DECEMBER, 1915

On Hand First of Month	—Purchased— Vouchers	Freight Charges	—Transferred— From Other Classes	From Other Stores	Received by Credit	Total Available for Use	Classes of Material	—Transferred— Used	To Other Classes	To Other Stores	Sold	Total Disbursed	On Hand Last of Month	Percent Disbursed to Total Available	Working Stock
220,597	269	3	5,881	6,901	1,381	235,032	1-A Frogs, switches, crossings and parts	9,736	1,993	6,336	97	18,162	216,870	4.4	.....
192,275	38,293	738	1,426	8,099	292	241,123	4 Lumber and piling for bridges, buildings, fencing, etc.	33,920	1,645	6,404	335	42,304	198,819	14.8	.....
							Total, Maintenance of Way and Structures								
101,762	12,673	146	4,073	6,252	55	124,961	11 Bolts, nuts, washers, etc.	11,760	1,424	6,480	157	19,821	105,140	10.4	12,372
68,686	22,224	5	5,317	5,695	574	102,501	21 Brass castings and journal bearings	28,226	3,427	5,667	103	37,423	65,078	31 0	8,663
							Total, Maintenance of Equipment								
51,492	12,264	59	3,157	8,163	118	75,253	36 Locomotive, train and station supplies	15,338	217	8,145	143	23,843	51,410	24.2	1,021
							Total, Conducting Transportation								
56,175	274	82	....	11,769	50,229	118,529	50 Scrap—Except rail	1,060	842	11,904	59,778	73,584	44,945	57.0	.....
3,397,512	342,903	7,308	132,624	152,524	153,499	4,186,370	Grand total	451,121	132,625	152,523	85,696	821,970	3,364,400	13.8	90,671

FIG. 1. MATERIAL STATEMENT. FIFTY-EIGHT CLASSES OF MATERIAL ARE PROVIDED ON THIS BLANK. TYPICAL CLASSES AND TYPICAL FIGURES ARE GIVEN IN THIS EXAMPLE

compare our performance with that of our neighbor, and profit by his experience and attainments. Now a classification of material was recommended for steam roads by the Railway Storekeepers' Association, at its convention in St. Louis in 1910. This was later incorporated in the "Rules for Railroad Store Department Operation," by the Director General of Railroads, under federal control. With one or two unimportant additions, this classification can be equally as well used by the electric roads. Under it, all materials will be included in about fifty-eight groups or classes. The names of these classes are shown upon the material statement, which illustrates this paper and to which I now refer. It will be noted that on the statement the

The information contained in this report permits an intelligent judgment to be formed, in considerable detail, as to the efficiency with which each store is being managed, and, by a consolidation of all reports into one report, a judgment as to the department as a whole. It is a report that needs to be studied by the storekeeper, the general storekeeper and the executive who has jurisdiction over the department.

On the form that I have used for illustration, some figures have been placed that are illustrative of actual operating conditions. It is interesting to note how the percentage figures vary, in the different classes. As previously stated, for a particular store, or for a particular road, it should be possible to determine, fairly

AMOUNT OF MATERIAL RECEIVED, PERCENTAGE DISBURSED AND COST PER $1,000 FOR HANDLING
MONTH OF JUNE, 1915 AND 1916

Storehouses	Year	Amount on Hand First of Month	Amount Received During Month	Total Debits	Material Disbursed During Month	Balance on Hand Close of Month	Percentage of Stock Disbursed	Day's Supply on Hand
"A" Storehouse	*1915*	*718,285*	*163,927*	*882,212*	*163,864*	*718,348*	*19*	*128*
	1916	1,231,481	348,968	1,580,449	244,914	1,335,535	15	170
"B" Storehouse	*1915*	*280,237*	*78,743*	*358,980*	*80,181*	*278,799*	*22*	*106*
	1916	380,729	94,571	475,300	85,827	389,473	18	137
"C" Storehouse	*1915*	*366,751*	*41,180*	*407,931*	*46,921*	*361,010*	*12*	*220*
	1916	373,739	164,425	538,164	136.783	401,381	25	90
"E" Storehouse	*1915*	*58,458*	*41,741*	*100,200*	*37,869*	*62,331*	*38*	*49*
	1916	68,468	37,914	106,382	32,548	73,834	31	67
"F" Storehouse	*1915*	*162,363*	*72,893*	*235,256*	*74,440*	*160,816*	*32*	*64*
	1916	174,974	127,774	302,748	111,423	191,325	37	51
System totals	*1915*	*3,397,502*				*3,364,417*		
	1916	4,165,358				4,381,192		

FIG. 2—CONSOLIDATED REPORT FROM ALL STORES

classes are grouped according to the I. C. C. general accounts. This frequently enables very interesting statistics to be presented to the operating department officials.

Each store of the system will have a material classification ledger, in which will be kept an account with each class of material. The class will be charged with the inventory and with the receipts and will be credited with the materials issued and used. These accounts will be controlled by the one account of "General Stores" in the general ledger. When the accounts are closed each month a statement will be drawn off the ledger on the statement form to which I have referred.

It will be noted that this form shows certain information each month about each class of material. The left side of the form shows what is started out with, and then what is received, showing also the source from which it is received. These are totaled to show all the material that was available for use. The right side of the form shows the disbursements and how the materials are disbursed and what is left at the close. Column 14 is very important, being an index figure for each class, to show the percentage of disbursements to the total material available. Column 15 shows the value of working stocks or fixed repair stocks that are carried at small points, too small at which to keep a storekeeper and maintain a detailed accounting. Column 16 shows the value of special materials included in the stock for new construction and authorization work. These amounts are oftentimes large and important and are usually beyond the control of the storekeeper. The construction work may be delayed, or deferred, so that the material really constitutes so much inactive and dead stock, and it is desirable that it be possible to segregate it in the statements so that they will not be distorted and misleading.

closely, what the per cent of disbursements should be, or, in other words, how large a stock should be carried of a certain character based upon the amount of material being consumed. This gives a criterion by which to judge a storekeeper's ability. By making comparisons between stores, by making allowances for different conditions, by gradually bringing each store up to the mark of the one that makes the best showing, by establishing a mark at which to aim—all these things bring about a rise in the standard of operation, and a gradual approach to the maximum percentage, compatible with satisfactory service, and when this is accomplished we have obtained good regulation.

A good supply agent will aim to keep most of his surplus material at his main supply point and not permit its accumulation to any extent at division and small stores. He will also keep his dead, inactive and obsolete stock at his general store. Carrying out this policy, the stock at the other points should be fairly active in its turnover. Bearing this in mind, the material statement can be studied. No final conclusion can very well be drawn from a report for a single month, as a number of things might occur to make a report abnormal and misleading. It is from the average figures over a period of months that reliable conclusions can be drawn.

The supply agent can, after some experience, judge what each store's turnover ought to be for each class of material, and as a whole. Some classes of material should be turned over in thirty days, some in forty-five, sixty or ninety days. If the average does not show that this is being done, he can generally conclude that the investment at that particular store is higher than it should be and take the necessary steps to transfer some of the stock to the general store, thus making it more available for use on other divisions and reducing

the investment on one division. This may save the purchase of some new materials and reduce the investment on the road as a whole.

The supply agent cannot, of course, tell from the statement the kinds and sizes of material that is surplus, but it tells him where to look, and he can then have examined the detail stock books, stock cards or stock sheets at the store for more detailed information.

The next step in the study, after that of the operation of each individual store, will be a study of the stock on the road as a whole. This study is made from a consolidated report from all stores made on the same form. In studying this report the effect of the transfers is eliminated. That is, material transferred is not material consumed, but remains available for use. The amount of the materials transferred may, in some degree, measure inefficiency, poor storekeeping and faulty distribution. Eliminating the transfers on the consolidated statement, the ratio which the material

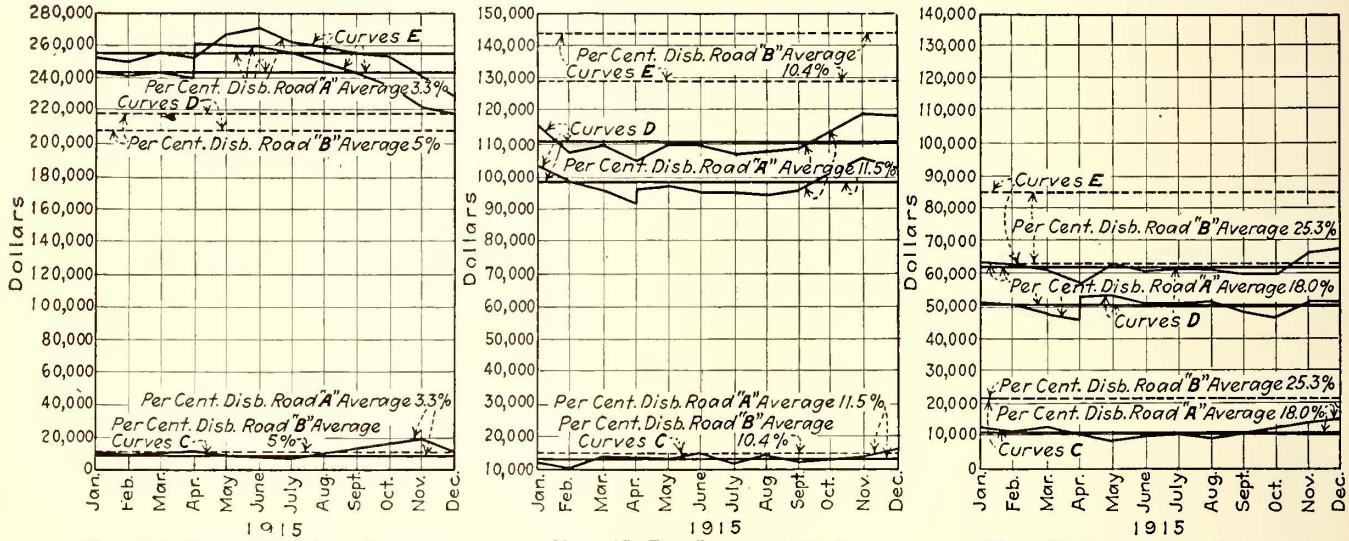


FIG. 3—SPECIMEN CHARTS, SHOWING DISBURSEMENT RATES AS COMPARED WITH STOCK ON HAND. VALUES ARE FOR TYPICAL STEAM RAILROAD ITEMS

Lower Line—Monthly Consumption. Middle Line—Monthly Stock Balance. Top Line—Monthly Material Available. Straight Lines Represent Yearly Averages.

used and sold bears to the total available is the figure that tells the story.

Here again after a certain amount of experience it is feasible to determine what a minimum stock should be to fill the needs, give a reasonable service and hold down the investment in supplies. This minimum is the thing for which to work, holding it available for the very most elastic distribution and not permitting it to remain where it is not needed. It is of course absolutely essential that all material shall remain in stock account until used, and that there shall not be stocks of material that have been shipped to different parts of the road, and charged out, when shipped. This is not only bad accounting, although frequently done, but is fatal to control of stock.

These reports can be made to tell their story much more quickly and interestingly by means of pictures or graphic charts. Three lines on the chart, one showing total material available, one showing consumption and one showing stock balance on hand, will be found to be most satisfactory. These charts can be made for each storehouse and for the entire system, considering all the material as a whole, and also made for each class of material, for each store, and for the system as a whole. Such pictures as these catch the eye quickly, and carry to the brain the salient points, that are lost and confused in a maze of figures. They show how conditions are tending, and permit prompt action to be taken, to prevent undesirable results.

While it is a good thing to have our reports show us what has happened when our stock has got somewhat out of control, so that we can curb it, it is a better thing if we can be told beforehand that such a thing will happen, so that we can stop it. Our accounting will assist us also in this respect. Surplus materials once got on hand are oftentimes most difficult to get rid of. They often remain for years, to clog the stock account and cause a poor operating showing in the store department. Care in ordering is of the utmost importance to prevent accumulation. An ounce of prevention here is worth many pounds of cure. Storekeepers are prone to order loosely and in excess of the real necessities of the case. This is not hard to understand, as their daily life with those who use the materials is apt to be more pleasant if they have an abundance of material on hand. It is also very hard for an approving officer to tell whether a storekeeper's stock requisitions are reasonable or not, in the absence of the necessary detailed information. Consequently most such requisitions are taken on faith and put through for the purchase. If, however, we cause our storekeeper to order his stock monthly, each class of material on separate requisitions, and have prices applied to the requisitions, it is comparatively simple to get the money value of the requisition, and another simple operation to look at the chart and see the value of the material that is being consumed, monthly, from that store. If the requisition should prove to be excessive, it can be corrected before it is too late.

A specimen copy of the material chart is given by way of illustration, as is also one other form which is in the nature of a comparative summary of totals by different store points. These forms, it is submitted, contain the essential features of the store accounting, to permit of accomplishing good regulation.

I would like to make a few comments on these charts and forms. Fig. 1 has been explained. Fig. 2 is a sum-

mary of grand totals by storehouse points. For comparative purposes it is well to group the stores together that have similar characteristics and that might be expected to produce similar results. On the specimen, storehouse "A" might perhaps represent the general store, being in a class by itself. Stores "B" and "C" might be of the next importance, such as principal division stores. Stores "E" and "F" might represent smaller points. Store "C" makes a disbursement of 25 per cent, which would suggest that store "B" ought to do equally as well and should be investigated. Store "C," it is also noted, shows an increase in stock during the month of $28,000.

Now by examining the material statement for each of these stores we can see quickly the particular classes in which "B's" percentage falls below that of "C," and also in what classes "C's" increase of $28,000 occurred. By looking back further to our storehouse charts of stores "B" and "C" we can see what has been the trend, in these classes, for a period of time, and thus get a clue to the classes in which the operation of store "B" is weak.

I would like now to refer for a moment to the specimen charts shown. One shows perhaps the hardest class to deal with on steam roads, namely, "Frogs, Switches, Crossings and Parts." Notice the tremendous stock carried during the year, of $255,000 a month, to provide for a consumption of only $8,000 a month. The chart shows the result of efforts made to bring this stock down, showing that the peak in June of $270,000 was reduced to $228,000, on Dec. 31. Another shows the class of "Bar and Sheet Iron and Steel." This is not so bad, showing a disbursement of 11.5 against 3.3 in the case of "Frogs, Switches, etc." The third, Class 36, "Locomotive, Station and Train Supplies," shows still better, or 18 per cent. The fourth shows all classes and an average of 13.8 per cent. The dotted lines show the averages of another road, of not dissimilar characteristics, and in the same section of the country, which shows a disbursement of 16.7 per cent. If road "A" had held its stock down, so that its consumption was the same per cent of its material available, namely, 16.7 per cent, its average investment in materials and supplies would have been about $2,800,000 instead of $3,500,000, or $700,000 less.

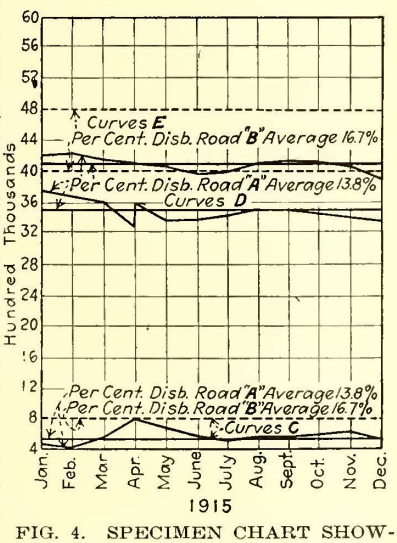


FIG. 4. SPECIMEN CHART SHOWING DISBURSEMENT COMPARED WITH STOCK ON HAND FOR MATERIAL

Possible Electric Railway Savings

Let us consider briefly what this might mean to the electric railroads of the country. The latest statistics that I have seen state the total mileage of the electric railways as approximately 48,500 miles. Moody's Manual for 1919 shows that fourteen representative systems, in different parts of the United States, having a mileage of 6,758 miles, were in 1918 carrying in their materials and supplies account approximately $19,000,000. In the same ratio the total mileage would be carrying $137,000,000. However, as the mileage included electrified steam roads, and as perhaps the mileage picked out may not have included enough suburban mileage, to be entirely conservative let us assume that $100,000,000 might be nearer correct. Moody's Manual does not publish any statistics relative to the value of material used. One system of considerable size, whose figures I have seen, was carrying about a million dollars in its stock account and had an average per cent of disbursements for the year of 9.1. This seems very low. Steam railroads in the same section of the country show 13 per cent to 17 per cent, and they certainly should do considerably better. Generally speaking, I believe the steam roads are more advanced in their storekeeping methods that the trolley roads, and I believe the turnovers of the steam roads are higher.

However, generally trolley systems are more compact than steam railroad systems and do not scatter their stocks so widely. This should enable higher percentages of disbursements. Therefore it would seem to me entirely reasonable that a trolley system should have an average of at least 20 per cent. If the road to which I have alluded had made such an average, its investment in materials and supplies would have been less by half a million dollars. If that system should chance to be typical of the electric roads in general there would have been a reduction in the investment for all of $50,000,000. I venture to say that at this particular time the executives could make very good use of this capital for other purposes. If this was surplus material, unnecessary to have been carried, and if it costs from 15 to 30 per cent to carry surplus material, there would have been a direct saving of from $7,500,000 to $15,000,000 of expense per annum. The saving of the transportation of this material, and of the raw material that had to be hauled before it could be manufactured, would certainly not have added any to congestion of traffic.

These figures may perhaps seem unreasonable or even visionary or absurd to you, but I am by no means convinced that they are either one or the other. When all factors are taken into consideration these figures are certainly well within the order of magnitude of possible savings.

An expert in the handling of materials and supplies speaking of the steam railroads of the country five years ago made the statement that the capital invested in materials and supplies on the railroads of the country was $240,000,000, and he estimated that $100,000,000 was surplus, unnecessary investment, resulting from absence of exact information in regard to handling this large investment, and a reluctance to depart from long-established precedent and custom. The carrying charges he estimated at 15 per cent to 20 per cent, which meant a wholly unnecessary expense of fifteen to twenty million dollars a year. In view of the vast increase in the value of stocks of material in the last five years, if these figures were revised to date they would probably be very much more startling.

The problem is a large one, difficult and complicated by various conditions. It requires all the light that can be thrown upon it. If a better and more scientific accounting method is a key to the problem, and I believe that it is, then the accounting departments of the railways have a very important field in which to expend some of their energies.

The Motor Bus as a Supplement to Electric Railways*

By R. Gilman Smith
Milwaukee Electric Railway & Light Company

R. GILMAN SMITH

Its Place Is in Extension of Car Lines Into Territory of Light Traffic Possibilities and Over Routes on Which Extra Fares Can Be Charged

THE present discussion will be limited to a consideration of the various factors affecting the advantages or disadvantages arising out of the use of motor buses in conjunction with an electric railway system. Such use will in general classify as follows:

(a) The operation of motor buses over routes forming extensions of existing electric railway routes.
(b) The operation of motor buses over routes independent of electric railway routes.
(c) The operation of motor buses over routes identical with electric railway routes.

With any of the three types of service just enumerated the motor bus may be operated as an integral part of an existing railway system, or it may be operated as a separate transportation agency furnishing a special class of service.

In making an inquiry as to whether motor bus or rail service is the more economical and at the same time the more satisfactory type of installation, a consideration of the local requirements plays an important part. These requirements differ widely under different local conditions of operation and have a marked effect upon the costs of the service to be furnished. Some of the factors to be considered are as follows:

(a) Volume of traffic.
(b) Distribution of traffic throughout the day.
(c) Frequency of stops.
(d) Character of pavement.
(e) Climatic conditions.
(f) Operating costs.

Motor bus service is especially adaptable where the traffic to be handled is more or less uniform throughout the day. The motor bus has a limited overload capacity and is not suited to care for rush-hour crowds. If peak-load conditions must be met, it requires the operation of a large number of additional units of equipment for a few hours daily, the fixed charges on which may offset whatever differential in operating costs there may be as compared with rail service.

The present rush-hour conditions in most American cities necessitates the operation during the morning and evening peak-load periods of approximately double the number of cars in use during the remaining hours of the day. This means that the actual carrying capacity of the system is increased during these periods by 100 per cent plus the amount by which the maximum load of cars exceeds the seating capacity. For a standard double-truck car this is an increase from about fifty passengers to about one hundred, or an additional 100 per cent, making the traffic ratio four to one. For a safety car the corresponding increase is from thirty passengers to about sixty, or the same percentage.

If this peak-load traffic is to be handled by motor bus, the smaller over-normal capacity of the bus will necessitate a greater increase in short-hour service. A large double-deck bus with a seating capacity of about fifty has a maximum capacity of not more than seventy, an increase of 40 per cent. A large single-deck bus seating twenty-four has a maximum capacity of forty, an increase of 67 per cent. This indicates that to obtain an equivalent increase in carrying capacity the number of bus units operated during the peak load periods would have to be increased by 120 per cent to 140 per cent over the base schedules, as compared with an increase of 100 per cent in the number of rail units.

The character of the street surface over which a motor bus is to be operated has a considerable effect in determining the desirability of the service. In the suburban districts of many cities the unimproved condition of the streets would make the operation of this type of service very difficult, and would at the same time decrease the initial investment required for the installation of rail service.

Another point is that, in Northern cities, climatic conditions experienced in winter raise serious problems. The transportation difficulties encountered in New York City as the results of the severe blizzards in the spring of 1920 indicate the helplessness of the motor bus as a snow fighter. A four-motor double-truck car or snowplow running on rails has at its disposal not only an unlimited supply of electric energy but also a large amount of kinetic energy arising from its weight. This can be effectively utilized in fighting snow by bucking large drifts at relatively high rates of speed. For equipment operating on rails this is a comparatively safe procedure. A motor bus or an auto truck equipped with a snowplow and depending upon a slippery pavement for its traction cannot safely fight the drifts in this manner.

COMPARATIVE COSTS THE CRITERION

The question of comparative operating costs for bus service and rail service is a vital one in an inquiry as to which of the two is the proper installation under a given set of conditions. Unfortunately data covering the operation of bus lines for recent periods are available in a limited number of instances only, and in the material available the detail underlying the total figures is not always known. The American Electric Railway Association recently published as a summary of the replies to a questionnaire on this subject its Data Sheet No. 201, containing data for seven companies which

*Abstract of paper presented at the annual convention of the American Electric Railway Association, Atlantic City, N. J., Oct. 14, 1920.

TABLE I—MOTOR BUS OPERATING DATA
(From A. E. R. A. Data Sheet No. 201) August 31, 1920

Name of Company and Location	One Way Mileage	Miles per Bus per Day	Number of Buses Operated	Average Passengers per Bus Mile	Seating Capacity per Bus	Operating Revenue per Bus Mile	Operating Expenses per Bus Mile
Fort Worth Auto Bus Company, Fort Worth, Tex.	4.90	33.4	8	1.80	17	$0.18	$0.47
Fort Wayne and Northern Indiana Traction Company, Fort Wayne*	2.25	159.6	2	1.26	16	05	12
Connecticut Valley Street Railway, Greenfield, Mass.	3.14	135.0	2	3.58	19	22	17
Minnetonka & White Bear Navigation Company, Minneapolis*	3.80	144.0	13	3.53	14	.18	35
Baltimore Transit Company, Baltimore, Md.	2.90	78.0	18	4.80	16	34	37
Manufacturing company in city of 200,000	2.00	124.0	8	8.81	21	37	36
Experimental operation in city of 400,000*		89.9	1	4.00	15	20	22

*Operation abandoned.

are now or have recently been operating motor bus service. These seven companies show revenues per bus-mile ranging from six to thirty-seven cents and operating expenses from twelve to forty-seven cents per bus-mile. The number of passengers per bus-mile runs from 1.26 to 8.81, and the average bus-mileage per day per bus from 33.4 to 159.6. Two out of the seven companies had operating revenues per bus-mile in excess of the operating expenses shown; in one case the revenues exceeded the expenses by 1 cent per bus-mile, and in the other case by 5 cents per bus-mile. No fixed charges are included in the figures quoted. A summary of these figures is shown in Table I.

Operating costs have fluctuated so widely during the last two years that it is difficult to set up a statement of comparative unit expenses for rail and bus service. Such a set-up has, however, been attempted by developing certain figures from the experience of various companies, and by estimating certain others on what would appear to be reasonable bases under normal operating conditions. The result shows that the direct operating costs, including only maintenance, operating labor and supplies, power and general expenses, but excluding taxes, depreciation and return, are as follows for four more or less standardized types of equipment:

Double-truck—two-man—car	33.75c. per car-mile
Safety—one-man—car	21.50c. per car-mile
Double-deck—two-man—bus	39.10c. per bus-mile
Single-deck—one-man—bus	27.00c. per bus-mile

The above costs include for the rail service allowances of 2.5c. and 2.0c. per car-mile respectively for the double truck and the safety car for the maintenance of way and structures, and an allowance of 0.5c. per bus-mile for snow removal. Drivers' wages are figured at seventy cents an hour, and the average speed of operation is taken as 9 miles per hour for all rail service and 10 miles per hour for bus service.

If allowance be made for taxes at 2 per cent per year, depreciation at 5 per cent per year on cars and 25 per cent per year on buses, and 3 per cent per year on general equipment and power equipment, and for return at 7.5 per cent per year the unit costs will be materially increased. Assuming an annual mileage of 20,000 miles per year per unit of equipment, the total costs, excluding any depreciation or return on investment in roadway and track, become as follows:

Double-truck car	47.87c. per car-mile
Safety car	29.90c. per car-mile
Double-deck bus	53.80c. per bus-mile
Single-deck bus	37.19c. per bus-mile

The results of these figures are shown in Table II.

Analysis of fixed charges is as seen in Table III.

From this study it appears that there is a differential between the double-truck car and the double-deck bus of 5.93 cents per mile of operation. The car-mile is not, however, an equitable unit of comparison, because of the difference in carrying capacity. Assuming an average of seven revenue passengers per car-mile for the double-truck car and a typical distribution of traffic between rush hours and non-rush hours a fleet of double-deck buses carrying the same traffic would average only 5.81 revenue passengers per bus-mile. On this basis the per passenger cost of the two types of equipment is 6.84 cents for the car and 9.27 cents for the bus, a difference of 2.43 cents in favor of the car. To make the bus operation more economical the density of traffic per mile of route operated must be such that the fixed charges on the permanent way required for rail operation will be more than 2.43 cents per passenger. If the cost of permanent way be taken as $50,000 per mile of single track and the fixed charges as 14.5 per cent, or $7,250 per year, the density of traffic need not exceed 300,000 revenue passengers per mile of

TABLE II—COMPARISON OF OPERATING COSTS PER MILE OF CAR AND BUS OPERATION

	Standard Double-Truck Car, Cents	Standard Safety Car, Cents	Double-Deck Bus, Cents	Single-Deck Bus, Cents
Direct Operating Costs:				
Maintenance of way and structures	2.50	2.00	0.50	0.50
Maintenance of equipment	4.25	3.00	12.00	10.00
Conducting transportation	19.00	10.00	17.10	9.00
Power (electric or gasoline)	4.50	3.00	6.00	4.00
General expenses	3.50	3.50	3.50	3.50
Total	33.75	21.50	39.10	27.00
Fixed Expenses and Charges:				
Taxes, depreciation and return on basis of 20,000 miles per year	14.12	8.40	14.70	10.19
Total	47.87	29.90	53.80	37.19
Total cost per revenue passenger	6.84	6.35	9.27	10.74

TABLE III—STATISTICAL DATA AND COMPARISON OF INVESTMENT AND FIXED CHARGES

	Standard Double-Truck Car	Standard Safety Car	Double-Deck Bus	Single-Deck Bus
Investment per Unit:				
Equipment	$10,000	$6,500	$7,000	$5,000
Power plant equipment	6,000	2,500		
General equipment	5,000	3,400	4,200	2,500
Total	$21,000	$12,400	$11,200	$7,500
Fixed Charges per Year:				
Taxes, 2 per cent	$420	$248	$224	$150
Depreciation, 5 per cent on cars	500	325		
25 per cent on buses			1,750	1,250
3 per cent on power plant	180	75		
3 per cent on general equipment	150	102	126	75
Return, 7.5 per cent	1,575	930	840	563
Total	$2,825	$1,680	$2,940	$2,038
Fixed charges per mile of operation on basis of 20,000 miles per year	14.12c.	8.40c.	14.70c.	10.19c.
Average number of revenue passengers per mile of operation (Assuming normal urban distribution of traffic)	7.00	4.71	5.81	3.46
Seating capacity	52	32	51	24
Maximum capacity	100	60	70	40
Average speed, miles per hour	9	9	10	10

single track in order to make the rail service the more economical. Even with the cost of permanent way as high as $80.000 per mile of single track—approximately the present cost—the traffic density need be only 480,000 revenue passengers per mile of single track to offset the differential in operating costs. At the present time urban railway systems average from 650,000 to 900,000 revenue passengers per mile of single track.

Referring again to the direct operating costs plus fixed charges it will be seen that the one-man bus shows a per mile cost of 37.17 cents as compared with 47.87 cents for the double-truck car, the differential being in favor of the bus. If, however, these costs be reduced to a per passenger basis, as were those for the double-deck bus, the per passenger cost of this unit becomes 10.74 cents, or 3.90 cents more than for the double-truck car. Applying this on the fixed charges for permanent way at $80,000 per mile of single track, a traffic density of 300,000 revenue passengers per mile of single track would make the rail service more economical.

In the case of the single-deck, one-man bus seating twenty-four passengers and with a maximum capacity of forty, which is the unit referred to above, its application to traffic having typical rush-hour peaks would mean an increase in the number of units necessary during rush hours of 120 per cent over those required during the balance of the day, as was shown earlier in this discussion. If these units were used on a system or on a line where the increase required to handle rush-hour traffic were less than 120 per cent, the average number of revenue passengers per bus-mile would be increased and the average cost per passenger would be reduced.

With operating costs as they are at present, the motor bus cannot compete with the electric railway for mass transportation. The comparatively low initial investment of the motor bus makes it adaptable for service over routes where the traffic density will not support the additional investment necessary for rail service. As this traffic density increases each additional motor bus unit placed in operation adds to the total investment as much as the initial unit, and there is therefore no gain in economy in motor bus operation through a gain in traffic density as long as this requires the operation of additional units. With rail service, however, the operation of additional units requires only the capital outlay for cars, car storage facilities and power facilities, the original investment in track being available to handle the increased traffic. From these general observations and the analysis of operating costs set forth above it appears that it is economical to utilize the motor bus as a supplement to electric railways only under certain conditions of operation, which may be summarized as follows:

(a) For the operation of extensions to existing car lines or new lines in outlying districts where the traffic density will not run in excess of 1,000 revenue passengers per mile of single track per day and will therefore not be sufficient to support the necessary investment in permanent way, or where the distribution of traffic throughout the day is more nearly uniform. Even such operation may perhaps be economically abandoned if construction costs of permanent way recede from the present high level.

(b) For the operation of service over routes where the public will pay an increased fare for what it believes to be a special service and where therefore loading conditions can be somewhat controlled and the small over-normal capacity of the motor bus is not a handicap.

Financial Problems Confronting Utilities During Reconstruction Period*

By Henry E. Mendes
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HENRY E. MENDES

Delicately Adjusted Position of the Utilities Has Made Them More Responsive to Financial Disturbance of the War—Some Accounting Problems Must Be Clarified, but Solution Lies Chiefly in Frank and Full Publicity and Efficient Economy

THE history of every important war teaches that immediately thereafter a so-called period of reconstruction sets in, its length depending largely upon the extent of the conflict, the havoc wrought, both in lives and property, and the extent to which the morale of the population, generally, may have been affected through individual or personal losses, and also depending upon either the favorable or the unfavorable conclusion of the conflict.

It would seem that in this country the present period is very much like that which existed during the decade or so immediately following the Civil War, but greatly aggravated because of the vastness of the World War, and this despite the fact that the actual conflict, fortunately, did not reach our shores. A period of reconstruction is generally when certain businesses, wage earners and others derive extraordinary income or benefit in contrast to those who, unhappily, find themselves in the opposite condition, in which plight, it must be admitted, are to be found practically all public utilities comprising interurban, telephone, telegraph, gas, electric and water companies.

By reason of the supervision exercised by the commonwealth, public utilities, as such, are not in as favorable a position as most industries. Without the permission of either State or Federal commissions, they are unable, usually, to increase their revenue to conform to increased costs. Considerable time usually

*Abstract of address delivered before the annual convention of the American Electric Railway Accountants' Association, Atlantic City, N. J., Oct. 13, 1920.

elapses, therefore, between the date of the application for an increase in rates or tariffs and the date that it is granted, if at all, and the increase, if granted, does not always come up to the expectations of the public utility as evidenced by its application, the decisions of the commissions being necessarily governed or dominated to a considerable degree by public sentiment, or in some cases even by political expediency. Unfortunately, public sentiment, as a rule, is biased, being molded largely through the opinions expressed in the press, which may either be based upon incomplete information regarding the pertinent facts or may be deliberately suppressed by it.

In order to give proper and efficient service for any length of time, a public utility must be in a healthy financial condition. The question naturally arises, then, when is a public utility in a healthy financial condition? The answer would seem to be: When the utility receives reasonable or ample compensation for the services it renders; sufficient to pay the necessary operating expenses commensurate with the service demanded by the public, sufficient to pay for renewals and replacements of worn-out and obsolete equipment, sufficient to provide necessary funds for the purpose of extending its service along with the development of the community served, and lastly, though not the least important factor, sufficient to reasonably compensate capital for its investment and the consequent hazard undertaken. The notion seems to prevail quite generally nowadays that, because of the comparatively large capital investments in them, public utilities have unlimited and inexhaustible resources, to which the ordinary rule that income must at least balance expenditure does not apply, the public failing to realize that such a situation cannot exist and that, to use an old expression, "it is impossible to draw water from a stone."

To give adequate service in a growing community a public utility must interest new capital, thus enabling it to secure the additional facilities required for an extension of service. At the prevailing high rates of interest occasioned by the general financial situation the problem of interesting new capital is indeed a very serious one.

Strictly speaking, public utilities are not in a position to compete in a tight money market. The margin between their gross revenue and expenses is never sufficient to warrant paying what might appear to be exorbitant rates of interest, even if they were willing. Because of the regulations and attitude of the commissions, however, and in some instances, the restrictions placed upon them by statute, public utilities are not permitted to sell their securities at a discount, this term not only comprehending "discount" in its usually accepted meaning but including expenses incidental to the refinancing which proper accounting procedure would permit as a part of the cost of the new money.

Short Term Notes Recommended

Without necessarily desiring to lay down a fixed rule, under the present abnormal conditions it is probably the best theory for public utilities to issue short term notes at market rates, secured by long term treasury bonds at normal rates deposited as collateral for the short term notes. This is on the assumption, of course, that upon maturity of the short term notes conditions in the financial world will have adjusted themselves to a more normal basis, and it will then be possible to issue the long term bonds in substitution for the notes. In this connection, the fact should not be overlooked that in some instances refinancing may be prevented through the fact that other long term bonds already are outstanding, to which the new issue would necessarily be subordinated and would therefore have to bear a much higher rate than ordinarily rules for that class of security. This condition was one of the factors prevailing in some recent refinancings.

Service-at-Cost Ordinances and Franchises

Consideration of this subject would not be complete without some reference to the so-called "service-at-cost" ordinances and franchises, which, so far, have only been applied effectively to electric street railways in several large cities—including Cleveland, Cincinnati, Youngstown, Rochester, Dallas and Montreal —although there is now agitation for the operation of gas and electric companies, and possibly other public utilities, on the same basis. In theory this is a commendable scheme, but the advantages to the community, on the one hand, and the proprietary interest, on the other hand, are frequently not as real as they may seem. The plan has a tendency to restrict service in some instances and, more particularly in a period during which abnormal conditions prevail, almost invariably prevents extension of property and improvement of service. The incentive to economy and efficiency is also to a very great extent removed by the guarantee of the return on the fixed capital investment of the company. Furthermore, a certain duplication of expense is almost inevitable under the plan, the ordinance usually providing for a traction commissioner with authority to organize a department of his own. To counteract the tendency to extravagance and to cultivate an incentive for economical management bonus systems are in effect in some cities in conjunction with the "service-at-cost" plan. It should also be noted that in some instances the communities affected have been known to object to a proper interest return, even on the reduced valuation placed on the property involved. Again, it should be noted that while the theory of the plan is good, it would seem that those who conceived and first advocated it were rather attempting to place themselves in a favorable light with the public, without regard to all of the essential elements; the result being that, in some "service-at-cost" franchises, no reference is made to such an important factor as depreciation, it being impossible, therefore, for the public utility to provide a fund for that purpose. Incidentally, the company is started out on an altogether unsound and erroneous basis, especially in relation to the public, which, once having formulated an idea, usually more or less hazy, regarding the provisions of the ordinance, can only adjust itself to the proper attitude with extreme difficulty, necessitating propaganda of an educational nature, which in certain communities the press is not willing to support.

Public utilities are not altogether blameless for the predicament in which they find themselves. They are largely responsible for a number of conditions that now give them embarrassment which, with a little foresight in the past, very easily could have been obviated. Perhaps the point most subject to criticism or, at any rate, the matter which has been responsible

for the major part of the adverse criticism, is the overcapitalization and, it may be stated, the cumulative capitalization that unfortunately has prevailed in not a few instances, but which during later years has been prevented by the supervision of the commissions under the regulatory powers conferred upon them by statutes. Of course, some of the reorganizations and consolidations effected in the past were justified by the peculiar conditions prevailing in certain communities, and, while sometimes the apparent effect may have been to inject water into the undertaking, the actual result was to provide a more efficient and better co-ordinated organization, capable of expanding the service in direct relation to the increased demands of the community served. Subsequent benefits derived by the community, arising through these mergers, usually have justified them, as they not only tend toward economy in management, with consequent better service, but also make it possible to give more extended service. The objectionable features, by reason of the supervision exercised by the commissions, have been corrected and practically eliminated during recent years.

Some Accounting Suggestions

Certain erroneous principles of accounting, as reflected on the books of some public utility companies, are also partly responsible for their predicament. These may be summarized briefly as follows:

(a) Not a few companies accrue taxes and other expenses that are of a recurring nature on anything but a scientific basis. It is asserted quite often that public utilities, because of their peculiar nature, should not accrue taxes and other similar items of expense in that which most industries and businesses find the most desirable procedure to follow in order to reflect proper operating results. The claim is made that taxes should only be accrued, if at all, in an amount sufficient to take care of actual cash disbursements that must be made for taxes during a given period as and when they fall due. From an accounting standpoint such a procedure is indefensible, and as a practical proposition its merit can be questioned quite seriously. Proper accounting, whether it be either for an industrial organization or for public utility, demands that taxes be accrued for the period covering which they are payable in relation to the expenditures of the state, or municipality, as evidenced by information usually shown on the tax bills, and if not so shown by information that always can be obtained from the tax officials, and not necessarily for the period to the last date by which the taxes must be paid in order to obviate the assessment of fines or penalties. This seems to be so obvious as to require no further argument.

(b) Depreciation also seems to be quite a bone of contention, the amount provided for this item on the books of some public utilities being dependent, in a great measure, on how much tariff the gross income can stand. The manner in which reserve accounts for depreciation are handled quite often indicates that the first principles of good accounting theory and practice are ignored altogether. A reserve account, as such, is only an account established for the purpose of equalizing the expense or loss entailed through the gradual wearing away, or passing out of existence of property, by reason of its use or otherwise, so that when it eventually becomes necessary to replace the property, the entire charge will not be made to the operations of the period in which the replacement is made, or possibly capitalized, but may instead be borne by the reserve account. Properly to create a reserve for depreciation it is necessary to credit currently to the reserve account definite amounts, calculated on the basis of rates of depreciation developed as the result of experience, by corresponding reductions of the gross earnings derived from operations. Any other treatment of a reserve account, such, for instance, as crediting to it arbitrary amounts at irregular intervals, serves no useful purpose whatsoever and might as well be abandoned. From a financial point of view, of course, the stockholder and investor is interested in seeing, and is entitled to know, that adequate reserves are being made by a public utility in arriving at the results from operations shown in its published statements. It should be emphasized, furthermore, that a reserve account of itself does not provide the funds necessary for replacements and obsolescence. A proper program to insure that any business will be uniformly successful over a period of years where the investment in plant is a vital and important factor contemplates the laying aside, or earmarking, of specific funds or investments for the purposes stated. Any amount of bookkeeping would not provide the funds necessary to achieve the desired result as they can only be derived from the usual sources.

(c) Another questionable practice adopted by some public utilities, which is related very closely to the foregoing, is to write off over a term of years the capital investment in wornout, old or obsolete equipment, after its replacement by new equipment, instead of, in the first instance, having written off the equipment over the period during which it was used, and providing a reserve for depreciation covering the new equipment, on the basis of recognized rates of depreciation, over the term of its probable life. Such practice merely tends to put off the evil day when an accounting eventually must be made, but, aside from a miracle, does not prevent it. Many public utilities, finding themselves in the predicament of having exhausted important units of their plant investment without having made due provision for their replacement, as explained, are confronted today with this situation.

(d) A further inconsistency that seems to prevail more or less generally is that of including allowances for depreciation in arriving at the basis for establishing rates and then, on the other hand, objecting to the reduction of the plant or investment account for the determination of capital values for the same purpose or of invested capital for Federal tax purposes and, occasionally, also for the purposes of the published financial statements.

Concerning the foregoing fallacies, no sound reasons can be advanced for handling the accounts of public utilities in any other manner than on the basis recognized by proper accounting procedure developed as the result of the experience gained in other sound businesses and representative industries. Public accountants are often confronted with the argument that certain features, by reason of conditions peculiar to a business under examination, must be considered from a different angle than that from which similar items may be treated in other unrelated businesses. While, admittedly, differences do occur which require special treatment, the matters set forth above are fundamental, and should apply to all businesses, not even excepting public utilities.

To conclude, then, the principal financial problems which must be solved by public utilities during the so-called period of reconstruction through which we are now passing may be considered to arise, on the one hand, from the abnormally high interest rates which preclude the possibility of obtaining funds for development or of refinancing maturing obligations on anything short of the most ruinous terms; from the urgent necessity which exists for the carrying out of long deferred improvements and from the excessively high cost of new construction and equipment; and, on the other hand, from the shrinking margin between operating revenue and expenses, due to increasing costs and the indifference of the public to the vital need for adequate increases in rates. The remedy appears largely to lie in the presentation of facts and figures to the public and to the public service commissions, stated upon the soundest basis and with the utmost measure of frankness; in the education of the public to the justice of the claims of the public utilities and to a realization of the truth that efficient service cannot be rendered for any length of time without adequate compensation to capital and, lastly, in the practical exemplification of the truth that a penny saved is a penny earned, by a continuance of the measures tending toward rigid economy.

The Motor Bus in Urban Transportation*

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The Superiority of the Motor Bus for Light Continuous Traffic Is Shown, the Tramway Being Economical for Heavy Continuous and Peak-Load Traffic

THE WRITERS of this paper are engaged in the management of motor omnibus services in Greater London. Their position is unique in that London, unlike any other metropolitan city in the world, has depended, and still depends, upon the omnibus for a large proportion of its passenger movement. In the year 1920, that is now closing, it is estimated that the underground railways will have carried 675,000,000 passengers, the suburban steam and electric railways 350,000,000, the tramways or street railways 1,100,000,000 and the motor omnibuses 1,035,000,000, so that each instrument of transport: railway, tramway and motor omnibus, will have approximately a third share in the total movement.

The motor omnibus is the successor of the horse omnibus, and the horse omnibus occupied in the past those streets in London which are now traversed by electric tramways. The tramway is the usurper. The mileage of streets and roads in Greater London occupied by electric tramways is 348. The mileage of streets and roads still occupied by motor omnibuses is 577, of which 222 miles are over the tracks of the tramways.

The problem of the relationships between tramways or street railways on the one hand and motor omnibus routes on the other is thus a peculiar problem in London. This paper makes no profession of dealing with it, although many of the facts given in the paper are necessarily drawn from London experience. Last year the writers had the pleasure and advantage of visiting the United States of America and seeing some of the important systems of street railways which now serve the great cities of that country, and they have endeavored to keep in mind the fact of the existence of the street railway as the predominant factor in urban development in expressing the views which follow.

A Historical Note

It must be admitted that the motor omnibus is a late comer into the field of urban transportation and has therefore provoked controversy. Every controversy has a historical background, and so it is in this case.

The origin of things always seems to be involved in obscurity, even though the origin is quite recent. It is therefore difficult to be certain of the truth of what is next stated. When was the first electric railway built? The answer would seem to be in 1881 at Lichtenfeld, near Berlin. The first tramway or street railway would seem to date back to 1883, several places in Great Britain competing for the priority being almost contemporaneous. In the United States, Cleveland (Ohio) apparently enjoys priority with a short section built in 1884. Whatever the settlement of this jealous dispute, the fact remains that the street railway is not very old, but yet much older than the motor omnibus. For the first motor omnibus in public service occurred in London in 1897. It was experimental only and from that date to 1902 remained in an experimental state; 1904 is the first year of effective motor omnibus operation. The motor omnibus then advanced a little more each year until by 1911 it had entirely supplanted its predecessor the horse omnibus. London is distinguished in being the pioneer of the motor omnibus in public service.

Between the introduction of the street railway and the perfection of the motor omnibus for public service there is a gap of about twenty-five years. These years were crowded with every sort of improvement and development of street railways, especially in America, so that by the time the motor omnibus was in a position to become a competitor the street railway had established itself as the one generally accepted means of dealing with urban passenger transport. By that time there would be, at a guess, over 35,000 track-miles of street railway in the United States, built at a cost of some $3,600,000,000, and carrying 9,000,000,000 passengers in the year.

Further, it is of especial interest to observe that the underground and elevated railways of American cities were not a new departure in urban transport, the intrusion of a new factor, so much as a progressive specialization of the street railway, the provision of the street railway not on the surface of the street but above or below the street proper, running over its own right of way to avoid delay and reduce congestion. Similarly, the interurban railways, which correspond closely to the branch lines of our English main line railways, are merely an extension or adaptation over the country of the urban street railway. And this is a continuing process. The motor omnibus comes in to disturb a situation which is primarily based upon the street railway as the one dominant factor.

Unlike London, therefore, the motor omnibus in America finds a large portion of its prospective field occupied by a well organized and established rival, and this historical accident accounts largely for the controversy which is now being waged.

The Street Car and Motor Omnibus Compared

In any discussion of the relative merits and capacities of the street railway and the motor omnibus route, it is first of all important to compare the vehicles employed as instruments of transport. The principal factors in such a comparison are four: Speed of operation, road occupation, convenience and flexibility of operation, and passenger accommodation.

In London the authorized maximum speed of a motor omnibus under the regulations governing its use on the streets is 12 m.p.h. This is generally agreed to be too low a speed and there could be little opposition to

*Abstract of address before American Electric Railway Association, Atlantic City, N. J., Oct. 14, 1920.
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its increase to 18 m.p.h. It is hoped soon to effect this amendment. The average speed in actual operation under urban conditions of traffic is about 10 m.p.h. This allows for an average of three or four stops to the mile. The practice has not hitherto been to mark out fixed stops for the motor omnibuses but to require the vehicles to stop to pick up and set down as required by the traffic. Recently a scheme of fixed stops has been adopted experimentally on certain routes. The stops are carefully surveyed to cover traffic holdups which are not included above, and average four compulsory and two optional stops to the mile. This alteration has been instrumental in slightly raising the average speed of operation.

In London the tramways have maximum authorized speeds ranging from 6 to 16 m.p.h., according to varying physical conditions governing the track, such as gradients, curves, width of streets, and so forth, the normal speed being 12 m.p.h., as for omnibuses. Again this is thought to be too low for modern improved conditions, and it is expected that it will be raised to a figure comparable with that for the motor omnibus given above. The actual average speed of operation under urban conditions of traffic is about 9 m.p.h., which covers an average of five stops to the mile. These stops are fixed and marked and are of two kinds, compulsory and optional. There are on the average nine to ten to the mile of track and actual stops are made at 50 per cent of them. The too great frequency of the stops, even looked at from the point of view of reasonable public convenience, is a determining cause in the relatively less efficient speed of the tramcar compared with the motor omnibus. There will, however, always be a slight gain of speed in favor of the motor omnibus because of its quicker stopping and starting. And there will always be a factor operating in favor of the motor omnibus in that the tramway speed is necessarily that of the slowest, most labored car.

Turning to New York, the figures given to us as the average working speed of street cars in Manhattan was 7 m.p.h. (while the maximum speed was only 9), and of the motor omnibuses in Fifth Avenue 8.5 m.p.h. The same feature would, therefore, seem to be present, but at a lower general level of speed, which is a curious trait. In the other cities of which we have data there is improvement. Detroit showed an average speed of 10 m.p.h. and Cleveland of 11 m.p.h. This improvement we ascertained was wholly due to a judicial revision of stops and a limitation in the number of them. In Broadway, New York, the stops have mounted to nearly fifteen to the mile, a usual number was twelve, but the desired number was not more than eight. Stops are the real determinant of speed, and the larger the vehicle the longer the stop, because the greater the load. This must be borne in memory in connection with the accommodation afforded by street car and motor omnibus, to be discussed later.

Having regard to the fact that the street railway or tramway usually occupied the center of the road allotted to fast-moving traffic there is every reason why it should operate at a relatively high speed, because it will then be less obstructive to other fast-moving traffic in that position. This and the danger to passengers boarding and alighting in the center of the road would seem to dictate a policy of few and well-regulated stops as the right one.

Road occupation is a function of the speed of operation, and the size of the vehicle. There has always been bitter argument as to whether a motor omnibus or a street car occupies the roadway to the greater extent and so contributes in the greater degree to cause congestion. In London there is fortunately the testimony of the London Traffic Branch of the Board of Trade. In its report for the year 1914 it says:

> The extent of occupation of the carriageway, both in regard to time and space, and the physical obstacle that each moving vehicle presents to other users of the road, considered in conjunction with the nature of its movements, are the main points that have to be taken into account in arriving at the coefficient of obstruction for each class of vehicle, quite apart from the actual work done by the vehicle, whether it be the quantity of goods conveyed or the number of passengers carried. Such matters as the general convenience that a public conveyance may afford, or the freedom from accident that it may enjoy, do not directly affect the point under consideration, however important a bearing they may have on the problem generally.
>
> It was hoped that the publication of a scale of units in 1910 would evoke some discussion of this matter, but it attracted very little attention, and for want of any better suggestion, the original scale has been adhered to hitherto in the census calculations. A certain amount of criticism, however, has more recently been disclosed, and in the light of the further four years' experience, it is recognized that some modification of the scale might make these figures compare more satisfactorily. The very large increase in the number of motor omnibuses in service has brought more prominently to notice the inconvenience and delay to other traffic caused by their drawing-in toward the pavement and stopping at intervals, and it is now realized that sufficient importance was not attributed to this movement originally. The development of the commercial motor and the introduction of the motor parcel car also entail some adjustment of the classification, and of the values allotted to these vehicles.

A resurvey of the table was therefore undertaken with a view to arriving at some more authoritative figures that will insure sound comparison in the future, and after obtaining many well qualified opinions, the following revised scale has been decided on, and the census returns of previous years have been recalculated accordingly:

Passenger Vehicles			Trade Vehicles		
Electric tram		9	One horse	Fast	3
Omnibus	Horse	5		Slow	7
	Motor	4	Two horse	Fast	4
Cabs	Horse	2		Slow	10
	Motor	1	Light motor, fast		1
Carriages	Horse	2	Heavy motor	Fast	3
	Motor	1		Slow	5
			Barrows		4
			Cycles		½

With the increase in the seating capacity of the motor omnibus first to forty-six and then to fifty-seven, which is now taking place in London, there can really be no question at all left that as a cause of congestion the motor omnibus is a smaller contributor than a tramcar. The importance of this factor is, however, reduced where roads, as in America, are so wide that there is no congestion. Where there is room for all and to spare it cannot matter.

Convenience and Flexibility of Operation

This factor is almost a corollary of the preceding one, that of road occupation, but it opens up two or three fresh observations.

The motor omnibus can accommodate itself to the other vehicular traffic of the road. It can pull out to the middle when its speed is good and fall in with the quick-moving traffic. It can pull into the side when its speed is poor or when it is picking up or setting down and so fall in with the slow-moving traffic. It also by this facility of movement directly contributes to the safety of the passenger by keeping him always on the

footwalk and obviates the creation of islands or safety zones, which occupy part of the available road space and often prove seriously obstructive.

Again, there is no limit to the extent to which passenger traffic can be dispersed by the use of motor omnibuses. Unlike street cars, they are not confined to expensive tracks or dependent upon continuous connection with a source of power. This permits of the routes and services being taken much more nearly to the actual points at which passengers arise in the residential districts or to which they proceed in the commercial districts, and vice versa. This is a great gain. It is a gain in convenience to the passenger. It is also a gain in street capacity, for a wide dispersal, whether of passenger or vehicular traffic, avoids congestion at particular points. Parallel roads may readily be worked in relief of each other. The services in an arterial road may branch out into secondary roads on either side at intervals, helping to reduce the pressure on space in the roadway.

This reminds us of the striking difference which exists between the layout of the system of routes of street cars in an American city and the layout of the system of motor omnibus routes in London. In an American city the routes are few and direct to some central point or diametrically across some central point. Passengers not desiring to make rides on this direct route are given transfer tickets to change onto another car to reach the destination required, which is not on the line of route of the original car. In London, on the other hand, routes are many and are interlaced so that in a given main radial there may be service proceeding to five or six different destinations by different routes, in fact to all destinations for which there is an appreciable traffic. This wide choice of rides removes the need for any transfer or exchange ticket, and when such tickets have been tried in London they have never been taken up and used in any numbers worth recording. The tramways of London copy as far as possible the motor omnibus routes in their complexity, but the delays at junction points of tramway tracks are a deterrent obstacle to the practice. The motor omnibus lends itself to such a layout of routes much more easily than the tramcar.

Against the merits of dispersal and flexibility is to be set the cost of maintaining many more roads suitable for heavy motor car traffic. It is only fair to note this, although main roads and first class roads, and even secondary roads in metropolitan cities, must under modern conditions always be made up to this expensive standard quite apart from the running of motor omnibuses over them.

Passenger Accommodation

While, therefore, the motor omnibus must be held to have the advantage of the tramcar or street car under the three factors already discussed, still a factor remains which somewhat adjusts the balance in favor of the street car, and that is the passenger accommodation.

In London up to the year 1919 the standard double-decked motor omnibus seated only thirty-four (sixteen inside and eighteen outside), while the standard double-decked tramcar seated seventy-eight (thirty-two inside and forty-six in a covered upper deck). This was a heavy handicap. With the rise in the costs of operation consequent on the war the smaller capacity of the omnibus restricted earnings and became uneconomical.

Prior to the war, in spite of the difference in size, the earning capacity per mile run of both vehicles had been approximately equal. With the war and the growth of the volume of traffic occasioned by it the tramcar drew ahead of the motor omnibus, and the problem of enlarging the motor omnibus became acute. Fortunately progress in design since 1906, when the pre-war type of omnibus had been last settled, made enlargement an easy matter. Early in 1920 a 46-seat omnibus (twenty-two inside and twenty-four outside) was built and proved successful. The comparison of the old and the new vehicles with the regulations establishing the standard approved by the police is briefly outlined in the following figures:

Item	Police Regulations	Pre-War or B Type	Post-War or K Type
Length	Not to exceed 23 ft.	22 ft. 6½ in.	22 ft. 7⅜ in.
Height	12 ft. 6 in.	12 ft. 7 in.	12 ft. 2 in.
Width	Not to exceed 7 ft. 2 in.	6 ft. 11½ in.	7 ft. 1½ in.
Wheelbase	Not to exceed 14 ft. 6 in.	12 ft. 10⅜ in.	14 ft. 2¼ in.
Overhang over back axle	7 ft. 6 in.	7 ft. 7⅛ in.	6 ft. 7¾ in.
Weight* unladen	Not to exceed 3 tons 10 cwt.	3 tons 12 cwt.	3 tons 9 cwt.
Weight laden	Not to exceed 6 tons	6 tons	6 tons 13 cwt.

*The police have permitted variations in the weights.

It may be observed: (a) That the increased load was obtained without any increase in the over-all dimensions permitted; (b) that with a lengthened wheelbase and improved springing the additional weight meant less and not more road shock; (c) that the general safety of the vehicle when fully laden has been improved by lowering the floor of the vehicle from 35 in. above the road surface to only 29 in. above the road surface, and consequently the center of gravity is lower too.

Once a new departure in design was initiated development was speedy. The 46-seat omnibus was not final. Experience with its operation almost instantly revealed the possibility of something still more commodius, and a 57-seat omnibus has been built experimentally. This too proved successful and 250 of the type are now under manufacture. The handicap of the motor omnibus has therefore been appreciably reduced. The principal tramway authority in London is so much moved by the success of the new omnibus that it is seeking from Parliament powers to run omnibuses itself, and has offered a prize of £1,000 for a design of a new tramcar.

Reverting to the other side of the account, the street car scores by its ability to draw a trailer. This doubles the seating capacity of a traffic unit and might be a conclusive advantage if it were not that a track cannot carry as many double units as it can single units under actual working conditions. There is talk of a motor omnibus trailer, but up to the present this is idle.

A standing load is not at this time permitted in London, the concessions of the war period being withdrawn. The policy that resists a standing load is open to question, especially when the large number of short riders on street vehicles and the popularity of the open crush spaces on French and German street cars and motor omnibuses is considered. America enjoys exactly the reverse policy, for the writers discovered that even the various traffic commissioners expected in the rush hours some fair percentage (50 to 75 per cent) of the load carried to be standing. This introduces a new element into the discussion of passenger accommodation in America.

The street car of the usual type seats fifty to sixty passengers, and easily accommodates as many more

standing. The motor omnibus of the predominant type now in use seats forty-two to forty-four, but accommodates at the most eight or ten others. Motor omnibuses to seat up to sixty are projected, but, so far as the writers are aware, are not in effective operation.

The handicap of the motor omnibus therefore persists under American conditions, and there can be no question that accommodation afforded must tend to become the crucial test of efficiency in street transportation with the growing congestion of the streets of the great cities.

Cost of Operation

Although not quite in the same category as the four foregoing factors, the factor of comparative cost of operation still remains to be reviewed. The cost per car-mile of operating an electric street railway in London is slightly more than the cost of a motor-omnibus-mile. The difference is negligible. This is what might be expected, for both vehicles have a driver and a conductor, and need garaging and repairs. The principal chance of divergence must rest in the cost of fuel, electricity based on coal and petrol based on oil. The danger to the motor omnibus industry seems to center in the fuel problem. The world stocks of oil seem less than the world stocks of coal. There is a time, calculated to be not very far off, when the oil will be exhausted. Fortunately the use of petrol substitutes throws open a door to a wider future. Before the crisis comes benzol or power alcohol may have achieved commercial success. Therefore there is no reason to fear that there will ever be a marked divergence in the costs of the two methods of transport.

On the other hand, the capital cost of tramways far exceeds the capital cost of providing motor-omnibus routes (the ratio is over three to one) and unless this capital cost can be spread over a dense service it becomes a burdensome charge per car-mile, and definitely places the tramcar in a worse position. It is estimated that, to enable competition by these two instruments of transport to be conducted on approximately equal terms as to cost per car-mile, the street-car service must amount to not less than an average of twenty-five in the hour throughout the day in each direction. Then some one will remark that the competition is not to be measured in car-miles, but in passenger-place-miles, and so the load factor comes in as a corrective. As it varies from city to city with the conditions and circumstances of the traffic, argument about it is fruitless. In London the average passenger load per omnibus-mile was last year twenty-seven for the 34-seat vehicle against thirty-one per tramcar-mile for the 78-seat vehicle.

The Passenger Movement of the Streets

It is not expedient to weigh up the case for and against the motor omnibus as it has been developed so far, for there is an entirely new aspect to be opened up. Even if a conclusion could be reached in the comparison of the two vehicles, the street car and the motor omnibus, still the problem to be solved is hardly fully stated. What do these two vehicles aim at accomplishing? What is the passenger movement of the streets to which they are to be applied? What is the traffic problem to be tackled? It is impossible here to answer these queries in full and a brief examination under two heads must suffice, namely, street capacity and passenger density.

One reason why London has remained a motor omnibus city is the narrowness of its main streets, and the irregularity of its planning. To provide double-track tramways in the main arterial roads has not been possible, and the tramway tracks in some of the roads even now contain lengths of single track, or double tracks with interlaced lines. This happens because of what may be termed a general requirement of all tramways in England, a clear space between the outer rail and the curb of not less than 9 ft. 6 in. Yet this 9 ft. 6 in. barely allows for one line of traffic either side of the tramway, and is obviously inadequate to make proper provision for the other vehicular traffic in such a street. One would have thought that an arterial road of a city carrying a tramway would have been of a width sufficient for the movement of three lines of traffic in each direction, of which the two center lines would have mainly consisted of street cars. London is a shameful way behind such a standard. London has tramways which ought never to have been constructed as they are.

This narrowness of the streets and the pressure of other forms of vehicular traffic on the tramway tracks react on the capacity of these tracks themselves. Under favorable conditions the maximum number of cars passing in one direction across a point in a continuous running track is only about sixty-five in the hour with trailers attached, or eighty without trailers. This falls short of the results obtained in America, but there the wideness of the streets tends to insure continuous free passage to the street cars. The fact of roads being wide and generously laid out invites and justifies the building of street car tracks. It is this entire change in the aspect of the streets which makes the new American cities tend to street railways while the ancient European cities tend to motor omnibuses.

Perhaps it may serve to impress this difference on the mind if the widths of a few principal London streets are recorded. The Strand, which is a main east and west channel of traffic, is in places only 32 ft. wide in the carriageway. It is now being slowly widened throughout to give a carriageway of 60 ft. This street carries motor-omnibus services mounting to 170 vehicles in the hour in each direction in its present unsatisfactory state. Oxford Street, the other main east and west channel of traffic, is 52 ft. wide in the carriageway, and it carries motor-omnibus services mounting to 199 vehicles in the hour in each direction, and carried prior to the war as many as 246. [The best result for an American street track that we can quote for comparison is 120 in one direction in the hour.] When the other vehicular traffic of these streets is considered, the above results are emphatic testimony to the flexibility of the motor omnibus and its adaptability to streets of such a character. The maximum-motor omnibus movement in any street in London at the present time is only 216 vehicles per hour in each direction. This occurs in Whitehall. The physical characteristics of the streets and roads used must govern the choice of the instrument of transport to a large extent.

Passenger Density

The second head is the volume of passengers offering for transport, and this must be looked at not only as a total number offering in a given time, such as a day, month or year, but as a volume unevenly distributed over the given time. After all, whatever instrument of transport is chosen it must be capable of dealing with the passengers when the movement is at a peak. Here again, while some features are common to all cities, the range in density from the slack hour to the rush

hour varies much. Observation in London, however, shows one curious feature. The motor omnibus is more successful than the tramcar in attracting passengers during the slack hour, and experience, therefore, a less disparity in its loadings throughout the day. It creates a traffic which cannot be secured by a tramcar because it enjoys a greater esteem or a higher prestige. In New York the same feature is observed, only there the higher fare helps to accentuate the distinction. It is more fashionable to pay the higher fare.

It is possible to frame an ascending scale of densities of traffic, and to note the limits in the scale which mark the service capacity of different instruments of transport. Such a rough scale prepared for London would be as follows:

Description of Traffic	
Very light	Under 500,000 passengers per mile of route per annum
Light	From 500,000 up to 1,000,000
Medium	From 1,000,000 up to 4,000,000
Heavy	From 4,000,000 up to 6,000,000
Very heavy	Over 6,000,000 passengers per mile of route per annum

Then, calculating the maximum possible carrying capacity of the flow of motor omnibuses or tramcars through the streets or of trains on a railway and the minimum possible load for each class of service which would be economical we can decide as follows:

Very light passenger traffic can only be economically carried by motor omnibus.

Light passenger traffic is best carried by motor omnibus, but can also be economically carried by street car.

Medium passenger traffic can be carried by motor omnibus, street car or railway train.

Heavy passenger traffic can only be carried by street car or railway train.

Very heavy passenger traffic can only be carried by railway train.

Such a scale may be applicable to American conditions without change, but probably the maximum limits for medium and heavy traffics are slightly higher.

Another method of analysis is interesting. The local passenger movement of a metropolitan city is of three types, convergent, incidental and dispersed. Convergent traffic flows inward and outward on the main radial routes chiefly between homes and workplaces. Its characteristics are, first, that it flows irregularly in peaks and shallows, following the customary divisions of the working day; second, that it covers moderate and long distances. Tramways or railways are the most suitable means for its conveyance. Incidental traffic is traffic arising in and around the various centers of activity both main and subsidiary. Its characteristics are, first, that it flows evenly throughout the day; second, that it covers short distances. Motor omnibus routes or tramways are the most suitable means for its conveyance. Dispersed traffic is traffic moving transversely or otherwise eccentrically in the area. The characteristics of this traffic are ill-defined, but generally it covers moderate or long distances. It is usually a light traffic and comprises a large element of pleasure riding. Motor-omnibus routes or railways are the most suitable means of transport employed. Convergent or incidental traffics are medium to heavy. It is estimated that in London 40 per cent of the total movement is convergent, 40 per cent incidental and 20 per cent dispersed.

This analytical method of approach is not suggested to lead to accuracy of diagnosis, but it helps to clear up the judgment of those who must prescribe for the traffic problem.

Having set out briefly the pertinent factors that must determine the judgment, it only remains to indicate the conclusions which can fairly be drawn from them. When is a motor-omnibus route the correct solution of a street traffic problem?

But before commencing to give an answer it is necessary to ask another question. Is there a street railway? If there is a street railway then two new questions come into view. Is the street railway capable of dealing satisfactorily with the problem? What new service can the motor-omnibus route afford?

Competition Justified

Clearly, where the street-car service at its maximum of efficiency is unable to deal with the traffic wanting to be carried at the time of maximum movement, it is only right to supplement it by a motor-omnibus service. This decision only presents new complications, for when the point of maximum movement is over, there is an excess of service and the task is to decide which of the competitors shall give way. There is no doubt that the motor omnibus is adapted to the convenient handling of all passenger traffic up to a density of 5,000 riders per hour in each direction (4,000,000 passengers per mile of route per annum). Hence the slack hours can usually be covered by motor-omnibus routes, leaving to the street cars the duty of coming in to relieve the heavy stream of the rush hours. The fact of the street car having the larger accommodation is only another index of the rightness of this. It is a peak-load vehicle. But then there is the capital sunk in track and overhead equipment, power plant and so forth, standing idle for the greater part of the day, so that questions of efficiency in operation must be qualified by financial considerations. Up to the limit indicated it becomes a question of expediency.

Clearly again, where the street-car service pursues a direct and single route and there is a reasonable volume of passengers desiring to diverge at some point on this route to destinations on either side, motor omnibus routes passing over the street-railway tracks and spreading out to suit the public requirements are justified as a public facility. Such routes develop and cater for new traffic.

Clearly again, where a motor-omnibus route proceeds over a street railway and advances beyond it it is affording a new facility which justifies it. The overlap of the motor-omnibus route onto the street railway should, however, not exceed such reasonable length of between one and two miles as will give a continuous ride to short distance passengers crossing over what would otherwise be the point of break in service.

There is not an instance in London where an omnibus route immediately parallels a tramway that is not justified under one or other of the above propositions, nor is there a single instance where the tramcar and the motor omnibus perform exactly the same service. Upon this it is pertinent to note that where a tramway route and motor-omnibus route work in parallel over a considerable distance it may be desirable that the service each provides should be differentiated. For example, by eliminating stops on the tramway the effective speed of the service may be increased and it becomes non-stop, or semi-express, and so affords improved facilities for moderate or long-distance traffic, while the motor omnibus service steps into its place to deal with the short-distance casual traffic. With the tramway in the center of the roadway, as already shown, the speeding up would be a natural development. This is merely a sug-

gestion; no such step in co-ordination has been attempted in London, but it would seem worth trial.

Competition, as competition merely, in transport service cannot be justified where there is public regulation or control. The best service can be given under such circumstances by co-operation. In American cities with their elaborate transport commissions, therefore, there is always an independent body able to weigh up the merits and capacities of the various instruments of transport as roughly outlined in this paper and give a judicial and equitable decision. There can be no excuse for what is known as jitney competition. In London, where there is no such control organization in existence, and where the municipal authorities own part and private companies other part of the transport facilities, there is necessarily room for conflict, but even then commercial considerations always tend to secure adjustments of view and efforts at co-ordination. There is an inevitable tendency toward it, just as there must be an inevitable tendency for motor-omnibus routes to be conducted under conditions no less ordered than street-car routes, and carrying with them privileges no less great. In London the streets are open to all competitors. Any one obtaining a license from the police authorities may run a motor omnibus. This is false freedom, and as the control of motor-omnibus traffic is extended, it makes the situation unfair. The aim that is to be sought is a franchise with its essential concomitant public control, with co-ordination of all transport services in the best interests of the passengers and the undertakings.

The Place of the Motor Omnibus

This is by the way, but sufficient has been said to indicate that where there is a tramway many considerations must enter into the judgment of the right use and employment of motor omnibuses other than those depending on the relative transport efficiency of these vehicles compared with street cars. On the contrary, where there is no tramway the judgment is clearly dependent on no other factors. It remains, therefore, briefly to summarize them once more.

For any traffic movement which does not exceed 5,000 passengers in any one hour in one direction the motor omnibus is the capable and efficient instrument on any ordinary street. On a wide street it is efficient and capable of handling a movement mounting to 8,500 passengers in any one hour in one direction, while for any traffic movement below 1,000 passengers in one direction *on the average* of every hour of the day the tramcar is uneconomical, or rather the motor omnibus can perform the work more cheaply. Therefore, for traffic up to an average throughout the day of 1,000 in the hour, which will most likely correspond to a maximum movement of 3,000 in the rush hour in one direction, the motor omnibus is the best practical solution, and between 3,000 and 5,000 both tramcar and motor bus are capable, with a preference in favor of the motor bus, and between 5,000 and 8,500 both are still capable, but now with a preference in favor of the tramcar. Over 8,500 up to 12,000 the tramcar is capable, after which a new means of transport must be introduced.

This means that for traffic on lightly or moderately loaded roads motor omnibuses should be used. This is the case on all cross-country routes, on cross-connecting roads, on extensions into the outskirts of cities. These are naturally motor-omnibus routes. Subject to a concluding caution set out later, main radial city routes are street railway routes, and as already indicated some of these call for both street railway and motor-omnibus routes.

As stated above the problem looks simple as A B C (even if the figures given are disputed). Every one can calculate the maximum possible movement of passengers with a vehicle of a given size and frequency, and every one can calculate at what point in density of service the capital cost per car-mile run on a street-railway system equates down to the capital cost per car-mile run of a motor-omnibus system. At a certain density this occurs and then the street car becomes an economic possibility. But alas, the traffic problem of any city is never stationary. Traffics come into being and disappear. They shift from place to place with shifts in trade, growth in populated areas, changes in neighborhood brought about by political and social influences. A city is always becoming a more and more specialized aggregation of people. There is a university quarter, a trade quarter, a theater quarter, a shopping quarter and so forth, and each quarter has its traffic idiosyncracies. How meet all this? Here is the great economical advantage of the motor-omnibus route; it can follow the traffic. Its garages can serve many streets and in its garages alone is it fixed to any spot. It can test changes in flow of traffic. It can seek out and create traffics. It need never be left desolate when its traffic has disappeared.

But more important than the shift and change of the traffic is the constant increase in the total volume which takes place year after year in all healthy progressive cities. Population drifts everlastingly into vast aggregations. London, with its 8,000,000 people, is a monstrous growth and still it goes on. Therefore, the rate of flow of traffic today is not the rate of flow of traffic tomorrow. There is no fixed measure by which to decide in favor of street car or motor omnibus. And here a new instrument of transport forces itself upon the attention. There is a limit to the capacity of the street car. Over 12,000 passengers in the hour in one direction means the breakdown of the service, after making liberal allowance all the while for strap-hangers. Then the underground or elevated railway, the specialized street with the specialized transport must appear. Once again there is a minimum limit. These railways are expensive to construct and probably a density of less on the average than 2,500 passengers per hour each way at any point would be uneconomical, but the maximum is advanced to much higher figures. Ten-car trains, each accommodating ninety passengers seated and as many more standing, running on a close headway giving thirty-six to the hour in one direction, multiply up to a grand total movement of 64,800 passengers.

All a reasonable man can do is to look ahead, and estimate as he is best able what the traffic requirements will be and provide accordingly. But he will use the motor omnibus whenever he can, because the risk of loss is much less an account of its transferability. He will not build a street railway when he knows that soon he will want an elevated or underground railway, for with an underground or elevated railway to handle the peak traffic and the long-distance traffic he will find the motor omnibus to be a sufficient auxiliary in the street above to deal with the casual short-distance traffic. This is the situation in large sections of London, and it is eminently satisfactory. This explains why London cannot ever be a tramway city. The tram has gone by, the phase is past. It may be a lesson for America, but who are we to say that?

The Motor Vehicle—Competitor or Ally?*

By George M. Graham
Vice-President Pierce-Arrow Motor Car Company

The Author Advocates the Operation of Auxiliary Bus Services by Electric Railways, but Expresses the Conviction That the Motor Truck Furnishes the Best Means of Giving Short-Haul "L. c. l." Freight Service

IN EXAMINING the big question of whether the motor vehicle can compete with the electric trolley car, can supplant it or can economically and profitably supplement it, there is difficulty in finding a specific "Yes" or "No." As in most things in life, no decision can be absolute. The trolleys are neither all good nor all bad, and motor buses come within the same category. The task is to find a place for both.

No motor-vehicle manufacturer has ever said that electric trolleys could everywhere be supplanted by motor vehicles. The statistics of passenger traffic on electric railways prove the essentiality of its service. We should not permit the trolley to be dealt with unjustly. The price the country paid for a narrow steam railway policy is a disastrous reality. We have corrected that injustice; we should not repeat the error with electric railways.

Nor should the electric railways be sacrified to the uncontrolled jitney bus. The trolley company has a responsibility to the entire community. It must be run or its franchise will be canceled. Bus operators, as a rule, are irresponsible for damages to property and liability to persons. They can get permits almost without investigation as to character, or as to the need of bus service. There are few laws or ordinances regulating the operation of buses, whereas in some cities the railways are subject to fines if they inadvertently fail to pick up passengers.

It is first vital to know whether the public will use motor buses, even at an increased rate of fare. Investigations show that the public is eager to use the bus. In London the buses carry more passengers than all the surface railways in the Borough of the Bronx and Manhattan in New York City. Paris has 1,000 highly profitable motor buses. Birmingham, Liverpool, Manchester and Sheffield have all found important applications for the motor bus. The most important bus company in the United States is the Fifth Avenue Coach Company, New York City, which for the fiscal year ended June 30, 1919, carried 36,488,447 passengers a distance of 8,022,026 miles in 279 buses. The drivers and conductors on these buses are the most courteous employees in the city. When all of the seats are occupied, no more passengers are admitted. Schedules are adhered to, and the service is so excellent that the buses are liberally patronized despite the 10-cent fare.

When contrasted with overcrowded, poorly ventilated trolley cars and the 5-cent fare, it is hard to believe that similar service could not at once be profitably installed in many cities of the United States with populations of 100,000 or more.

The question arises as to whether the bus can best be applied by independent agencies, as a competitor, or whether it should be operated by electric railways as part of their monopoly. The report of the Federal Electric Railways Commission recognizes the jitney and the motor bus as factors in transportation, and recommends that these forms of conveyance, when operated as public carriers, should properly be subject to equivalent regulations. This is in line with the expressed belief of J. H. Pardee, president of the American Electric Railway Association, that if there is to be a test of the two means of transportation, it should be conducted under the same conditions. Either the motor vehicle should be compelled to assume the burden of taxes, of imposts such as street paving, street cleaning and snow removal and of service requirements as to routes, schedules and equipment, or the electric railways should be relieved of these burdens.

There is a logic and equity about this viewpoint which is hardly to be disputed. Mr. Pardee has enunciated an unassailable principle, but in practical work there are other factors to be considered. The automobile industry is not immune from levies. In taxes and license fees it pays $100,000,000 yearly to city, state, and nation. Motor buses should bear their share of the taxes and other obligations, but the regulations imposed upon them should be equitable and not punitive, and should not be planned to protect monopolies that are defaulting in their obligations.

After All It Is a Matter of Cost

The question of which can serve the public more cheaply is naturally important in any effort to determine the place of electric trolley or motor bus. While there is abundant material dealing with this subject, the conditions vary so greatly that no set of figures can have a general application. It costs the Fifth Avenue Coach Company about 8.5 cents to carry each passenger as compared with a 10-cent fare. In spite of its many advantages, this company has not been uniformly successful. There can be no question of profit on earnings with regard to New York's other bus lines, for they are backed by the city and any deficit comes from the taxpayers.

The lower cost of motor-bus equipment, as compared with electric railways, is shown by an examination of the figures of the London system. The number of passengers carried in 1912 by the London railways was about the same as the number carried by its omnibus system. The aggregate length of routes operated by railways was about 148 miles, and more than 300 miles by the motor buses. At the close of 1912 the total London railway investment, less the accumulated sinking funds, was $53,000,000, while the amount of capital employed by the omnibus company, as evidenced by its outstanding securities, was only about $15,500,000. Thus we find that the London railway investment was about

*Abstract of address at the annual convention of the American Electric Railway Association, Atlantic City, N. J., Oct. 14, 1920.

three and a half times that in the omnibuses, to carry the same number of passengers. Manhattan and the Bronx surface railways, carrying only 20 per cent as many passengers, had an investment twelve times as great, or $190,000,000.

Bus Has Advantage in Low Overhead

Recognizing that actual figures vary widely according to conditions, I have sought to make a comparison that will be applicable to the average American city of more than 250,000 population. It is based on public report of electric railway costs and known figures of motor vehicle operation.

Let it be supposed that an electric railway company is confronted with the necessity of providing service in the suburb whose most remote point is three miles away from the present extreme of the line. The requirements involved are: The line is on city paved streets, fifteen-minute headway is to be furnished, 1,500 passengers per day are to be carried, sixteen-hour service is to be given during 365 days of the year, the territory is level, the electric railway line is single track, and the fare to be charged is 10 cents. The query is: Which is better, to extend the trolley tracks or establish a bus line? Figures on this point are given in Table I.

TABLE I—COMPARISON OF ELECTRIC RAILWAY AND MOTOR BUS FOR SUPPLEMENTARY SERVICE

	Railway	Bus
Investment required	$200,000	$35,000
Number of vehicles operated	3	3 (plus 1 reserve)
Speed in m.p.h.	10	12
Number of operators per vehicle	2	1
Passenger capacity per vehicle	45	25
Passengers per trip per vehicle	12	12
Operating expense per mile of line	$17,000	$17,742
Operating expense per vehicle-mile, cents	36.3	37.9
Number of vehicle-miles operated	140,160	140,160
Revenue per vehicle-mile, cents	38.9	38.9
Cost per passenger, cents	9.19	9.72
Net revenue per passenger, cents	0.81	0.28
Total cost per day	$137.97	$145.82
Net revenue per day	12.03	4.18
Net revenue per year	4,390.95	1,525.70
Interest on the investment, per cent	2.2	4.3

If the above line were to be extended one mile and the fifteen-minute service maintained, that would involve $65,000 additional capital for the trolley line as against only $6,000 for the bus line. Obviously, the smaller the capital expenditure, the greater the return will be, provided the revenue remains constant.

Another angle to be considered is the increase of service after a project has been installed. Suppose in the above case the headway is reduced. This will involve the operation of additional vehicles and the handling of more passengers. For fifteen-minute headway, three cars or two buses would be required; for ten-minute headway the figures would be four and three, for five-minute headway eight and six, for three-minute headway twelve and eight, and for two-minute headway eighteen and twelve. This shows how the number of vehicles increases as the service is increased. Of course, it costs the railway more to place each additional car in service than to place a bus in service. The car costs new $15,000, as against $5,500 to $6,000 for a bus.

Some Facts from Existing Bus Lines

In many places successful, independent, suburban motor lines are already in operation. Among them are the following:

The Wilkes-Barre line operates forty-nine buses, 4 miles in the city and 7 miles interurban, on a seven-minute schedule, one man to a bus, as against a fifteen-minute trolley schedule, two men to a car.

The Suburban Transit Company, Plainfield, N. J., a subsidiary of the Spicer Manufacturing Corporation, operates thirteen motor buses, ranging from 1-ton to 5-ton, with a passenger capacity of from twelve to seventy-five. Under its contract with the Spicer Corporation, the company agrees to furnish, for those Spicer employees who live in Plainfield, free transportation to and from the plant. This line is operated at cost, monthly statements being sent to the Spicer company. For public service the company operates a line from Plainfield to South Plainfield, a distance of 3½ miles, for which a 10-cent fare is charged. Other trucks are available on arrangement for picnics, parties, tours, etc. The operating cost varies from 40 cents per mile to 80 cents per mile, the average being 45 to 60 cents, depending upon operating conditions.

The experiences of the Fifth Avenue Coach Company show that it could not operate on a 5-cent fare basis, even with its double-deck, forty-five-passenger bus. This system is most efficiently run, yet the operating cost, exclusive of taxes, was 29.03 per cent per bus-mile.

The Baltimore Transit Company, in spite of a passenger density of 5.5 passengers per bus-mile, was unable to make ends meet on a 6-cent fare, and can hardly hope to do better than break even on the present 7-cent fare.

Many instances here given argue against the bus as a competitor, but the service rendered by the Fay Motor Bus Company at Rockford, Ill., points the contrary. On the buses of this company a 10-cent fare is charged as against a 7-cent fare on the trolley. Workmen have shown a willingness to pay the extra fare in order to travel on the Fay buses.

It is claimed that the Fay buses operate at an average of 16 cents per bus-mile, as against 19.38 cents for the one-man safety car. Each Fay bus seats from twelve to nineteen passengers. The urban lines extend 4 miles from the center of the city, and the interurban lines 37 miles from Rockford. Outside the city limits the fare is 4 cents per mile. These lines have been in operation for three years, and even in the severe storms of 1919 missed only three trips through snow.

On this subject there are thus varied views. It is well to look at them soberly. Many excessive claims for the motor bus develop at times of tension between trolley companies and the public. There is, no doubt, a general public feeling that motor buses could well be applied to both urban and suburban transportation. The important factor in city transportation is freedom from traffic congestion. This is the great advantage of the Fifth Avenue buses, which load and unload passengers at the curb, keeping the center of the highway free for private vehicles. There is also a safety factor here, only twenty-three accidents having occurred on this system in 1919, of which only one proved fatal.

Municipal Ownership Is Not the Answer

Of the three ways that buses can be operated, namely, by the trolley companies, by independent companies and through municipal ownership, the last named is the least desirable. The events of the last four years have changed many of our ideas, and we no longer think of government ownership as a panacea. Motor buses should not be allowed to compete with established trolley lines. Duplicate transportation facilities never work out satisfactorily or permanently. Furthermore, trolley companies are entitled to protection on account of their capital invested.

There are many benefits to be gained by having the electric companies themselves operate buses in conjunction with their lines. Buses can give service on streets parallel to congested trolley tracks, and thus not only handle passengers on the parallel streets but make possible a faster trolley service. The bus could offer also a short cut between factories and principal residential districts, thus avoiding the transfer of large masses of rush-hour riders at a few overcrowded points. The bus would offer the possibility of a flexible fleet of vehicles to help in emergencies.

The problem among the smaller cities is very intelligently dealt with by the Waterbury Chamber of Commerce, which after a careful investigation recommends: (1) That the trolley must be given the exclusive business on the streets now occupied by its track; (2) that jitneys and motor buses shall be permitted to operate only on streets not now served by the trolley; (3) that if with such advantages the trolley cannot or does not provide adequate service at reasonable rates, provision shall be made to allow a supplementary use of motor vehicles.

The Change Should Be Gradual

Wherever a trolley company can substitute motor-bus equipment for trolleys, it should do so, but the change should be gradual. This would to a considerable extent retard an over-rapid depreciation, and would make it possible to supply less costly facilities for those that wear out. But in the last analysis the trolley company should treat its inventories just as a manufacturer treats machinery which he finds out of date, and for which he substitutes new equipment even at a loss, remembering that that which is economically in error cannot be artificially kept alive.

One of the greatest problems that now confronts the electric railway company is the need of giving service into newly opened sections. This is a constant case of conflict. A new suburb develops; its residents demand service. The railway company investigates and finds that the utmost possible patronage to be gained will not permit an even break on the costs of installing a new line. Then it either declines to add a spur to its existing trackage, and thereby increases the public resentment against itself, or establishes such a line and accepts a loss.

Either of these alternatives involves an error. There is a better means. The motor bus affords the answer. It is but just that the electric railway should profit by suburban extension, for it was largely responsible for the early stages of the away-from-the-city movement. It has been argued as an objection to the use of buses in such service that they cannot be operated satisfactorily in winter weather. Experience has shown that the bus fares little worse under such conditions than the trolley. In Wilkes-Barre and Scranton last winter the regular electric service was handicapped for several days, whereas the bus line in Wilkes-Barre maintained almost normal schedules. The experience was somewhat similar in New York City. The Fifth Avenue Coach Company has a snow-fighting force patterned after the Fire Department, reducing interruption to traffic to a minimum.

In respect of accident fatalities, and damage suits resulting therefrom, London reports show that the buses kill five times as many persons as the electric railways, but it is to be remembered that in London the bus renders its service in the most densely crowded sections. The New York figures indicate that the bus accidents are not numerous. In one year there only one person was killed and twenty-two injured by the Fifth Avenue buses.

Already seventeen electric railway companies in this country are operating motor buses as feeders and auxiliaries. I believe that there is not an electric railway company in the United States that could not somewhere with profit apply motor vehicles in its system.

I would suggest that you bring in the motor vehicle man for consultation. Tell him your troubles. Get his ideas. He is an expert specialist in transportation subjects. It is more than likely that he will have some valuable suggestions.

At this point I desire to direct attention to some methods by which trucks could effect a direct economy in operation and maintenance: (1) Emergency trucks stationed in various zones and equipped with power and emergency equipment for temporary repairs can rerail cars, remove lines, shut off power in case of fires, repair overhead or underground construction, repair electric switches and string new wires. Cable can be laid and pulled with winch-equipped trucks. (2) For sand distribution trucks are useful. By this procedure one company has saved $8,260 per year. Salt can also be distributed thus advantageously. (3) Ties, rails, crossings, centers and paving material can be effectively handled by truck. (4) Pull-trailers, melters, sand-blast machines, welders and riveters can be placed by motor truck much more quickly than by horses.

I question often if the great public understands how enormously the resources of the American motor-vehicle manufacturer have grown. The United States, with one-sixteenth of the world's population, has ten times as many cars and trucks as the rest of the world put together. There are in the United States something like 8,000,000 motor vehicles, of which 800,000 are motor trucks. The total value of motor vehicles, parts, tires and accessories for 1919 exceeded $3,166,000,000,-000, This would seem to be a good industry to depend on for equipment.

Winning the Public Good Will

So far I have looked at the subject largely from the standpoint of money making, but there is still another factor that is of most vital importance.

I believe that the greatest gain to the electric trolley company in the application of buses would not be in larger cash receipts, but in an increase of good will. A great gain could be made in public esteem by having a squadron of emergency vehicles to handle rush traffic. For such service additional street cars, even if available, cannot be readily operated on already overcrowded tracks, but I have never been able to understand why there could not be fleets of motor buses running over the congested routes during the morning and evening hours, on the same and parallel streets. I should call them "good-will-service" buses, and should make clear in newspaper advertising that they had been applied in an effort to win the friendship of the public.

These auxiliary buses could be routed from day to day as occasion demanded. They could be used in the afternoon to handle baseball crowds, and in the mornings to take women shoppers down town. They could be applied to special picnics, the hauling of circus crowds and various similar functions. They could carry their good-will service into the suburbs.

As to the cost of these buses, all of the items of expense are definitely known. Against these costs the railway official could set the revenues to be obtained at a rate of fare higher than the trolley fare.

USE OF TRUCK ADVANTAGEOUS IN FREIGHT HAULAGE

I have presented the doctrine that in respect to passenger traffic the motor vehicle is an ally—not a competitor. I wish exactly to reverse this position when dealing with the subject of freight haulage. Here I consider the motor truck not an ally, but a competitor; in fact, except in isolated cases the suburban trolley is barred from developing any considerable volume of freight haulage. Fifteen years ago there seemed a great opportunity for the electric railway in freight haulage but now it is in the middle position, with both ends being played against it. In long-distance movement of heavy tonnage it is surpassed by the steam railroad; in short-distance transit of less-than-carload lots, up to 100 miles, it cannot compete with the motor truck.

The trolley is limited by its trackage; it cannot reach the distant outlying points as can the truck. Nor can it economically use trucks as feeders to haul freight to central points, thence to be transported to cities by trolley, for the reason that such a system would mean trolley shipment only part of the journey. Whatever economies might be effected within this limited distance would be more than overcome by the cost of unloading from the truck, loading on the trolley freight car, unloading at the terminal and then reloading on truck or other vehicle to complete the journey.

The ability of the motor truck to give a door-to-door service over an extended distance is a distinctive and inestimable advantage, and one that applies especially in the handling of anything so perishable as food products.

The only chance for the trolley as a factor in freight movement is to cater to such factories, farms, mills, stores or warehouses as are located directly along its line, thus eliminating extra haulage by other vehicles. Actually the haulage of freight has never become a very great revenue producer for the electric railways, although data obtained from Secretary E. B. Burritt shows that 404 companies have special facilities for freight service.

Regarding truck freight transportation facilities it is true that only about 12 per cent of the roads in the United States are surfaced, but their mileage, 296,290, is greater than the total steam railroad trackage and sixteen times as great as the electric trolley. The use of the motor vehicle is becoming a habit. One man in every fourteen in the United States has passed the pedestrian or wagon stage of conducting his business and applies motorized efficiency. Iowa and Nebraska show one vehicle to every half dozen of population. Therefore, shipping by truck seems the natural development.

Nowhere has trolley freight transportation been more successfully applied than in Indianapolis, the yearly figures being 400,000 tons with a revenue value of $1,500,000; yet here the motor truck is cutting heavily into the interurban freight revenues. Lines radiate to Michigan, Ohio, Illinois and Kentucky, with an average radius of about 100 miles. There are four companies operating or connecting with seventeen different roads.

Some trolley companies are attempting to deal with the situation by operating their own trucks as feeders to their electric lines. The Chicago instance is typical. Four truck lines approach Chicago respectitvely from the north, west, southwest and south, but owing to their lack of terminal connections in Chicago their service is not yet available for the Chicago shipper. This motor express feeder service is already handling approximately 50 tons per day, and is operating six trucks and two trolleys.

There are in the United States 6,361,502 farms. Senator Capper of Kansas has estimated their total value at $70,000,000,000, and states that at some stage of its transit from point of production to point of consumption $21,000,000,000 worth of food, dairy products and live-stock products go over the highways. Just as I have conceded that the number of passengers in our great cities is too enormous to be handled by motor buses, so equally I am certain that electric railways cannot hope to make more than a dent in supplying transportation facilities to the American farmer. There are too many of him and he is too widely spread.

On the contrary, the motor truck is here rendering a service to which it is ideally adapted, and its application is already having a most considerable effect. The main advantages of the truck are: (1) It gives wider production area; (2) it definitely lowers cost of foodstuff without detriment to the farmer by saving much excess transportation cost; (3) it shortens time of transit to market, thereby increasing the farmer's producing hours on the farm, and (4) it assures the prompt arrival of perishable products at the door of the consumer when they are in best condition and command the highest prices.

There are possibly 10,000 motor haulage lines in the United States at this time, some of which have investments as high as $2,000,000. They are doing an enormous business. The volume of business being developed by the truck is not being drawn from the trolleys alone. R. C. Wright, general traffic manager Pennsylvania Railroad, expresses the opinion that the haulage of less-than-carload lots of freight for distances of less than forty miles cannot be made to pay. Of the 659 steam railways belonging to the Short Line Association, 419 have less than 25 miles of track. Hence, if Mr. Wright is correct, these roads are being operated in economic error and cannot hope to be successful. In the natural course of events they must give way to a better adapted medium, the motor truck, and I feel that this is equally true of the trolley car.

The electric railways dominate urban passenger transportation; they should concentrate on that. They should apply their highly developed organizations and go after public good will. They should eliminate the motor bus as a competitor by making it part of their equipment.

They should not figure too hopefully on freight revenues; in this field they are handicapped, and sound business would dictate the withdrawal of their facilities where they cannot successfully compete with steam railways and motor trucks.

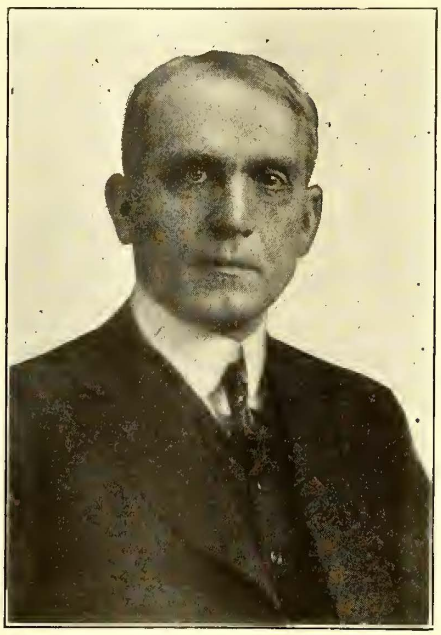
Above all they should banish prejudice, forgetting past wrongs and unfair competition, and look to the future. They need revenues. Provided they can get these what difference does it make whether the power that mints the coin comes from the leap of the electric current or the explosion of the internal combustion motor?

American Association Proceedings

Notable Address by Gov. Henry J. Allen of Kansas a Feature of the Program—Addresses on the Place of the Motor Bus Attract Much Attention—Discussion on Public Relations, the Federal Commission Report and Training Electric Railway Personnel Were Other Important Subjects—Philip H. Gadsden Enthusiastically Acclaimed as New President

THE first session of the thirty-ninth annual convention of the American Electric Railway Association began about 9:45 a.m. Oct. 12, when President Pardee called the meeting to order in the Greek Temple. There was a large attendance. The first order of business was the president's address, which is published elsewhere in this issue.

Secretary Burritt then presented the report of the executive committee, which was not read as it consists of the minutes of the different meetings of the committee and will appear in the printed report. Mr. Burritt then read the report of the secretary and treasurer. This was followed by the reports of the committee on compensation for carrying United States mail. Both of these reports appear in abstract below.



By electing Philip H. Gadsden to its presidency the American Association showed its appreciation of the notable contribution to the rehabilitation of the industry which he made during his service as a member of the Federal Electric Railways Commission.

REPORT OF THE SECRETARY-TREASURER

The report of the secretary described the activities of the year. The mid-year meeting at Cleveland on Jan. 8 was first mentioned. A brief summary of the other principal activities follow.

The association assisted in the distribution of the report of the Federal Electric Railways Commission and in the work of securing for it proper publicity in the press of the country. Addresses delivered by President Pardee before the annual convention of the Chamber of Commerce in the United States in April and the National Association of Credit Men in June were abstracted and advance copies furnished with release date to about 1,200 newspapers. Other special bulletins and statements and special reports of the Bureau of Information and Service have been furnished to the financial and daily press. In the coal situation the association has co-operated closely with the National Electric Light Association and the American Gas Association in the presentation of all matters before the governmental authorities, and at hearings before the Interstate Commerce Commission on priority coal orders.

It has also been represented at the hearing before the Interstate Commerce Commission in the electric railway mail pay case, and has printed and forwarded copies of the complete findings of the commission to all member companies. *Aera* has satisfactorily fulfilled its function. It has recorded fully the activities of the association and of the various company sections and has continued to aid in the general publicity work of the industry. The August issue contained probably the most complete presentation of the work and aims of the association that has ever been printed. Announcement of the resignation of Harlow C. Clark, for the past seven years the editor of *Aera*, is made with regret. Mr. Clark brought the magazine to its present high standard and his personal contribution to its pages, embodying the results of constant and intelligent study of the electric railway problems over this period of years, has set a high mark in the literature of the industry. The publication of a book, "Service-at-Cost Plans," by Harlow C. Clark, by the association in June is mentioned.

In accordance with the action of the executive committee at the Cleveland meeting in January, Charles L. Henry, chairman of the committee on national relations, was appointed in charge of the Washington office. The membership of the association in the Chamber of Commerce of the United States is maintained, and there should be no question that the association membership and active participation in the activities of the body will be of great benefit to the industry. The association has recently taken membership in the National Industrial Conference Board. Other national meetings and conferences at which the association has been represented officially have been those of the United States Chamber of Commerce, Federated American Engineering Societies, National Association of Traffic Officers' Convention, National Industrial Conference Board and Federal Highway Council. From Nov. 1, 1919, to Sept. 30, 1920, twenty-one railways have been enrolled as new members, with a number of others in immediate prospect, and eighteen have resigned. Eighteen manufacturing companies were enrolled and twenty-four have resigned. Individual membership during this period showed a net loss of forty, and the

INCOME STATEMENT TEN MONTHS ENDED AUG. 31, 1920

Revenues:	
Admission fees:	
Railway companies	$140
Manufacturer companies	140
Total	$280
Annual Dues:	
Railway companies	82,496
Manufacturer companies	15,497
Individuals	2,157
Total	$100,150
Miscellaneous Income:	
Interest on deposits	228
Interest on investments	557
Sale of year books and proceedings	105
Sale of engineering manuals and binders	102
Sale of "Cost of Urban Transportation Service"	700
Sale of bibliography on valuation	1
Sale of miscellaneous pamphlets	270
Sale of dinner tickets	5,480
Contribution hotel men's assn	4,483
Total	$11,928
Aera:	
Advertising	13,197
Subscriptions—Railway companies	2,460
Subscriptions—Manufacturer companies	1,410
Subscriptions—Individuals	1,438
Subscriptions—Company section members	2,455
Paid subscriptions	174
Sale of extra copies	24
Sale of binders	18
Total	$21,179
Total revenues	133,538
Expenses:	
American Association	94,123
Aera	34,755
Total expenditures	$128,878

EXPENSES TEN MONTHS ENDED AUG. 31, 1920

American Association:	
Salaries	$37,301
Rent	3,906
Postage	3,421
Office supplies and expenses	2,570
Express	137
Telephone and telegraph	3,010
Stationery and printing	7,431
Repairs to furniture and equipment	160
Traveling expenses of staff	2,141
General expense	3,540
Exchange	105
Miscellaneous pamphlets	1,925
Mid-year meeting	481
Mid-year dinner	5,485
Proceedings and advance paper	8,750
General convention expense (1919)	1,755
Convention entertainment expense (1919)	233
General convention expense (1920)	732
Convention exhibit expense (1920)	1 037
Hooper-Holmes Bureau	500
"Cost of Urban" Transportation	1,960
Washington office	7,533
Total expenses	$94,123
Aera:	
Salaries	11 291
Postage	341
Rent	565
Telephone and telegraph	470
Discount	172
Traveling expenses of staff	1 342
Magazine expense:	
Printing	14 750
Paper	4 372
Mailing	500
Cuts	950
Total	$34,755

STATEMENT OF COMPANY MEMBERSHIP SEPT. 30, 1920

	Railway	Mfg.	Total
Number of members Nov. 1, 1919	315	240	555
Number of members reinstated	20	4	24
Number new companies	21	18	39
	356	262	618
Resignations	18	24	42
Net total	338	238	576

STATEMENT OF INDIVIDUAL AND COMPANY SECTION MEMBERSHIP SEPT. 30, 1920

	Individual	Company Section
Members, Nov. 1, 1919	929	1 938
New members	38	42
	967	1 980
Resignations	78	71
Members, Sept. 30, 1920	889	1 909

company section membership showed a net loss of twenty-nine.

Considerable space was given to the report of the Bureau of Information and Service. Prior to 1918 this department handled about 500 inquiries annually. Last year showed an increase of 1,019, while the year just closing showed a total of 6,532. During the month of September 940 requests were answered. A list of the subjects of this information most in demand was given. More than 900 different companies made requests for information during the year, or an average of more than seven requests per company.

In conclusion, the secretary spoke of the loyalty of the office staff and made special reference to J. W. Welsh, the association's special engineer.

There are nine appendices giving detailed lists of the number of requests made for information on various subjects, special compilation prepared by the Bureau of Information and Service, questionnaires sent out, circular letters sent out, bulletins on the fare situation sent out, bulletins on the labor situation sent out, etc.

A summary of the report by the treasurer appears in the adjoining column.

Compensation for Carrying United States Mail

During the fall of 1919 the committee completed, with the assistance of special counsel S. S. Ashbaugh of Washington, the brief for presentation to the Interstate Commerce Commission and conducted the oral argument before the commission in Washington on Dec. 6. The commission did not hand down its decision until Aug. 7, and the decision was not communicated to the association until two or three weeks later. In the decision, copies of which have been sent to member companies, the effective date for the new rates was set as Dec. 6, 1920, just one year subsequent to the date of the final oral argument before the commission.

While the commission by the terms of its order has materially improved the existing situation concerning mail pay, nevertheless the committee feels that as a whole the decision is disappointing. It was hoped that as a result of the voluminous testimony and the earnest efforts made to present to the commission the injustices and impositions of the Post Office Department in the past it would adopt a more broad-minded and liberal attitude. In the judgment of the committee the commission signally failed to do this and did not give the railways the rates to which they were entitled.

Electric railway mail pay by this decision has been definitely put upon a space basis, although the definition of space is not as clear as it should be and it may be interpreted so as to inconvenience seriously mail carriers, particularly where mail is handled on passenger cars. The previous unfair and nebulous rates have been clarified to some extent in that the number of pouches to be carried for the minimum rate is limited to ten. This minimum rate has been increased 33⅓ per cent. When more than ten pouches are carried the order as indicated above is not clear, although there is provision for increased pay for each additional unit increment of 30 cu.ft. of space used. Further, there is a provision for tests to be made at least once in two years for determining the number of articles of mail that will fill the unit of 30 cu.ft. One significant provision of this portion of the order is the provision for conducting tests, "with the presence and assistance" of the railway officials, which is felt by the committee to be a recognition by the commission of the unfairness of the former prac-

tice of the Post Office Department in secretly handling and compiling all data relative to weights, space, etc., both on street railways and on steam railroads.

The rates laid down for independent cars and for railway Post Office cars are faulty, because they provide for no return on the value of the investment, the commission apparently having attempted merely to cover the operating costs for 1917. A new departure is the authorization of space on baggage and express cars, and here, too, it is felt the rate is too low.

Relief from side and terminal service has been provided, it being optional with the companies whether they will perform this work, except, of course, where directly contiguous to the right-of-way. A clear indication of the narrow-minded way the commission has treated the subject of compensation is shown in its allowing but 3 per cent over and above the actual cost of handling side and terminal service for supervision, accounting and general overhead expenses connected therewith.

While the situation has been somewhat clarified, the committee recommended that a committee on mail pay should be appointed for the ensuing year to continue work on this subject. The report was signed by V. S. Curtis, chairman; Charles L. Henry, G. K. Jeffries, P. J. Kealy, L. H. Palmer, Samuel Riddle, W. S. Rodger and C. L. S. Tingley.

Mr. Palmer, who read the report on United States mail, in the absence of the chairman, Mr. Curtis, added that Mr. Ashbaugh, the special counsel in this case, contends that this order is illegal and inconsistent with the decision of the Interstate Commerce Commission in the steam railroad mail pay case, docket 9,200. He thinks that the first duty of this association is to decide whether it wishes to file a motion to amend the order to make it conform to the law, as he believes it exists on the statute books. He also says that in his opinion under this decision no road need carry any mail until Dec. 6, 1920, when the order becomes effective, and that if this should be done it would most effectively bring the matter to the attention of the commission.

ELECTROLYSIS

The report of the committee on electrolysis was then presented by Calvert Townley, chairman. Mr. Townley's written report, which was very brief, simply stated that in accordance with the policy of the American committee on electrolysis the association committee had confined its activities to serving the delegates of the association, and that as there had been no calls upon it no meetings had been held. He recommended, however, that the association should continue the committee, so that it might be ready to act if necessary. In discussing his report he then explained more the purposes and functions of his committee, which he said was one of a series of similar committees from nine associations and also the Bureau of Standards, all forming the American Committee on Electrolysis. This committee was organized some ten years ago to unite the interests of the associations mentioned, which comprise all of the national associations representing corporations owning metallic structures in streets, the purpose being to study the electrolysis situation in a scientific manner. After about three years the committee produced a report which was confined largely to facts definitely determined and also to definitions compiled so that the various technical organizations forming the committee would talk the same language. During the war the committee was largely inactive. Recently there has been more activity. One of the arrangements which has been made by the American Electric Railway Association committee on electrolysis has been to appoint a representative to act with the Bureau of Standards in regard to any investigations which the bureau may conduct on the subject. This representative is L. P. Crecelius of Cleveland. Mr. Townley believes that from the work undertaken the number of disputes would be materially less, as the present plan provides a way by which the representatives of the interests affected can get together.

NATIONAL RELATIONS

Mr. Henry then read the report of the committee on national relations. An abstract follows:

The present organization of the committee on national affairs is practically a merging of the former committee on national relations and a subcommittee thereof known as the committee on national relations, and the committee was appointed at a time when Congress was considering the subject which afterward resulted in the passage of the transportation act of 1920. The committee found much to do before the passage of that act and was largely responsible for amendments proposed and accepted for the purpose of protecting interurban electric railways from being classed with steam railroads, where it was apparent that this would be injurious to the electric companies. Principal among the revisions urged by the electric railway companies and accepted was the provision that the issuing of securities by interurban electric railways should be under the control of the State public service commissions instead of the Interstate Commerce Commission; another that excluded them from the jurisdiction of the proposed United States Labor Commission; another that they should be excluded from the general provisions of that part of the act which provided for the grouping of railroads into districts, their appraisal and establishment of specific rates if they were not operated as a part or parts of a general steam railroad system or were not engaged in the general transportation of freight.

After the law was enacted many questions in connection with it developed. The first and principal one to call for the attention of the committee was the provision (Section 15-a) understood as an amendment to the interstate commerce act, which excluded the interurban electric railways, except where they "were operated as a part or parts of a general steam railroad system or engaged in the general transportation of freight." This called for a construction by the commission, so that any interurban electric railway might know whether it was or was not to be classed with steam railroads under this section. Finally the commission sent out questionnaires to various companies to get the facts on which they might base the construction of that clause. These questionnaires have quite generally been answered, but up to date the Interstate Commerce Commission has given no ruling in the matter. It is probable, indeed, that it will eventually be decided independently for each separate company.

Sections 300 and 301 of the transportation act deals with the appointments and duties of the United States Railroad Labor Board, and recently cases have been referred to that board concerning disputes between several electric interurban railways and their employees, and the board has to decide the question of jurisdiction. A hearing on this subject before the

Labor Board was set for Oct. 5, 1920, but nothing definite was determined. Several other cases are set for Oct. 18, and in the hearings on these the Labor Board is very likely to pass upon the question of jurisdiction where the cases relate to interurban electric railways.

The coal situation has received a great deal of attention at the hands of the committee and, co-operating with similar organizations from other utilities, the provisions in the service orders issued by the Interstate Commerce Commission for the benefit of electric railways and other public utilities were secured.

The chairman of the committee has been charged with oversight in management of the association's Washington office, which is at 950 Munsey Building. Paul W. McGovern is assistant secretary of the committee and personally in charge of the Washington office. He is there all the time to give attention to personal calls and inquiries and also calls by telegraph, telephone and mail for whatever information or assistance members of the association may require. With the reassembling of Congress there will be, undoubtedly, numerous matters of legislation which will claim the close attention not only of the committee but of the entire industry. In the meantime, the work before the Interstate Commerce Commission and the Labor Board and the various departments of government has presented many questions which the committee has been called upon to take care of.

At the conclusion of his written report Mr. Henry explained that under the rules of the Interstate Commerce Commission every road under its jurisdiction must have a representative in Washington upon whom notices can be served and to whom orders can be delivered. The Washington office of the association is in a position to assume this responsibility for any member company which desires such a service. In that case Mr. Henry explained that the companies should supply him with a power of attorney made out in his individual name. That will make further representation unnecessary.

Problems of Fuel Supply

A paper entitled "Problems of Fuel Supply" was then read by Eugene McAuliffe, president Union Colliery Company, St. Louis. An abstract is printed on another page.

James D. Mortimer had prepared a written discussion on Mr. McAuliffe's paper, but it was not read on account of the lateness of the hour. It will be included in the record, Mr. Mortimer being absent. In his discussion Mr. Mortimer summed up in a few words the various difficulties enumerated in the paper with which the coal industry has had to contend in recent years. He then commented that correction of the difficulties of the coal business must start at home, for he thought all progressive operators were ready to admit that there are internal problems requiring solution. He contended that assistance from coal customers is also required and that legislation would not be needed if all operators and all customers would work to a common end. Mr. Mortimer then spoke about the growing importance of the network of electric power transmission lines originating at more or less economical generating plants and the electrification of the railroads, in connection with the solution of the problems of fuel supply.

A. G. Gutheim, manager public relations committee, car service division, American Railway Association, Washington, and formerly with the Interstate Commerce Commission, appeared before the association at this time to discuss Mr. McAuliffe's paper on the problems of fuel supply. He said he wanted to emphasize two points made by Mr. McAuliffe, that the coal industry must get ready to carry a larger load and that the need for taking steps to bring about a uniform load on both the coal mines and railroads was paramount. He said that few people appreciate how miners must be content with but two or three days' work a week during a good share of the year. This is a primary cause of a great deal of the labor disturbances. Referring to the quotation from Herbert Hoover that the mines were more than 20 per cent overdeveloped in order to handle the peak load, he declared that he was of the opinion that the mines were overdeveloped 80 per cent, giving reasons for his conclusion. This matter of load factor is a very serious problem.

He then spoke of the impossibility of railroads conforming absolutely to an even distribution of a limited supply of cars among various mines. He also spoke of the Interstate Commerce Commission rule which had made it possible for the public utilities to go to a mine and contract for their daily requirements under a guarantee of adequate car supply to handle the order. This, he pointed out, was the very thing which the railroads were condemned for doing twelve years ago. The result of the order was that some of the mines did not get any cars at all for periods as long as two weeks. Upon investigation as to the reason for this, it was found that so many utility companies had gone into Kentucky, which was non-competitive on account of the fact that this coal was not shipped for export, to make their coal purchases that all available cars had been drawn into this territory under the I. C. C. ruling. Speaking of the reference in the paper to the fact that a 50 per cent car supply was all that had been secured, he declared that this 50 per cent was based not upon what the country needed in coal production but on the maximum potential output of all of the mines of 900,000,000 tons a year. It this 50 per cent were based upon the coal needed, it would be seen to be adequate to transport the normal supply.

Mr. Gutheim then spoke of the seasonal freight rate, and while he though it might help, he did not believe that legislation was the way to go about it. He considered that freight rates are too delicate a structure to be controlled by legislation. He thought also that zoning by a freight rate adjustment was not practical, although the object desired might be accomplished through legislation. In conclusion he made the statement that if there were any specter of which the coal industry has any fear today, it is that the government shall undertake to regulate it. He noted that in two or three states an attempt had been made along this line, and predicted that if this state regulation progresses it will result in controveries between states and national jurisdiction and will inevitably bring about a national commission. This, he said, he would not like to see come, but thought that the only way it could be avoided would be by the members of the industry itself adopting a more circumspect attitude than they have during the last few months.

"Aera" Advisory Committee

R. B. Stearns then read the report of the *Aera* advisory committee. An abstract follows:

Aera has demonstrated itself to be one of the most useful and essential features of the association's work for the industry, and a more progressive and construc-

tive policy for its conduct has been planned and is being made effective. This policy, following the submission of a report by your committee, as heartily indorsed by the executive committee of the association, which, by resolution, called upon all members for support in the following words: "That the executive committee of the American Electric Railway Association urges upon railway manufacturer members and upon railway companies and manufacturers of railway apparatus and supplies generally that they lend their support to the *Aera* advisory committee in its plans for the betterment and improvement of *Aera*." With this policy clearly established by the executive committee, the *Aera* advisory committee has formulated the following plans, which it is believed will greatly enhance the value of the magazine to all association members and thereby provide ways and means for the publication to fulfill to the fullest measure the possibilities for good which lie in this field.

1. Securing constructive editorial discussion from the leading men of the industry.

2. Provision for general articles on timely and interesting topics by leading executives from all branches of the industry.

3. Arrangements have been made for technical articles from manufacturer members of the association of an educational character which will appeal not only to company section members but also to the rank and file of electric railway and manufacturing employees in general. These articles are for the purpose not only of interesting operating, repair and shop employees but also for the purpose of educating them in operating, construction, mechanical and electrical machinery problems of all kinds, which in turn will obviously tend toward lower maintenance cost and less abuse of equipment.

4. Provision for articles and discussions of interest to transportation and traffic managers and all other matters pertaining to this branch of the industry.

5. Articles and discussions by leaders of the maintenance of way, structures and other related problems.

6. Similar articles on power plants, substations, transmission and other problems embraced in this branch of the industry.

7. Special space to be devoted to specific problems confronted by companies in various cities such as those already published with respect to Detroit, Toledo and Bridgeport, an article on the latter being published in the October number, just issued.

8. Improvement and enlargement of the Question Box Section.

9. The great value to members of the association of the Bureau of Information and Service is becoming more and more apparent to the industry, as witnessed by its remarkable growth and extension of usefulness during the past year. It is planned, therefore, to give greater space and thereby more thoroughly inform members as to what this bureau is accomplishing so that all may avail themselves of its service.

10. It is planned to improve the mechanical features of the magazine for the benefit of advertisers.

11. It also is planned to work in closer co-operation in the future with the committee on membership and the committee on company sections, it being fully appreciated by your committee that the magazine can be of very great assistance in the work of both of these important committees.

12. Steps already have been taken to improve greatly the make-up and general appearance of the magazine as a whole. The August and September numbers appeared with a new cover design, which was part of the new plans. The August issue was designed to aid the committee on membership in its campaign for new members and at the same time indicate to the readers of *Aera* the new policy under which the committee expects to go forward and build an important and more valuable publication. It is recognized that a magazine, when properly conducted, is of immeasurable value in securing and holding membership in the association.

In general, it is the purpose of your committee to make improvements and changes and add new features which will give the readers of *Aera* a constantly improved magazine from every standpoint.

The present circulation of *Aera* is approximately 6,500 copies a month. This is far below what it should be considering the field it occupies as the official publication of the association, and your committee is firmly of the belief that this number can be greatly and rapidly increased if all executives and managers of both railway companies and manufacturer companies fully appreciated the great value to the industry as a whole and further realized the value of having their employees read the magazine regularly. Your committee believes that if serious and constructive efforts were carried out to secure additional subscribers the number could be increased several fold.

In planning to place this matter clearly before all members, your committee has divided its field of operations into eight regional districts and has appointed a committee to represent railway and manufacturer members in each district. The duties of these regional committees are to carry out the policy and plans of the *Aera* advisory committee, working in conjunction with the local committees on membership and conducting an active campaign to strengthen and build up this important branch of the association's work.

The entire plan for the betterment of *Aera* of course depends upon the support given your committee by the members of the association. A better magazine undoubtedly will bring steadily increasing circulation and this means better and more extensive understanding of the problems confronting the electric railway industry.

Aera now is a potent force for good, but it can be strengthened and made more valuable with every issue. The work must not be permitted to stand still. It must go forward, and to go forward it must have the active support of every member of the association. The committee bespeaks your co-operation and assistance. The report was submitted by R. B. Stearns, chairman; E. C. Faber, M. B. Lambert, I. A. May, C. C. Peirce, R. E. McDougall, A. M. Robinson and Martin Schreiber.

MR. GADSDEN GIVES VIEWS ON COMMISSION REPORT

Philip H. Gadsden, electric railway commissioner of the Federal Electric Railways Commission, was called to the floor by President Pardee to give some of his views and impressions of the work of the commission. Mr. Gadsden reviewed briefly how the industry had drifted into its present transportation methods from the horse car days and with only horse car experience to guide it. He pointed out how the resultant situation had become continually more difficult and had brought the industry constantly nearer to bankruptcy because of the uneconomic foundation upon which it was working. In referring to the final report of the commission he called particular attention to the fact that it formed

the opinion of seven men, of whom five knew no more of the street railway industry than they did of 500 other industries when they began work. What they said in the report, therefore, represents what the people think. If railway operators feel that they cannot subscribe to some of the points made they should consider that the real question is whether or not these commissioners have reflected the real public mind. If so, then they must follow this dictation, for the future depends on whether we follow the code of ethics which the public has thus set up. He thought railway managers must give more and more thought to the consideration of the public.

Mr. Gadsden declared that one great value of the commission report was that for the first time men of the industry are able to cite the findings of an official body as to conditions in the industry. Whereas heretofore they have been under a continual handicap to make the public believe that taxes, paving charges, etc., were overcoming the industry, because the statement came from a biased person, this argument would no longer be necessary, for the railway men can cite an authority for the statement. Likewise, in the past, the exploitation of the railway treasury by the city officials was considered no crime, but when this official body has declared that of every carfare ½ cent goes to taxes, then it should not be long until the great mass of the people who must ride in the street cars will understand this and object to the payment of this sum for the benefit of the property owner who rides in his automobile. Likewise when the men of the industry have endeavored to tell the public that the industry was practically bankrupt, only to be disbelieved, they can now refer to this report, wherein a judicial determination of the real facts has been made.

Referring in a very complimentary way to the work of the Committee of 100, Mr. Gadsden said that the testimony and evidence presented was so complete and exhaustive that when the commission finally gathered to formulate its report there was not a single controversy on any facts regarding the industry. The commissioners were entirely of one mind on the facts, and there was surprisingly little difference of opinion on the conclusions to be drawn from these facts. What differences there were were largely on the importance to be attached to the various conclusions.

In its report the commission has sought, he said, to set up a complete theory for the reorganization of the electric railway industry, and in this connection he called attention to three or four basic things. Up to now, in the negotiations between company and city, each has tried to make the best trade possible, and in this procedure both parties have acted without regard to the considerations of the real party at interest, the public.

Another basic thought brought out in the report, which Mr. Gadsden said was the most valuable contribution of the commission, was the emphasis which had been laid on the restoration of the credit of the industry. Heretofore no one but executives of railways have considered this problem. There has been a popular notion that when money was needed all that was necessary was for the executive to go down to New York, spend a few days in Wall Street and come home with the money. Emphasis had never been laid on the right point, and it now appears that consideration has been given to the wrong people. The real parties in interest are the car riders on the one hand and the investors on the other—service and credit. Mr. Gadsden urged upon the members that they should go forth and preach this matter to the people generally, for the industry has been proved and declared essential and is giving a greater service than ever and yet is prostrate because of lack of credit. The question is, what are we going to do to revive the industry?

Mr. Gadsden endeavored to answer this by pointing out that it was no longer a question of what rate of fare will a city grant, or a supreme court ruling on what is a reasonable rate of fare. The real test of an adequate rate is not that which will produce a proper rate of return on the capital in the property now, but what it is necessary to pay for money from the man who has never put money in the industry before. Is he going to come in on a 6 per cent basis when he can get 10 per cent on securities of the highest rating in other industries? Mr. Gadsden insisted that the electric railway industry has got to be in a position to go into the money market to compete for the money so desperately needed. The proper rate must be that which will meet the demands of the investor, not the City Council.

Mr. Gadsden considered that the best route to follow in the effort to restore credit was by way of the service-at-cost plan or something along that line. He contended that the investor will not come back into the industry under the old conditions; he is not going to put his money into an industry which is subject to the control of some one outside of it. In all other businesses the management forecasts the future and adjusts the price of its commodities to conform to existing or expected conditions, while the electric railway industry has thus far never been able to secure a fare increase until it has proved that it was on the verge of bankruptcy.

In summing up, Mr. Gadsden said that the first step to be taken in working out the situation was to secure an accurate physical valuation of the property. He said there never was a more propitious time than the present to do this, for the appraisers are bound to be affected by present prices.

The second step to be taken was to make the capital value of the property conform to the physical valuation established.

Mr. Gadsden also laid stress upon the fact that harmonious relations with employees must be established in the industry because people are not going to put money into a business which is continually torn by strikes. He said that we must work out a plan which will guarantee continuous operation of the electric railway properties.

In concluding Mr. Gadsden referred again to the splendid work of the Committee of 100, saying that it was the most effective piece of work that had ever been done in any industry, not only in the preparation for the hearings, but in the manner in which publicity about the hearings was spread over the country. He thought that the work of this committee had only begun and that it should be continued by all means. As indicating how the benefit which may be expected to accrue from the report will continue, he said that only last week he attended a meeting of the board of directors of the United States Chamber of Commerce, at which the committee on public utilities of the Chamber filed a most excellent report on the public utility situation. This report was ordered to a referendum vote, so that during the next six weeks it will come before every local chamber of commerce and affiliated

business organization, bringing attention to our industry through a very sympathetic report. He said that the electric railways ought to have a representative at every one of these local meetings.

President Pardee then appointed the following committees before adjournment:

Committee on resolutions: B. A. Hegeman, Jr., chairman; W. H. Sawyer, W. C. Ely, W. K. Archbold and E. S. Wilde.

Committee on recommendations in president's address: W. F. Ham, chairman; C. C. Peirce, C. D. Emmons, E. R. Hill and J. H. Drew.

Committee on nominations: Arthur W. Brady, chairman; W. A. Draper, L. S. Storrs, Thomas W. Casey, C. D. Cass, J. W. Perry, L. J. Drake, L. E. Gould and F. R. Coates.

Wednesday's Session

The second session convened in the Greek Temple on Wednesday morning, at which time reports of the committees on fare systems and company membership and publicity were presented. Abstracts of these reports are given below.

Fare Systems

The report of the committee on this subject is a continuation of the investigation conducted last year by the committee on zone systems. In a study of the results of flat fare increase, reports were received from forty-five representative electric railway companies.

In almost all cases when an increased fare was first put into effect there was a decrease in the number of revenue passengers carried. Due to the higher rate, however, this decrease was not sufficient to prevent an increase in revenue. As time went on and the patrons of the company became accustomed to the higher fare the volume of riding increased, and it is the opinion of many of the executives of the companies that they have gotten back practically all the riders lost in the beginning. Many properties have had more than one fare increase, and it has been the experience of a number of them that on the succeeding increases the revenue passengers carried showed no material losses. Where the public has been led to oppose fare increases, the gain in revenue has been limited, but in other cases, where the increase has been taken in a spirit of fairness and justice, the revenue has approached quite closely the theoretical limit. Only general deductions can be stated, because in a number of localities the economic and industrial readjustments occurring since the end of the war have made specific and accurate comparisons impossible.

One of the outstanding effects of the war so far as electric railways are concerned has been the destruction of the idea that a city street car ride should never cost more than 5 cents and the committee is of the opinion that the realization of this fact has been of great service in reconciling passengers to pay the higher fares, especially where more than one increase has been found necessary.

Hereafter, the greatest single factor in forcing still further fare increases will be the demands for higher wages, which are being continually and skillfully put forward by employees. It seems to the committee that it is becoming clearly understood by the public that increases in wages necessarily mean increased fares, and the granting of future demands of this sort will be largely dependent upon the attitude of the public.

Maximum Practicable Flat Fare

In the committee's investigations the direct question was asked as to what executives felt was the highest fare that could be charged on their own properties. The answers varied, being obviously influenced by existing local conditions, but the views expressed would seem to indicate that the price of a car ride must be determined by costs of labor, supplies, and commodities. If the country is facing still further increases in costs of living and higher wages, undoubtedly fares must be raised beyond 10 cents. Under existing conditions the large majority of the executives report that for their properties the charge should not be in excess of 10 cents. A considerable number of the executives placed the figure lower than 10 cents, and those placing the figure at 10 cents apparently had in mind the fact that 10 cents is a dime, a standard coin.

In Boston, Mass., where a flat 10-cent fare is in effect, some 5 cent non-transfer lines were provided in the built-up sections of the city in an effort to encourage short riding; but the results obtained were not particularly encouraging, due partly to the lack of transfer privilege, partly to slow operation through congested districts as compared with subways and elevated, and to some extent to lack of interest on the part of patrons in the possible saving.

In Portland, Maine, when the original increase in fares was established some 5-cent lines were put on to operate in the business district with a charge of 1 cent for transfers in case the latter were requested. These lines, which were the result of the suggestions of the Public Service Commission with the idea of encouraging short riders, were not successful from that standpoint, and when a further change in fare was made were abandond.

These two illustrations, while not conclusive, seem to discourage the idea that short-ride, low-fare car lines in congested centers of cities would be successful.

The fact is incontrovertible that costs of living, manufacturing and producing have increased over 100 per cent all over the country. While it is hard to make people acquiesce in the fact, it is inevitable that they must eventually pay proporticnately as much more for transportation as they would have to for clothes, food, and other articles. Gradually the public mind is accepting the logic of this situation, and this is one of the psychological factors that are enabling the companies to obtain the theoretical increase when fares are raised, and is one of those underlying elements which are tending to restore the industry to some degree of prosperity.

The committee believes that the experience of the past year confirms the preference for the use of metal tickets expressed by the committee on collection and registration of fares. This has been especially demonstrated on certain systems where the use of the multiple fare paper tickets resulted in abuse by unscrupulous employees and patrons.

The experience of many companies now indicates that a substantial differential between a cash fare and a metal ticket is desirable in order to encourage the use of the metal ticket. There is, of course, ample justification for a higher cash fare because the transient and occasional riders who do not desire to purchase tickets should pay a higher fare for service which is always available for their use.

It is the conclusion of the committee with reference to the above matters:

1. That, for the large number of cities, a cash fare of 10 cents would not decrease the riding habit sufficiently to prevent the obtaining of needed increases in net revenue, and that in very many cities this 10-cent fare is absolutely necessary for adequate service and restored credit.

2. That if an average fare in excess of 7 cents is necessary to establish credit and allow proper service, it would recommend a 10-cent cash fare with such reduced rates, if any are desirable, preferably through metal tickets, as will produce the needed average fare.

JITNEYS IN FLAT-FARE CITIES

Up to even one year ago there was among many a general feeling that increases in fare, especially for short riders, would bring on very much more serious jitney competition. The results show that fear to have been unfounded in many cases, of but slight moment in others, and serious in some cases where the conditions were local unto themselves. Eighty per cent of the replies received to the questionnaire reported no stimulation to jitneys whatever, only 8 per cent reported an actual stimulation, while 12 per cent referred to it as slight or as lasting but a short while. Although the questionnaire did not directly ask for that information, one-third of the answers referred to the increased use of the privately owned automobiles. The general feeling seemed to be that the increase in fares was a negligible factor in the increase in the number of autos, though there was for a short time after an increase in rates of fare a growing practice on the part of auto owners to invite their friends to ride with them.

Sensible regulation has in many communities either eliminated the jitney entirely or confined its operations to streets or districts not adequately served by the railway lines. Although very substantial progress has been made by public authorities at different places in dealing with this question, there are still many localities where the problem has not been squarely faced.

While it is granted that, as summarized above, in many localities the jitney problem has been effectively met, the fact remains that there are still numerous communities in which jitney competition is most serious. The fundamental conditions in connection with this form of unbridled and usually unregulated competition have been stated and discussed on numerous occasions both before the association and in the technical press, but it seems to the committee that it is necessary again to draw attention to this problem. It is entirely possible that we shall, within the next few years, face a slackening of industry and business, and, if this occurs, the jitney menace may again assume more serious proportions.

The only way that a fair trial of the motor bus or jitney service can be made is for the authorities to insist that these vehicles give the same character of service as provided by the electric cars. This means they must furnish dependable and regular service during the early hours in the morning, during the mid-day period and after the evening rush peak, operating on schedule, whether the weather is pleasant or rainy, and going out to the ends of the unproductive or unprofitable routes. Just so long as jitneys and buses are permitted to skim the cream off of street railway traffic, they are working an injustice not only to the car company, but to the citizens and the communities themselves, because they are lessening the possibilities of the electric railroads performing adequately and completely the functions they are to render.

Certainly, the American Electric Railway Association should take the strongest possible ground against the uneconomic and short-sighted practice of some municipal officials in using jitneys as a means of reprisal against street railway companies. This industry of ours is governed by the same economic laws as other businesses, and, if these laws are violated to satisfy the grudges or prejudices of municipalities or politicians, not only the industry will suffer, but the citizens of the community in the long run will be the greater sufferers.

The conclusions of the committee with reference to the jitney situation are:

1. That the operation of jitneys should be confined to non-competitive and supplementary or auxiliary service.

2. That in a number of localities the handling of the jitney problem by public authorities has tended to decrease the operation of jitneys and affords an example to the remaining localities for an effective and far-sighted use and development of the urban transportation problem.

3. That this association should take strong ground against unfair motor vehicle competition and should urge its members to combat piratical competition in every way possible.

ANALYSIS OF THE EFFECT OF FLAT FARE INCREASES ON OPERATING REVENUES AND REVENUE PASSENGERS

The results of this study show that increases in carfares have not destroyed the street railway business. The street car is still the ordinary man's conveyance. Detailed information was obtained from a group of forty representative companies operating on a flat fare rate, and from the information furnished, the accompanying chart has been prepared which shows the passenger revenue, revenue passengers, and the average rate of fare by months from January, 1917, to May, 1920, inclusive. There was a consistent increase in operating revenue, amounting for the period in question to 56 per cent. Similiarly there was an increase in revenue passengers amounting to 12 per cent, and the committee's study shows that on the whole there has been a substantial gain and not a loss in revenue car riders.

The weighted average rate of fare was obtained by dividing for each month the passenger revenue by the number of revenue passengers for the entire group. This curve shows a consistent increase in the average rate of fare, from about 4.65 cents to 6.5 cents. Small fluctuations in the average rate of fare, particularly in the early months of 1920, are due largely to the variations in the relative traffic and revenue among the companies in the group, and to the effects of the severe winter weather in certain sections of the country. These curves are all compiled on a logarithmic chart and therefore show relatively, by the slope of the lines, the comparative increases in each of the plotted quantities. Attention is called to the fact that the lesser increase in revenue passengers than in passenger revenue and rate of fare does not indicate a reduction in the riding habit. Such a reduction could accurately be determined only by a comparison with an extended prior period in which no substantial fare changes occurred.

It is, of course, obvious that the bottom two curves on the chart, representing the passenger revenue and the revenue passengers, are parallel so long as the rate of

fare is constant; and that the slope of the bottom curve, representing the passenger revenue, will increase in proportion to the algebraic sum of the slopes of the revenue passenger curve and the rate-of-fare curve.

It is significant, however, that during the final two years shown on the chart, in which the greater part of the fare increases have become effective, the growth in revenue passengers has been 12 per cent, as compared with fare increases of 36 per cent. This indicates that in the cities represented on the chart there has been no material interference with the normal growth in traffic as a whole. The yearly average increase in revenue passengers for the forty companies shown on the chart was therefore 6 per cent as compared with the average of 3.7 per cent for all electric railways of the United States as shown by the United States census between the years 1912 and 1917.

The committee believes that the conditions disclosed by this analysis confirm the opinions expressed above as to the transient character of traffic losses and the revenue possibilities of further increases in flat fares.

Results to Date of Zone Systems

Two kinds of zone systems have been in operation in the United States. (1) The central area zone system, as used in Milwaukee, Portland (Maine), Providence, Springfield and Holyoke, and (2) the kind more nearly similar to the British system used on the Public Service Railway in New Jersey and the Connecticut Company.

Sufficient experience has been accumulated to show that the central area or fixed minimum zone systems can be successfully operated in American cities. Notwithstanding the fact also that after brief trials in New Jersey and Connecticut uniform rate zone systems have been abandoned, the committee feels that the experience gained has demonstrated that, if deemed desirable, it is practicable to introduce the uniform rate zone system in American communities of large population, but it is of the opinion that it should be done only with a fixed minimum charge.

Results to date have shown most definitely that the minimum fare should not be less than 5 cents. Speaking generally, where additional revenue is needed and the change from flat fare to a zone system is contemplated, the minimum fare for the zone system should not be less than the previous flat fare at least at the beginning. The increased number of passengers necessary to make up for revenue lost by reducing the fare to the short rider would, for the most part, ride on portions of routes already congested. Even if it were possible to obtain these riders by the reduced fare they could not be handled probably with present facilities in many communities.

In all cities using zone systems minimum fare riders constitute the larger percentage of revenue-producing passengers. On the Public Service Railway there was not a great increase in short riding when the fare was reduced from 5 cents to 3 cents, and, as a result, the company did not receive sufficient additional revenue from this source to make up for the loss from all of the riders who were able to avail themselves of a ride for a fare less than the previous flat rate of 7 cents.

It is true that the low fare zone system in use abroad has had no fair trial in this country, but experience thus far indicates plainly that under present conditions an initial rate under 5 cents would not bring a proportionate increase of short riders and would be ruinous, in that the fare of the long haul passenger would have to be increased to a prohibitive degree. Up to the present time, the zone system has been adopted because it was believed to be the preferable way, taking all needs into account, to secure the necessary additional revenue, and has in no case been tried out purely on its merits as being more equitable than the flat fare plan for producing the same revenue. There apparently has been no call on the part of the majority of the riding public in this country for a zone system except, knowing that increased fare had to be obtained, it was accepted as the less objectionable method. It is interesting to observe that, once having been tried out, it has remained in effect in all places where it has had a fair trial, and the prevailing opinion is that a large majority of the public, where such a system is used,

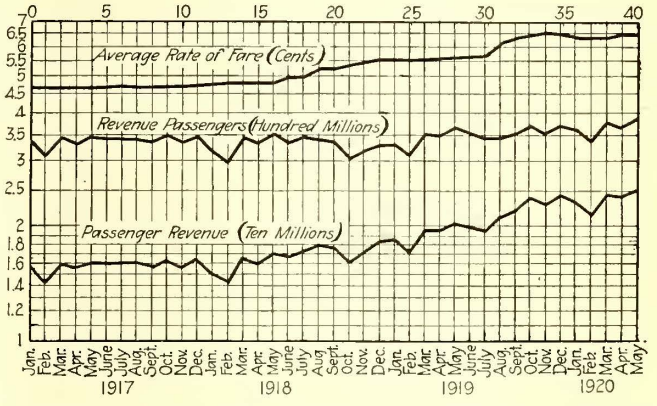


CHART SHOWING AVERAGE RATE OF FARE, REVENUE PASSENGERS AND PASSENGER REVENUE FROM GROUP OF FORTY COMPANIES, FORMING PART OF REPORT OF COMMITTEE ON FARES

would not change to a flat fare system producing equal revenue. The committee feels that in New Jersey and Connecticut the uniform rate zone system did not have a fair trial.

All of the companies report practically no change as to congested areas or real estate values, due to the zone system. While true, this is not necessarily conclusive, because allowance must be made for the shortage in and unsettled conditions of housing facilities that have existed during the recent war adjustment period. The committee believes that this objection to a zone system has been very much magnified, and that it is not an important or valid one.

Against the protests made in the fare case at Springfield, Mass., by residents of suburban territory, that such territory had been built up under the flat fare system, and that the departure therefrom would be unjust and prejudicial to the inhabitants and especially to owners of real estate, the commission, in its decision, stated its belief that the zone plan would have no substantial influence on land values in the outlying districts. Even if it should, however, have such an effect, it was a fact that the electric railway lines had materially increased such values in the past; that the landowners profited by and enjoyed this unearned increment; and that, if they should be deprived of this in some slight measure by an attempt to apportion the mounting costs of electric railway service more nearly in accordance with the service furnished, there should be no complaint on this ground. The committee declares that this argument is logical and a fair answer to the protests of real estate promoters and suburban developers and landowners.

In some of the cities using a zone system no real

jitney competition existed, but, in the majority of cases, jitney competition actually existing at that time, or fear of jitney competition with higher fares, was a very important feature in connection with the decision to introduce a zone system. Unquestionably the danger of jitney competition has been minimized by the adoption of a zone system instead of a corresponding increase in flat fares.

The managements now using zone systems investigated by the committee are practically unanimous that they prefer their present zone system to a flat fare system, and it is the opinion of the committee that in these places the companies are in a better position than they would have been under a flat fare system.

The committee has no changes to recommend in the terminology and definitions submitted in the report presented last year by the committee on zone systems.

The report also contained extended data on the results of the zone fare operation in certain cities as well as an appendix containing the replies to the questionnaire submitted by six companies. The report is signed by W. H. Sawyer, chairman; R. F. Carbutt, Thomas Conway, Jr., Robert M. Fuestel, L. R. Nash, L. H. Palmer, J. K. Punderford, A. S. Richey and C. L. S. Tingley.

Discussion on Fare Systems by Mr. Mortimer

J. D. Mortimer submitted a prepared discussion on the report of the committee on fare systems, in which he stated that it was the consensus of experience that increases in flat rates of fare without change of fare points have pretty generally resulted in increases in revenue. If the area served for a single fare is large and the average ride long the increase in fare needed to compensate for increased costs has been larger than where the single fare area has been smaller and the length of average ride shorter. No one has yet been able to construct a demand curve for urban railway traffic. The relation between rates of fare and traffic is unknown. Attempts were made some years ago to show that the high riding habit in Cleveland was due to the 3-cent fare then obtaining, but investigation showed that the then high riding habit was accompanied by active business, disclosed by post office receipts, building permits and bank clearings. There was a much higher correlation between riding habit and business activity than there was between riding habit and rate of fare.

With the meager data available and the rough methods of reduction generally in use, it is impossible to say just what effect the rate of fare has on riding habit. It will probably vary in different localities; it will certainly vary during different seasons of the year, and it will vary with the industrial and commercial activity. Few cities during the last three and one-half years have possessed identical business characteristics. Some participated in war prosperity; others suffered because they had no war industry and temporarily lost population to the selective draft. If there is anything in the assumed relation between traffic and the rate of fare it is likely to appear more evident when war prosperity has become only a memory.

The diagram in the printed report shows that for the three years and five months the forty companies used in computing the comparative figures enjoyed an increase in traffic. The number of passengers during the first five months of 1920 was 1,843,000,000 compared with 1,667,000,000 during the first five months of 1917; this is an increase of 10.5 per cent. Just how much the traffic would have increased if there had been no fare increase no one will ever know. Neither will we know how much more traffic would have increased if the use of automobiles had remained constant during that period.

The fact that it became necessary to abandon the operation of the zone fare system on the lines of the Public Service Railway and the Connecticut Company is cause for great regret. Many people have been led to believe that these systems abandoned zone fares because they were impracticable; distance tariff plans thus received a setback. The central area zone system, devised in Milwaukee as early as 1911, but not placed in operation until January, 1914, appears to have given general satisfaction to both the company and the patrons. Needless to say, the central area zone scheme did not always produce the revenues which were expected; traffic reactions were indeterminate in quantity and accurate estimates difficult to make. In all the central area zone schemes except in Milwaukee zone fares were adopted for the purpose of increasing revenues at the time of adoption. In Milwaukee the plan was adopted to forestall an extension of the single fare area or central area in the near future and increase revenues in the more distant future. A look into the future was taken, and it was recognized that if expansion of the single fare area could be prevented, the problem of rising electric railway costs, then sensed, would be less difficult to meet. It was expected that the Milwaukee zone scheme would result in some reduction in revenues; an immediate small reduction was justified on the ground that in years to come the growth in revenues under this fare plan would far more than offset any temporary disturbance in income account.

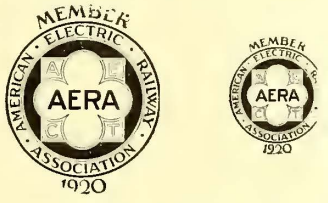
That portion of the metropolitan system lying without the central area has never been remunerative; it has required support from the heavier traffic in the central area. But zone fares have not increased as rapidly as the increases in costs; the drag on the central area has increased. The commission and courts have held that the metropolitan system is to be considered as a whole and that the deficits on suburban lines are to be offset by larger returns in the central area. There remains much to be done in determining the best method of assessing the costs of service between the long and short haul rider. To require the long haul rider to pay all the costs of serving him will result in very high fares, fares so high as largely to reduce traffic. Probably only a general rule can be enunciated, *i.e.*, so to arrange the zone fares as to cause the minimum adverse reaction to traffic and support the deficit by the short haul traffic.

The problem is not greatly different from that of assessing income tax; ability to pay appears to be an important consideration. All the companies which have received increases in fares appear to be satisfied with the respective methods by which such increases were put into effect. The flat fare advocates are happy, and the zone fare proponents, who yet have their plans, seem satisfied with themselves. Probably most of us feel that revenues are still insufficient, and none of us, with possibly one exception, is very particular as to what scheme of fares gets us the money. If the railways are to run our motto must be, "Get the Money." Should industrial and commercial activity recede to the level where unemployment becomes noticeable and the depressed conditions of 1908 are approximated, then it

will be instructive to watch the relative effect on earnings of the two general fare schemes discussed by the committee.

COMPANY MEMBERSHIP

The committee on company membership reported that its work this year had consisted of three parts: (1) The compilation of a list of possible members, based upon preliminary lists furnished by Secretary Burritt and revised according to data secured by correspondence and conference; (2) the enlisting of the active co-operation of railway men throughout the country in the endeavor to bring to the attention of companies which



EMBLEMS RECOMMENDED BY COMPANY MEMBERSHIP COMMITTEE

are outside the fold, as forcefully as possible, the advantages of membership in the association; (3) the use of all other possible means to secure the actual applications of possible members in time to have the names included in this report.

The committee made several suggestions as to ways in which its work can be followed up. It submitted the accompanying design of an emblem for use of member companies on stationary, in catalogs and the like.

The committee reported a total of twenty-one new railway companies secured during the year.

The report was signed by F. R. Coates, chairman; Benjamin Adams, J. P. Barnes, H. F. Dicke, C. R. Ellicott, L. E. Gould, C. A. Hall, E. B. Moore, H. H. Norris, R. T. Sullivan, E. M. Walker, E. P. Waller and E. F. Wickwire.

PUBLICITY

The report on publicity explained that its instructions provided that the committee of publicity men, composed of local publicity men in the employ of a number of member companies, was to report to and work in close co-ordination with the committee on publicity. Such a co-ordination had been effected. The report mentioned the work done in disseminating the report of the Federal Electric Railways Commission and abstracts thereof and outlined a program for the coming year, including the preparation of car cards, the stimulation of utility managers to more consistent utilization of their employees as good will promoters, and the consideration of the publicity work of the various state associations, particularly that of the Illinois Committee on Public Utility Information, with a view of putting into effect such part of the work as can be adapted to the industry for use nationally.

OTHER PAPERS AND REPORTS

In the absence through illness of Gen. Guy E. Tripp, chairman of the Committee of One Hundred, President Pardee outlined the reasons for the formation of the committee, some of its accomplishments and stated that the executive committee of the association had voted for the future continuance of the committee for the purpose of further disseminating information pertaining to the industry.

The paper on possibilities of transporting other than passengers on interurban lines by Britton I. Budd, Chicago, was then read. It will be found on another page in this issue. Owing to the absence of Mr. Budd the paper was read by L. C. Carraway.

Martin Schreiber, Public Service Railway, Camden, N. J., then presented an address on the training of electric railway personnel. On account of the interest which this paper has to all branches of the electric railway industry its publication has been deferred to the next issue of this paper so that it can receive the wider circulation reached by the "mechanical issue" of this paper.

SETTLEMENT OF LABOR DISPUTES

At the conclusion of Mr. Schreiber's address President Pardee announced that Gov. Henry J. Allen of Kansas had arrived and would speak to the delegates on "Settlement of Labor Disputes in the Interest of the Public and its Influence on Fares."

A large audience had collected in the Greek Temple to hear Governor Allen, and eager listeners stood at the open windows. The Governor's address was devoted largely to an account of the working of the conciliation court in Kansas and the reasons which had led to its establishment. In the Governor's opinion a new principle in the settlement of labor disputes had been reached, beneficial alike to labor, capital and the public. His address was received with great applause. An abstract of it appears elsewhere in this week's issue. At its termination a vote of thanks was moved by Thomas N. McCarter and was unanimously carried by a standing vote.

Thursday's Session

The last session of the American Association was called to order about 10:30 a.m. Thursday, with President Pardee presiding. First in the order of business of the day was the report of the committee on valuation, which, in the absence of Chairman Kealy and Vice-Chairman Schreiber, was presented by Cecil F. Elmes, member of the committee. No action was taken on the report, an abstract of which follows:

VALUATION

The report of the committee on valuation was largely a reaffirmation of the principles outlined in the report of October, 1919, and an elaboration or a more specific definition of the significance of certain terms, such as "reproduction new," "present-day prices" and "going value."

The committee reported that it has spent its time in the study of important commission decisions and in the study and analysis of important papers which have been presented. It has also taken into consideration the fact that this is the fifth year of "abnormal prices" and that the general trend is still upward. It recommended the careful consideration of the reports of the committees on valuation and return of the Illinois State Electric Association, the Illinois Electric Railways Association and the Illinois Gas Association.

In making more clear what is meant by "cost of reproduction new" the committee says the following:

It is one method used in making an appraisal and should not be confused with some other method.

The "cost of reproduction new" of the physical plant, as we view it, means the estimated cost of reproducing a new property identical with the one under investigation, under

present conditions of labor and materials cost and methods of doing work without any deduction for loss of value due to age or other causes. The new property must be made up of the same number and kind of units as the existing property that is being reproduced, and all of the materials and labor that entered originally into the construction of these units must be considered in finding the reproduction cost of the new property.

As to present-day prices, the committee gave additional argument why unit prices of today must be used, for "in no way can the values of today be found by using unit prices of ten years ago, unless the dollar will purchase the same amount of material and labor today as it would have ten years ago. The company is clearly entitled to have the value of its property expressed in dollars having the same purchasing power as the dollars the public is paying for the service the company is compelled to give."

The committee also gave further argument with reference to "going value" and the reason for including it in a valuation. It states that "going value" is a fact just the same as the physical plant is a fact. Some of the more important items which take up "going value" are listed.

"Rate of return" is a subject directly collateral to that of valuation. The committee felt that it has not had time to give adequate attention to this question this year, but called attention to the paper on "Rate of Return" to be presented at the convention by C. F. Elmes, a member of the committee.

The report was signed by P. J. Kealy, chairman; Martin Schreiber, vice-chairman; H. C. Anderson, C. F. Elmes, Williston Fish, C. W. Gillespie, J. H. Hanna, W. J. Harvie, W. H. Sawyer and B. E. Tilton.

Following this report was the paper by Cecil F. Elmes of the firm of Sanderson & Porter on "Utility Regulation and Rate of Return," given in abstract in another part of this issue. On motion, the association gave a unanimous vote of thanks to Mr. Elmes for his paper.

Motor Bus Papers

Following Mr. Elmes's paper, three motor bus papers were presented. The first of these was "The Place of the Motor Bus in Urban Passenger Transportation" by George J. Shave, superintendent of maintenance, and Frank C. Pick, commercial manager, London General Omnibus Company, London, England. In the absence of both of the authors, the paper was read in abstract by Harold V. Bozell, editor ELECTRIC RAILWAY JOURNAL. It is printed in full in this issue of this paper. Considerable interest was expressed in favor of having this paper printed in full for the benefit of association members.

This paper was followed by one on "The Place of the Motor Bus as a Supplement to Electric Railways" by R. Gilman Smith, Milwaukee Electric Railway & Light Company, Milwaukee. This paper is abstracted elsewhere in this issue. A written discussion on this paper was submitted by J. D. Mortimer. It said, in part:

> We are prepared to admit the strong appeal of the pneumatic-tired vehicle operating at high speed with few stops. That some service can be rendered with a car seating four or six passengers needs no further proof. Whether such fares can be collected in competition with good street railway service as will make such business adequately remunerative has never been proved. The four and six passenger vehicle in "jitney" service does not seem to be permanent; the recession rate among operators suggests that something more than the usual monetary reward is necessary to keep an individual in such business. If there is any tendency, it is toward bus service seating sixteen to thirty or more passengers.

The papers presented today deal with the larger type of vehicle. Mr. Smith, by a study of the comparative operating and investment costs, shows that both the motor bus and the electric car operating on rails have their respective places. The economical field of the motor bus is not nearly as extensive as the politicians and some of the bus operators have attempted to lead the public to believe.

Probably the electric railway industry would be in better financial shape today if a reliable motor bus had made its appearance before the relatively large investment had been made in rail lines through sparsely settled urban and suburban districts. Then we probably would not be able to show how electric railways had built cities and increased taxable land values. But this heroic feeling is only satisfying for the time being. There is little permanent satisfaction in the knowledge that the sheriff is going to catch you sooner or later.

Our cities are going to continue to grow. The same tendencies noted in all the recent census decades were recorded in the more rapid growth of the urban population during the period 1910 to 1920. Cities will continue to spread out and transportation facilities will be required to serve the new districts. Much growth will occur along lines of existing railways. But other territory will be built up requiring new facilities. Here is one place for the motor bus operated as an integral part of the city transportation plant. The motor bus will permit traffic to be developed to the point where the large investment in a rail line may be justified. The bus will thus conserve capital for more attractive uses.

The cities that require motor buses as feeders or supplements to existing rail facilities are not numerous. Most cities are overbuilt with rail lines. Most cities could get better transportation if they had less track, and all cities could have better street car transportation if some of their track was in other places. Nevertheless, there are places where rail lines would ordinarily be built in response to "popular" demand, provided capital were available. In such locations the motor bus offers a solution of what may, for a time, be a pressing problem. The experience in Milwaukee and Kenosha will be watched with interest.

If the motor bus has a part in the scheme of district transportation, then it is the duty of the railways to be the first to find its place and put it to beneficial use. Ill-advised competition may thus be anticipated and the better interests of the public more advantageously served.

Following this paper, George M. Graham, vice-president Pierce-Arrow Motor Car Company, Buffalo, N. Y., gave an address on "The Motor Vehicle—Competitor or Ally?" This address was most ably presented. By unanimous vote Mr. Graham was adjudged "Not Guilty." An abstract of Mr. Graham's remarks is given elsewhere in this issue.

There was no discussion on these papers except that Mr. Moser of the Fifth Avenue Coach Company, New York, said that he desired to correct a statement or impression given in Mr. Smith's paper, with reference to the experience of that company last winter. Mr. Moser said that at the time of the big storm his company, by means of a fleet of motor plows, opened the streets for normal operation by 6 a.m. of the day following the storm and that the chief difficulties encountered were caused by the snow thrown onto the streets from the sidewalks.

Recommendations of the President

This ended the program of the session and committee reports were next in order. The first was the report of the committee on recommendations in the president's address, presented by W. F. Ham, chairman. It indorsed the president's recommendations of an increase of the executive committee by the addition of six members, to be elected from the body at large, and the change in the membership class to provide for three additional classes of members, namely, (1) bankers, (2) investment organizations, and (3) consulting engineering firms. On motion the report was accepted and the

administration was directed to take the steps necessary to put the recommendations into effect.

RESOLUTIONS PASSED

The next report was from the committee on resolutions and was presented by B. A. Hegeman, Jr. This report, given below, was unanimously accepted and approved.

Whereas a commission, appointed because in the opinion of the national government the crisis in the electric railway industry was seriously affecting the national interest, has reported to the President of the United States that electric railways constitute an "essential public utility," and that in their rehabilitation "the first essential is to restore credit," and

Whereas the present deplorable condition of the industry and its immediate restoration to full usefulness is a direct concern of the public, inasmuch as new capital in the amount of between $200,000,000 to $300,000,000 a year, not now obtainable, is required for extensions and betterments necessary to meeting urgent public requirements, and

Whereas such new capital will be forthcoming only if the reasonable requirements of the investor as to the safety of and return upon his investment be met, and

Whereas the readjustment in the relations between the public and the railways in order to effect this reassurance lies with the public authorities, state and local; therefore be it

Resolved, That the American Electric Railway Association, acting from a sense of public duty, calls to the attention of the nation the fact, as emphasized by the Federal Electric Railways Commission, that the restoration of electric railway credit is a requisite to the proper functioning of these utilities and urges with regulation of public utilities the application of such common sense economic and business principles as will restore credit and so enable electric railways to perform their full public service.

Whereas John H. Pardee has served this association as its president during the last two years, and under his wise direction it has increased to a remarkable degree in usefulness and value to its members and to the industry, generally, and

Whereas Mr. Pardee has devoted his time, energy and great talents to the association's interests and has placed all electric railways and all electric railway men under a not to be estimated obligation; therefore be it

Resolved, That the thanks of the association and its deep appreciation be extended to John H. Pardee, our retiring president.

Whereas since the association last met in annual convention death has claimed some of its most valuable and esteemed members; therefore be it

Resolved, That by this action the association expresses its sense of loss and its appreciation of the services rendered by its deceased members, both to the association and the industry.

Whereas the technical press has, as usual, been of great assistance to the association and has actively and effectively served the industry and the companies and individuals composing it; therefore be it

Resolved, That the thanks of this association be and hereby are extended to the ELECTRIC RAILWAY JOURNAL and to *Electric Traction.*

Whereas the officers, and especially the secretary, of the association have been indefatigable in their efforts in its behalf during the past year, and have done their work faithfully and well; therefore be it

Resolved, That the association hereby expresses its appreciation of their services and extends its thanks to them individually and collectively.

NOMINATIONS RECOMMENDED

The last report was from the committee on nominations, presented by Arthur W. Brady, president Union Traction Company of Indiana, chairman.

This report, in addition to making the usual nominations, made a recommendation as to a fixed nominating policy for the association and, itself, acted in accordance therewith. The report, which follows, was accepted and approved unanimously and the men who were nominated were unanimously elected to office for the ensuing year.

Your committee on nominations respectfully submits its report as follows:

For president for the ensuing year, Philip H. Gadsden, president Charleston Railway & Light Company.

In selecting Mr. Gadsden the committee was guided by its view that the principal work confronting the association during the coming year is of a very difficult and delicate nature. It is obvious from the developments of the war period, and is accentuated by the recent report of the Federal Electric Railways Commission, of which Mr. Gadsden was a member, that it is the immediate duty of the association to devote its efforts very largely to the cultivation of improved relations between the electric railway industry and the public. The committee regards Mr. Gadsden as eminently fitted for this task.

In this connection the committee takes occasion to recommend that in view of the great changes which, from year to year and almost from month to month, mark the critical period through which our industry is passing, it shall be regarded as the fixed policy of the association that, in the selection of all its officers, the association will be guided by the requirements at the time, unaffected by the choice of previous years.

Your committee nominates for vice-presidents the following:

First vice-president, Robert I. Todd, president Indianapolis Street Railway.

Second vice-president, P. J. Kealy, president Kansas City Railways.

Third vice-president, Britton I. Budd, president Metropolitan West Side Elevated Railway.

Fourth vice-president, C. D. Emmons, president United Railways & Electric Company of Baltimore.

The committee nominates as members of the executive committee representing manufacturer members the following:

D. B. Dean, sales manager J. G. Brill Company, Kuhlman plant.

B. A. Hegeman, Jr., president National Railway Appliance Company

J. R. Lovejoy, vice-president General Electric Company.

H. D. Shute, vice-president Westinghouse Electric & Manufacturing Company.

E. F. Wickwire, secretary Ohio Brass Company.

For members of the executive committee representing electric railway members, as authorized by action taken at this meeting, the committee recommends the following:

Frank R. Coates, president Toledo Railways & Light Company.

Frank Hedley, president Interborough Rapid Transit Company.

H. R. Mallison, assistant to president Montreal Tramways Company.

J. N. Shannahan, president Newport News & Hampton Railways, Gas & Electric Company.

W. H. Sawyer, president East St. Louis & Suburban Railway.

William Von Phul, president United Railroads of San Francisco.

As Mr. Gadsden had had to leave Wednesday evening, it was impossible to induct him into his new office, and the convention was pronounced adjourned by President Pardee.

Transportation & Traffic Association Proceedings

W. H. COLLINS
Retiring President

Six Topics Only Were Considered at the Atlantic City Convention, Namely, Collection and Registration of Fares, Traffic Principles, Safety Cars, Economics of Schedules, Freight and Express and Merchandising Transportation—R. P. Stevens Was Elected President

R. P. STEVENS
President-Elect

THE first session of the Transportation & Traffic Association was called to order by President Collins about 2:45 on Monday afternoon. The first order of business was the presentation of the president's address, of which an abstract follows:

PRESIDENT COLLINS ANALYZES YEAR'S WORK

"The electric railway industry is still facing a grave crisis. It has been confronted during the past year with more serious problems than ever before in its history. The conditions brought about by this situation have required the most intelligent and persistent efforts on the part of executives to meet and overcome. I believe, however, great progress is being made toward rehabilitating and stabilizing the industry, and I think we can now look toward the future with much greater confidence.

"Our association has accomplished much in the past, but I think it can be vastly more useful in the future if we can develop a greater spirit of enthusiasm and co-operation among the members, and I want to urge the importance of association work and the tremendous value it bears to the success of your properties.

"Last year a radical change was made from former practice in that instead of the presentation of a large number of subjects by standing and special committees only a few were covered, which gave ample time for a thorough discussion of each. This year the executive committee followed the same plan and six subjects were studied as follows: (1) Collection and Registration of Fares, (2) Code of Traffic Principles, (3) Safety Car Operation, (4) Economics and Schedules, (5) Express and Freight Traffic Facilities and Costs, (6) Merchandising Transportation.

"Of these subjects three were continued over from last year, namely, (1), (2) and (3).

"The problem of collecting and accounting for fares under a zone system has been the particular subject of one committee's investigation. The zone system is the object of general interest at the present time and offers the one best method thus far evolved of making the fare proportional to the distance traveled, and doubtless it would now be much more in vogue were it not for the difficulties of fare collection.

"After an extended and comprehensive study of the problem of traffic regulation in American cities a second committee has drafted a model form of traffic ordinance which it believes can be adapted, with some modifications to suit local peculiarities perhaps, to the requirements of any American city. The increasing congestion of traffic in city streets makes it of the first importance to us if we are to make any pretense of maintaining our schedules to see that the rights of the street car on city streets be carefully defined and strongly safeguarded.

"The committee on safety car operation in its study of this subject has prepared and sent out a comprehensive questionnaire covering practically every phase of safety car operation. The replies have been carefully analyzed by the committee and a summary of the conclusions derived from this analysis is incorporated in the report. The subject is of such timely interest just now that I am confident that the members of this association will derive considerable profit from a study of this committee's report.

"The study undertaken by the committee on economics of schedules gives promise of yielding a very valuable return. Among the subjects considered were: Analysis of schedules showing relation of dead time to live time, effect of increasing schedule speeds on platform expense, on investment, on traffic; methods of traffic checks to serve as basis of schedules. The traffic man and schedule maker, and the executive officer, too, for that matter, would find this report of immediate and practical value in his work.

"The possibilities of developing new sources of revenue by the transportation of express and freight is a subject which should command the interest of every operator who has the facilities for such business. Motor-truck operators have built up short haul business of this kind in the most unexpected places and there is no reason why the electric railways should not do the same. There can be no doubt that they can do the business much more cheaply than motor trucks. Just what it does cost the electric railways has been the object of this committee's investigation and its findings are given in its report. It is a subject which is very much to the point right now when the electric railways need to avail themselves of every possible source of income.

"Finally, merchandising transportation is a subject of the greatest timeliness. Every operating official knows

that his business is not only to make transportation salable but also to sell it. The committee which has studied this subject this year has had the experience of the most efficiently operated properties in the country placed freely before it, and the committee has prepared in concise form a summary of the methods which experience has shown to be the most practical in developing the business of electric railways."

The reading of the report of the executive committee was omitted because it consisted principally of minutes of the meetings of the committee. The secretary's report was then read. It referred to the topics selected for discussion at the annual meeting and explained that the administrative expenses of the association were absorbed by the American Electric Railway Association.

President Collins then announced the appointment of the committee on resolutions: H. H. Norris, J. P. Barnes and G. K. Jeffries. The committee on nominations was then announced. It consisted of J. N. Shannahan, H. B. Flowers and F. W. Coen. At this point members of the Accountants' Association entered the hall to participate in the joint meeting to consider the report of the committee on collection and registration of fares.

Collection and Registration of Fares

The joint committee of the Transportation & Traffic and Accountants' Associations on collection and registration of fares presented, first, names and definitions for the four types of zone systems (a, b, c and d) discussed in the 1919 report of the T. & T. Association and conforming with the practice of the zone committee of the American Association. These definitions, which were deemed necessary to avoid confusion in the questionnaire and to assist in standardizing nomenclature, follow:

(a) "Uniform Rate Zone System" is one in which the fare is directly proportional to the number of zones traveled in or through, that is, one in which the fare per zone is the same in each zone, including the first.

(b) "Initial Charge Zone System" is one in which the fare for the initial zone of any ride is greater than that for the succeeding zones.

(c) "Fixed Minimum Zone System" is one in which a certain rate per zone is charged, with a definite fixed minimum fare, which minimum disappears when the sum of the zone charges exceeds it.

(d) "Central Area Zone System" is one in which a flat fare or uniform charge, regardless of length of ride, within an established central area, is combined with zone charges on routes which extend beyond such central area.

A questionnaire was sent to thirty companies known to have given a trial to one of the four types of zone systems and eleven replies were received from companies which were able to speak from experience. These companies serve communities with populations varying from 20,000 to 1,250,000. The practice of several of these companies was described.

One company first discontinued transfers for crosstown riding and its revenues increased 2.7 per cent. It then established a zone area, 2.8 miles in radius, with a fare of 5 cents inside or outside for one zone ride and 8 cents for a ride to or from the center of the city beyond the zone limits. The operating revenue then increased 4.2 per cent over the previous year. Twelve days later the zone system was abandoned for a straight 7-cent fare, including crosstown riding and free transfers, and a 12 per cent increase was recorded. Another company is trying plan "d," and finds it successful, though it appears that as zone points are brought into the heavy traffic area the problem of passenger identification becomes more and more difficult. Another company speaks of the disadvantages of penny change and lack of a proper and simple method of fare collection, though it considers the zone system preferable to the single fare method if the latter is used with other than a 5-cent or a 10-cent fare. Another company has 5-cent zones, each divided into two sections to provide overlaps. It finds the system practicable even on open cars and with an overhead register. Another company has two zones with pay-as-you-enter inbound, those in the outer zones paying through receiving an identification check. When the zone limit is reached these checks are taken up. On the outbound trips the pay-as-you-leave system is used, the passengers who board the car in the outer zone receiving an identification check, so they do not have to pay the through fare when they leave the car.

The committee in its conclusions declares that under a zone plan identification checks are essential to prevent over-riding, but so far the committee has not been able to discover any satisfactory device for the issuance of such checks. Issue by the motorman or conductor is the only known method. The report concludes as follows:

"Analyzing all the reports received by your committee, we find that while several companies have been able to operate successfully under a zone system others have not been able to obtain satisfactory results with the type of zone system which they adopted and later the system was changed. Your committee is unable to say from the above analysis whether the difficulties experienced were due to local conditions solely or were inherent in the type of system applied. The principal difficulty appears to be that the details of application, so far as present zone systems are concerned, are burdensome both upon the public and the employee in carrying out the requirements without impairing the quality of service.

"It has been brought out that one of the chief advantages of a zone system is that it more nearly approaches the ideal condition for which all operating companies are striving, namely, that the fare collected be based on the transportation furnished the rider. Such a basis is of course fundamentally sound in principle and is equitable. All of the difficulties experienced and cited in the data furnished your committee are those of practical application, especially at points of congestion or heavy travel.

"In conclusion your committee desires to state that it is in full accord with the first above-mentioned fact and principle. With reference to the second condition stated above, your committee is forced to report, from the data available, that it is not able by analysis or otherwise to draw a constructive conclusion or to suggest a remedy for the practical difficulties which have developed.

"With respect to the application of a zone system to the one-man safety car, your committee recommends against its adoption except in small or sparsely settled communities, until some more simple system than any now in use is developed."

The report is signed by the committee, consisting of W. J. Harvie, chairman; M. W. Glover, co-chairman; R. D. Beatty, N. W. Bolen, L. D. Pellissier, E. C. Spring, C. W. Stocks, A. Swartz, W. A. Doty, John J. Duck, G. W. Kalweit, R. H. Stevenson and F. E. Webster.

Discussion on this report was not so complete or constructive as had been anticipated. Several points of interest were, however, touched on in the discussion which followed.

Ralph D. Hood, general manager Massachusetts Northeastern Street Railway, said he thought that the railway men were groping for light on this fare situation. Many systems had been tried and many discarded. He related the history of the Massachusetts Northeastern fare system, the advance from 5 cents to 6 cents, the change to shorter zones with a 5-cent unit, and subsequent change to 6 cents and then to 10 cents cash fare, with the present strip ticket selling at the rate of six for 50 cents. Mr. Hood said that this last system worked very well on his road: it has the advantage of a wholesale sale of rides; it makes the work in the first section somewhat harder for the conductor, but, on the other hand, the other zones are easier to handle. It is a good system where there are long rides and where there is extra riding from terminals. They have been able to find no specific case of resale of tickets. With respect to the effect of the increase in rates on riding, Mr. Hood said that while there was a 25 per cent reduction, he laid it entirely to the industrial condition of that section of the country over which the railway company of course had no control rather than to any change in fare. In reply to a question as to how he prevented conductors from substituting tickets for cash fares, Mr. Hood said that the amount of the cash fares was not more than 5 per cent of the total and that, frankly, he preferred to have the conductors get the advantage of the 1⅔ cents rather than to have them have the opportunity to take the entire 10 cents.

After Mr. Harvie had put a little catalyzer in the meeting, the discussion became a little more animated. John Benham of the International Fare Register Company said the manufacturers had always been trying to assist the railways to get all the nickels in the days of the 5-cent fare. When the fare system changed it became a serious problem to the manufacturer to make boxes which would register correctly and make it certain that the company was receiving all of the fares paid by passengers. It is not the mechanical or design difficulty, but rather the immense cost necessary to develop and change boxes to take care of changing fares. He related the history of reasons for locking up the pennies, such as the conductor substituting small nickels which would go through the penny register, thus making 4 cents per operation, and the subsequent development of the token, which immediately increased earnings beyond the rosiest expectations. While no longer in the fare box business, Mr. Benham commended the use of fare boxes and tokens as the one best method of assuring receipt of all money collected.

Mr. Benham also emphasized that city officials must help to make the fares simple. They are now agreeing that increased fares are necessary and they can be made to assist in making the fares simple and possible of collection. If zone fares are necessary, then Mr. Benham believes that plan No. 7 as reported by the committee is a desirable one. One of the most serious questions in this case or on the zone system in general is the question of over-riding, and that has by no means been solved. "Of course," said Mr. Benham, "I sell registers, but independent of that I believe that audible and visible registration of fares is necessary."

J. B. Stewart, Jr., general superintendent Youngstown (Ohio) Municipal Railway, said that under the service-at-cost franchise there the fare had been raised until finally on Jan. 1 it was 8 cents and on June 1 it was 9 cents. When the fare was 6 cents the conductors were substituting the smaller nickels through the penny register, but at 7 cents the tide turned and the public commenced to beat the conductor, particularly at heavy loading points. The first man of a large group, for instance, would board the car and ask for change for $1 and while the conductor was giving this change large numbers of others would go by and drop reduced fares or substitute tickets in the box. On May 1 the overhead register was installed and an immediate increase in revenue was noted. Pay-as-you-enter inbound and pay-as-you-leave outbound is the method of fare collection.

M. W. Glover, auditor West Penn Railways, called attention to the zone fare system section in the report of the Federal Electric Railways Commission, which, he said, he thought was very much to the point. Mr. Glover was a member of the joint committee, and in connection with the work of the committee said:

> One fact brought out by this report, in my opinion, is a question which may seriously affect the welfare of the American Electric Railway Association, namely, the apparent lack of interest shown by members of the association in replying to inquiries sent out by the association on subjects which vitally affect nearly every member company.
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> The members of this joint committee at considerable inconvenience to themselves held meetings and wrote numerous letters endeavoring to secure information to enable the committee to prepare a report which would be of some value to the associations. Forty-nine questionnaires were sent out and in addition letters were written several other companies asking for information on the subject of collection and registration of fares under the zone system and replies were received from only nineteen companies. Of these replies only eleven furnished information of such a nature as to be available for use. Upon taking the matter up with the secretary's office, I was surprised to learn that this percentage of replies received by this committee was above the average. It is indeed unfortunate that for some reason companies who take apparently an active interest in the welfare of the American Electric Railway Association are willing to ignore requests for information, yet the records of the secretary's office show that hundreds of requests for information are received at the association office from member companies on various subjects and some of the very companies which request information fail to reply to questionnaires sent out by the association.
>
> I think this is a most important matter and that the future success or failure of the American Association depends upon the value of the information secured by it, and in turn furnished to its members, and I hope the executive committee of the Accounting and Transportation & Traffic Associations will bring this matter to the attention of the executive committee of the American Association in the hope that future requests will be given better attention.

Mr. Glover then confirmed his agreement with the report of the committee and said:

> It is reasonably certain that some workable method will be devised which will meet the requirements of electric railways and it is the duty of all operating and accounting men to give this matter thought, and when they have found a solution communicate the fact to other members of the association, as it is only by co-operation that we can expect to evolve a system which will prove equitable to the companies as well as to the traveling public.

L. H. Palmer, United Railways & Electric Company, Baltimore, said that the report of the fare systems

committee must be read in conjunction with the report of this joint committee. The two reports really form one subject. Mr. Palmer said that he understood that there were still considerable over-riding difficulties in England, where the zone system is in extended use. This difficulty must be overcome to make the zone fare system really 100 per cent.

A. Swartz, Toledo Railways & Light Company, Toledo, said he thought the zone system is really coming on American railways. The matter of getting the money is the important thing. He related the Toledo experience of how, when they were operating on a 6-cent fare, they decided to get fare boxes, but before the fare boxes arrived they had changed to the paper tickets, which, by the way, immediately lost some revenue. Then a later change in fare, coupled with the use of boxes, increased the revenue again. When the token was used the revenue went up in a jump, and, so far as Toledo is concerned, he believes tokens and fare boxes to be the answer. Even with decreased riding, income went up when tokens and fare boxes were used. Another point is that the accounting work was reduced so much that he personally was sometimes half ashamed to take his salary for the work the accounting department had to do.

John Benham, who had been through the fare changes in Toledo and tried to furnish boxes to collect various kinds of fare pieces, said: "If you fellows will only get something uniform in the method of fares and decide upon what you want the manufacturers will give you something which will do the work."

Carl W. Stocks, ELECTRIC RAILWAY JOURNAL, said he believed the railways will try to find some sort of a standard zone scheme to apply in this country. Formerly all operation was on a standard 5-cent fare basis and everybody knew what it was all over the country. Now the railways will have to get back to some similar uniformity under changed conditions. He thought there was no doubt the 6-cent and other higher unit fares eliminated the short haul, and that, as electric railways were incorporated to carry the people, this made it more difficult to do that, and unless they do carry all the people possible they are not doing their duty. Mr. Stocks believed in the next five years we will see more zone systems in this country; in fact, that zone systems will increase rapidly.

At this point the Claims Association entered the hall for the joint Claims, Traffic & Transportation session.

Chairman H. B. Flowers presented the report of the committee appointed to draft a code of traffic principles.

CODE OF TRAFFIC PRINCIPLES

The formal report of the committee on code of traffic principles was devoted almost entirely to the proposed model form of traffic ordinance, which had been drafted by the committee during the early part of the year and had been offered by it as a suggestion at the convention in San Francisco, Aug. 23-27, of the National Traffic Officers' Association. In the report of this convention, published on pages 494 and 495 of the ELECTRIC RAILWAY JOURNAL for Sept. 11, 1920, an extended abstract of this proposed ordinance was published. The remainder of the report of the committee gave the reasons for the draft of such an ordinance and the principles on which it is based. The report pointed out that the advent of the motor vehicle in various forms has so enormously increased the congestion in city streets that an entire revision of the traffic ordinances in all large cities has become imperative. Furthermore, the report pointed out that studies of the traffic in downtown New York and to a lesser extent the congested districts in other large cities during the peak hours show that before long main artery traffic must be dispatched under a system which would permit of a movement of several blocks without stopping, that foot passengers must be forced to move with vehicular traffic, that speed regulation must take the form of a minimum rather than a maximum limit, and that in many cases left-hand turns must be eliminated. Such a change will meet with opposition from the individual who claims the right to drive a slow-moving vehicle, to stop where he pleases and to reach his destination by the shortest and most direct route, so that public support for a properly drawn ordinance can be secured only by public education. Persons who have a right to the use of the highways were divided into six general classes: (a) Abutting property owners; (b) pedestrians; (c) users of slow moving or heavy vehicles; (d) users of fast or medium-moving vehicles; (e) users of public conveyances, such as street cars and public buses; (f) those demanding emergency service, such as fire apparatus, police patrol, etc. The streets are too narrow to permit all of these parties to exercise their full rights at the same time, so that each must lose something of its individual freedom, the convenience of the few yielding to the convenience of the many, and the normal use yielding to the emergency use.

The report was submitted by the committee, consisting of H. B. Flowers, chairman; W. H. Maltbie, Fielder Sanders and P. E. Wilson.

W. C. Culkins, City Railroad Commissioner, Cincinnati, stated that he started out with an ideal ordinance that provided only one-way streets, eliminated parking of all vehicles and prohibited left-hand turns in congested areas. It was not possible to promulgate the original ordinance, for one-way streets enlarged the terminal districts, caused passengers to be disgruntled because they had to walk several blocks in some cases to reach their connecting route. Merchants in the original terminal districts also opposed this change in rerouting, saying that the elimination of two-way streets would cut realty values and cause them severe losses. The ordinance now in effect cuts parking time to a minimum, limits standing time of street cars to three minutes, prohibits vehicles unloading on streets except when there is no alley available and gives street cars the right-of-way between cross streets. At present consideration is being given to multiple berthing of cars and the elimination of automobiles between cars at such berthing points. An attempt is also to be made to prohibit taxicabs from cruising up and down the streets by the establishment of fixed taxi stands. For infractions of traffic rules Mr. Culkins recommended the more extensive use of the tag system, for it required a smaller number of traffic officers properly to enforce the regulation. Mr. Culkins also urged very strongly that the committee be continued so that the points of contact already established by Mr. Maltbie with the National Association of Traffic Officers and other traffic associations be preserved.

W. H. Maltbie of the committee spoke in detail of the criticisms to the committee's code made by the Traffic Officers' Association, an abstract of which was printed in our issue of Sept. 11, 1920, page 424. Mr. Maltbie asked that any constructive criticisms be forwarded to the committee for use at the coming meeting

of the traffic officers' drafting committee, which will meet in Cleveland some time in November or December.

J. L. Wickes, Public Service Commissioner, Bureau of Transportation, Baltimore, stated that the Public Service Commission was endeavoring to aid the street railways of that city in every way in solving the street traffic problems. Personally, he had made a suggestion that when there are parallel streets, each with double street car tracks, they both be made one-way streets and that express and local street car service be established thereon. This suggestion is at present frowned upon by the officials of the United Company, but nevertheless he believes it will in a large measure help solve some of the problems if put into effect. Mr. Wickes is much in favor of doing all that is possible to speed up the surface cars, and also advocates the elimination of parking in downtown districts and the wholesale unloading of vehicles backed up to the curb, especially during peak-hour travel.

Both H. D. Briggs and R. E. McDougall stated that the claims men were heartily in favor of standardized traffic ordinances.

C. M. Talbert, Director Department of Streets and Sewers, St. Louis, stated that in his city the state had supervision over street traffic and that at present several congested arteries had been turned into one-way streets with some measure of success. He urged that all parties working on traffic codes take the fundamentals that had been agreed upon, which represent at least 90 per cent of the rules, and have the United States Bureau of Standards promulgate a code. Such a code would carry considerable weight and be of benefit to all kinds of street traffic.

D. F. Fennell, superintendent of transportation Kansas City Railways, speaking from his experience, urged the use of loading platforms and safety zones to facilitate the handling of vehicular traffic. Mr. Flowers, however, believed that such requirements should not be included in a traffic code, but should be a matter of agreement between the railway company and the supervisor of city traffic.

On motion by T. C. Cherry the report was approved and referred to the executive committee of the American Association for further action.

C. M. Talbert, St. Louis, then presented a paper on "Automobile Hazards," an abstract of which appears elsewhere in this issue, and spoke particularly of the work that had been accomplished in St. Louis in reducing traffic accidents. Mr. Talbert's paper caused much favorable comment and a committee, consisting of Messrs. Palmer, MacDougall and Cherry, was appointed to confer with him as to what the street railways could do to help decrease traffic accidents and report to the ensuing executive committee.

Tuesday's Session

A joint meeting of the Transportation & Traffic and the Engineering Association was held on Tuesday afternoon for the presentation of the report of the committee on safety car operation. This was presented by C. W. Kellogg, chairman, and an abstract of the report appears below.

Safety Car Operation

Statistics obtained by the committee on safety car operation show that the number of safety cars purchased in 1920, including those to be delivered up to Oct. 1, 1920, is 3,750, compared with 1,100 for the same period in 1919. The total number of companies using safety cars on Oct. 1, 1920, was 340, compared with 130 on the same date in the previous year. Data from sixty-five companies operating safety cars, obtained by a questionnaire, are given in the report.

As to population served, four of these companies reported population in excess of 250,000, twenty-four less than 100,000 and eleven from 100,000 to 250,000, six not answering. The average number of such cars used during rush hour was 23 per cent greater than normal service, indicating that the cars carried the base load rather than the rush hour service. The weight of the cars varied from 13,000 to 20,000 lb., or 48.5 per cent of that of all the other cars on the respective systems. One-half the companies report no change in specifications of the standard Birney safety car, while minor changes have been adopted by others. The more important of these changes have to do with more seating capacity and more heat-resisting body construction in places where severe winter weather is encountered, the standard car having been developed for climatic conditions prevailing in the South.

The average energy consumption was 1.20 kw.-hr. per car-mile at the car, with 0.10 to 0.50 kw.-hr. per car-mile for heating and other auxiliaries.

Only one company out of fifty-two definitely reported dissatisfaction by trainmen with the cars. The average differential paid to operators of one-man cars over other trainmen is 4.24 cents, or about 10 per cent increase. This differential makes the job attractive to the men in spite of the increased duties, and this feeling of satisfaction does not seem to wear away with time. Most companies recruit the operators from the existing staff. About half of the companies in answering gave the opinion that the same qualities in trainmen were needed for the safety and for the two-man cars. The others felt that in a general way the younger, more alert men with conductor's experience made the best safety car operators.

Only two of fifty-one companies experienced any public opposition in the establishment of safety car operation, and at present, according to the answers, not a single case of state or city commission ruling against safety car operation exists, although in several cases operation of one-man cars without safety features is not permitted.

Out of fifty companies reporting schedules, twenty-five have made no change in headway with the use of safety cars. The others have made increases in frequency of from 10 per cent to 100 per cent, the average being 40.5 per cent. Schedule speeds were increased by ten of the forty-five companies answering this question. Twelve companies supplement safety car service with larger two-man cars on the peak and thirty-four companies do not.

The averages of the companies which increased their schedules with safety cars show 40.5 per cent increase in car-mileage, with a decrease in gross earnings per car-mile of only 0.93 per cent. That is, the gross earnings with safety cars show substantially the same per cent increase as the car-miles operated.

The practice in flagging railroad crossings varies greatly. On ten roads the operator leaves the car to flag crossings, while on nineteen roads the operator flags the crossings from his position without leaving the car. In a few cases regular flagmen are employed on account of legal requirements.

The vote on bearings was thirty to eight in favor of friction as compared with ball bearings for journals. No snow-fighting equipment had been found necessary by any company over that previously used with two-man operation. Air-operating sanders in winter were considered desirable, and the majority of the companies used overhead registers in addition to the fare box, which is universal.

From a recent study of a group of companies under one management, representing approximately 5,000,000 car-miles per year of safety cars and 7,300,000 car-miles per year of other cars, a saving of 53 per cent in safety car maintenance per car-mile compared with that of other types was reported. The returns of the companies reporting to the committee indicate materially reduced accident expenses per car-mile from the safety car. Forty-seven companies replied that their experience with the safety car had been such as to lead them to favor expanding its use on their systems, and only two answered to the contrary. The answers as to suggestions for improvement in safety cars tended to making the car sturdier in certain respects, a plan which the committee says is already being followed by the manufacturers.

The report on safety cars was signed by C. W. Kellogg, chairman; S. W. Greenland, J. K. Punderford, J. M. Bosenbury, J. C. Thirlwall, C. H. Beck and Gardner F. Wells.

Following the presentation of the report J. K. Punderford, the Connecticut Company, said that his property now has in operation 130 safety cars and thirty remodeled one-man cars.

The differential paid by the Connecticut Company to safety car operators, Mr. Punderford believes, is money well spent, as it is possible to obtain a better class of men and more efficient operators. No boarding or alighting accidents have occurred with safety cars. The Connecticut Company uses fare boxes without double registration. The latter is favored, but it is believed that this would add too many duties.

H. B. Flowers, United Railways & Electric Company, Baltimore, said that his company has now in operation thirty-three safety cars and twelve converted one-man cars. The results of safety car operation have been a little disappointing, as the expected increase in traffic was not obtained. A differential of 5 cents in wages is paid, and the public took very well to the car. Mr. Flowers said that it was inadvisable to conduct an extensive publicity campaign prior to inauguration of safety car service, as this acted as an apology for the car.

D. L. Fennell, Kansas City Railways, stated that fifteen safety cars were placed in operation on that property in April, 1919. Due to the preceding strike all men had had not over two months of railway experience. The cars were put in service on a six-minute base and a three-minute rush headway. This has since been reduced to a five-minute base and a two-minute rush headway. Street collectors are used in congested districts and prove very helpful. This method of collection, however, was used prior to the inauguration of safety car service. Kansas City now has ninety-five safety cars in operation. Mention was made by J. M. Bosenbury, Illinois Traction System, of one property on which an increase of 25 per cent in car-miles had caused an increase of 33⅓ per cent in revenue. This resulted in a change from $1,000 deficit to $8,000 net revenue.

S. W. Greenland, Fort Wayne, Ind., said that his property did not have the standard Birney car, but that the average weight of his equipment was 18,500 lb. The operators receive 2 cents an hour higher wages than the interurban men. Fort Wayne has 100 per cent one-man service.

No safety cars have yet been placed in service in Chicago, said H. H. Adams of the Chicago Surface Lines, although ten standard cars have been ordered. Mr. Adams is making an extensive study of the safety car problem from a standpoint of car design for semi-congested service. This includes a study of the possibility of a separate exit and entrance and some method to safeguard the exit to make impossible its use in boarding. Mr. Adams believes that the present car is not quite ample in dimensions for outlying crosstown lines. Any large city has locations where the safety car can be used successfully. Mr. Adams asked that the railway operators present discuss any weaknesses which had developed in the car body and the necessity for the manufacturers to design a new motor. The present 25-hp. motor is not guaranteed for service on a car weighing over 16,000 lb., and the changes which Mr. Adams has in mind will increase this weight to 18,000 or 19,000 lb. It is believed that a car 8 ft. 4 in. or 8 ft. 6 in. in width and longer than the present car could be used. A proposed design gives an additional 16 in. in length and provides thirty-seven seats in place of the present thirty-two. It was pointed out that any decrease in maintenance resulting from the use of safety cars depends upon the age of the equipment replaced. The question of armature clearance was also raised.

R. B. Stearns, Eastern Massachusetts Street Railway, said that his company had purchased 250 new one-man cars and expected 100 more within a month. It is also remodeling the older cars at the rate of about forty per week for one-man operation. These are giving entire satisfaction. A couple of years ago the company had 2,345 passenger cars and of these 649 were scrapped last year and 738 this year. With the exception of about 100 cars, which are needed for train and other special operation, the property will soon be operated exclusively with one-man cars.

The company found that while under state supervision it is possible to raise fares, it is nevertheless necessary to save money, and one-man operation promised much in this direction. Mr. Stearns estimated a saving of about $3,000 per year per car on a 30,000-mile basis, with car-for-car replacement. The company had tried some experiments with single versus double folding doors and had decided on the former as better, although a door width somewhat greater than the minimum possible was preferred. Another experiment related to the lengthening of old single trucks, which was not found satisfactory. Their use showed the need of resilience.

As to maintenance of the one-man cars, Mr. Stearns felt that it is too early to reach a conclusion, but he felt that it might prove true that equipment and track maintenance varied somewhat with the weight of the car. His company is investing $4,000,000 in rolling-stock equipment to save $1,000,000 annually.

J. C. Thirlwall, General Electric Company, said that judging by recent results, one-man operation is going to be greatly extended both with standard and remodeled cars. It is quite possible to operate cars larger than standard by one man. Mr. Thirlwall quoted data secured

in co-operation with the ELECTRIC RAILWAY JOURNAL showing operating results on a number of properties. From partial statistics it appears that the increase in gross earnings is about 90 per cent of the increase in service, while maintenance costs are cut roughly in two. Following Mr. Thirlwall, K. S. Schluss, Tacoma Railway & Power Company, said that, based on experience with thirty-two cars installed in 1917 and twenty-nine more installed in 1918, he considers the bodies amply strong, particularly in view of the war-time service to which they were subjected. For six months ended August, 1920, he had found about 1.3 cents per car-mile to be the average maintenance cost. E. M. Walker, Terre Haute Traction & Light Company, put in a plea for the standard car and said that the motor and compressor capacities of the cars used in his city are ample. The air equipment operates about 40 per cent of the time, and the motors have reserve capacity. The energy consumption for propulsion alone is less than 1 kw.-hr. per car-mile, the total being 1.1 kw.-hr. in summer and 1.5 kw.-hr. in winter. With 95 per cent of the rolling stock of the safety type, twenty months of operation to Aug. 1, 1920, showed that the safety cars produced 70 per cent of the gross income and 99½ per cent of the net income, while they are responsible for but 50 per cent of the operating costs.

The discussion was closed by C. H. Beck, Westinghouse Traction Brake Company, who called attention to the difference in the tenor of the discussion as compared with the 1919 meeting. Then it related to economics, now to details of design. Assuming that the safety car mileage in this country is 380,000 per day, the passengers carried total 2,000,000. At least $8,000,000 is saved per year by the safety cars. He urged managers not to forget why they put the safety cars in, but to extend their use to secure the maximum benefit.

Following Mr. Beck, H. B. Flowers moved that the report of the committee be accepted and the committee continued and this motion was passed. The meeting then adjourned, the engineers gathering in their own hall to discuss the subject of the keeping of stores.

Wednesday's Session

The session of the Transportation & Traffic Association on Wednesday afternoon was devoted to a discussion of the report of the committee on economics of schedules. An abstract of this report, which was read at the meeting by Alexander Jackson, follows:

ECONOMICS OF SCHEDULES

The subjects considered by the committee follow:

1. Analysis of schedules showing relation of dead time to live time.
2. Effect of increasing schedule speeds, on platform expense, on investment, on traffic.
3. Methods of traffic checks to serve as basis of schedules.

In connection with subject 1, the committee presented as a standard analysis of car-hours and crew-hours and for discussion the following division into the various factors now known to exist:

ANALYSIS OF CAR-HOURS

Revenue Passenger Cars.

1. Actual time operating to or from carhouse to starting point, known as "pull-in" or "pull-out" time, "run-on" or "run-off" time, dark or inactive hours, idle time or dead time.
2. Time operating between terminals including time allowed at stops; that is, running time.
3. Time allowed on the schedule for layover of car at terminals between trips, called allowed time, slack or layover time.
4. Time actually consumed out of No. 3 in operating between terminals, including time at stops; that is, running time plus delayed time.
5. Time consumed beyond time allowed in No. 3, commonly known as "set-back," "fill-in," "turn-back" time.

It is necessary to divide car-hours for revenue cars into the above various factors in order properly to define trip speed, schedule speed or actual speed.

It is understood that special or chartered cars, or funeral cars, or other passenger-paying cars will be included as revenue passenger cars.

Miscellaneous Revenue Cars.

The same method of computation would apply for sprinkler cars, mail cars, freight cars and express cars.

Non-Revenue Cars.

Non-revenue cars include supply cars, shifting cars, rail cars, wreck cars, pay cars, line cars, snowplows or sweepers, sand cars, sleet cars, dump cars, coal cars, bonding cars, slot scraper cars.

ANALYSIS OF CREW-HOURS

Revenue Passenger Cars.

1. "Reporting time" is time allowed in preparing car for service or putting car away after service.
2. "Platform time" is actual time operating trips including time between trips allowed on the schedule as layover time.
3. "Time allowance" is time in addition to platform time allowed to bring run to a prescribed number of hours.
4. "Spread allowance time" is time allowed because of length of spread or over-all time to work a given (scheduled) run.
5. "Minimum or guaranteed time" is the amount of time allowed to bring time of extra men up to a prescribed number of hours per day or per week.
6. "Over-time" is time worked by men in excess of their regular run.
7. "Continuous time" is time allowed between the completion of a regular run and time reporting for extra work. This also covers all swings for which crews are paid.

EFFECT OF INCREASING SCHEDULE SPEEDS

The committee assigned this subject to Alexander Jackson to formulate a brief statement showing the effect of increasing the schedule speed as requested to form the basis of a discussion. It is considered under three heads as follows, (a) On platform service. (b) On investment. (c) On traffic. An abstract of the discussion by Mr. Jackson, who is superintendent of timetables Public Service Railway Company, Newark, follows:

(a) The effect on platform expense is very pronounced. On a line operating a speed of 8 m.p.h. at a wage scale of 60 cents per hour per man, or $1.20 per hour per crew, the cost is 15 cents per car-mile.

If the schedule speed could be increased to 9 m.p.h. a saving of 1⅔ cents per car-mile could be made in platform cost, and if increased to 10 m.p.h. a saving of 3 cents per car-mile would result. If an increase in

wages was made to trainmen making the rate 65 cents per hour per man, or $1.30 per hour per crew, it would only be necessary to raise the schedule speed to about 8.7 m.p.h. to absorb the increase and keep the car-mile rate constant.

(b) The effect on investment is so far reaching it is difficult to arrive at the exact amount. The following estimate on the amount required per car is thought conservative:

Cost of car	$15,000
Car house and shops	2,500
Power house investment	10,000
	$27,500
Yearly interest at 8 per cent	2,200

The power house figures are based on the following: Investment of generating station at $125 per kw.; transmission and substation at $75 per kw., total $200 per kw.; 50 kw. will be required per car *i.e.*, $200 multiplied by 50 kw. = $10,000 per car.

(c) Effect on traffic: The principal effect on traffic is that increasing speed reduces the number of cars in any given area at a given time, to give the same service. This reduces congestion, with a consequent increase in regularity. From the passenger's point of view, higher speed means a quicker trip, and speed is an important factor to be taken into consideration with jitney competition.

For example, assume a property operating 100,000 car-miles per day at a speed of 8.50 m.p.h. consuming 11,765 car-hours. The speed is increased 10 per cent to 9.35 m.h.p., then to operate 100,000 car-miles 10,695 car-hours would be used, making a daily saving of 1,070 car-hours.

If we assume the average car use per day as fourteen hours, under the old speed 840 cars would be used,

Estimated saving in investment 76 cars at $27,500 each	$2,090,000
Saving in interest at 8 per cent	$167,200
Saving in platform expense at $1.20 per car-hour $1,284 per day—$1,284 by 350 average days	449,400
Saving per year	$616,600

while the new speed would require 764 cars, saving seventy-six cars. This may be summarized as above.

METHODS OF TRAFFIC CHECKS TO SERVE AS BASIS OF SCHEDULE

The committee finds that in the past this subject has received very careful consideration and many data are now available. The following facts were contributed on this subject by Joseph A. Stoll, traffic manager United Railways & Electric Company of Baltimore, Md.

A traffic department that is alive and efficient will save many thousands of miles in a year that otherwise would be run needlessly and will anticipate and forestall complaints through close analysis of traffic checks and prompt adjustment of schedules. Proper statistics are indispensable to the intelligent handling of the many traffic problems that are constantly arising. Results depend, of course, more upon the quality than upon the quantity of statistics. Undoubtedly the most effectual results are obtained from simple records that faithfully and clearly portray actual traffic conditions.

A very satisfactory method to pursue in the acquisition of traffic data is as follows: After a list of checking points is selected, preferably at compulsory stops, and at points which should be agreed upon by the commission's representative or other regulatory authority, a checking schedule should be prepared in such a manner as to include all the lines of the system. The more important lines should be checked regularly and frequently and those of less importance as often as considered advisable. There should also be one or two extra men assigned to do special work, such as making running time tests, on and off characteristic curves, etc. Furthermore, there should be a supervisor of checkers.

The checking schedule should be arranged to cover a.m. and p.m. rush hours; mid-day and night rush-hours, and Saturdays and Sundays. Each checker should be supplied with a copy of his working schedule, a list of seating capacities of the cars, and such other general information as will aid him in his work. The checkers should be equipped with good watches and the watches should be synchronized with the official clock. A form similar to that submitted by the 1915 committee has proved very satisfactory. Upon this slip should be entered the train (or block) number, arriving time (nearest half minute) and total passengers. Where the checking is done at a transfer point the inclusion or exclusion of interchange traffic should be predetermined.

The slips should be added by the checkers, or observers as they are sometimes called, in half hour subdivisions. The checks should be turned in each day and after they are audited a typewritten record made of the half hourly results. This record presents clearly the service furnished and demanded during each period of the day and when compiled for a series of days will show adequacy of service and how closely the schedule was adhered to on the days checked.

Periodically there should be continuous all-day checks made and the results tabulated in half-hourly periods and charted. A series of such charts will reflect good or bad progress in the application of schedules.

The traffic department should also study the possibilities of short line service so as to obtain both maximum use of available equipment and better distribution of the passenger load. For this purpose it is desirable to have counts made of passengers boarding and alighting at all stops and the data so obtained for a number of trips under typical conditions reduced to a curve, generally known as a "characteristic" or "on and off" curve.

Proper running time must also be determined from observations and stop-watch tests made under the supervision of a competent transportation man. The United Railways of Baltimore has found it both feasible and advantageous to vary the running time in accordance with the degree of ease with which the cars may be "gotten through" at different hours of the day. Another very useful chart graphically depicts the loading of individual cars, average loading and spacing. The report was submitted by Edward Dana, chairman; James P. Barnes, H. F. Fritch, Herman E. Hicks, Alexander Jackson and J. A. Stoll

J. V. Sullivan, assistant to president, Chicago Surface Lines, in discussing the report, said he was impressed with the moderation of the committee in listing the kinds of times for which the company has to pay. He then read a list of some eleven times other than "running time," which are paid for in Chicago, and said that they aggregated 19 per cent of the entire time. He said the advantages of having definitions for different kinds of time would be great.

John J. Duck, general auditor of the same company, said that it would be desirable to have the records supplied to the management worked out on the basis of both platform time and total running time. In this way it would be possible to determine exactly what the cars were earning. J. E. Duffy, general superintendent, New York State Railways, Syracuse, also expressed pleasure over the outlook for accepted definitions of different kinds of time. He also pointed out that statistics on miles per hour would be confusing unless there was acceptance of such definitions. H. E. Hicks, superintendent of schedules, New York State Railways, Rochester, a member of the committee, explained that the definitions given in the report were not intended to be inclusive of all kinds of time and that with each new labor contract new kinds of time for which companies had to pay were possible.

H. B. Flowers, general manager United Railways & Electric Co., Baltimore, thought that schedule speed should be changed during the day more often than is frequently the case in order to increase the average speed. He thought a gain could especially be secured by increasing the schedule speed of the cars going in the opposite direction from the main flow of traffic.

D. L. Fennell, superintendent of transportation Kansas City Railways, suggested standardization of methods of schedule making, as for example, the method of figuring spreads.

N. W. Bolen, superintendent Public Service Railway, Newark, explained that that company kept separate records of its revenue and non-revenue car mileage. In connection with the point raised by Mr. Flowers, he asked whether it was better to have the car crews change their running time at a certain hour on the route or at terminals.

Herbert C. Moser, superintendent of transportation Fifth Avenue Coach Company, explained that that company changed its running time by the clock, that is to say, when a bus reached the next time point after the time at which the change was to be made. He believed that companies should have a much larger number of running times during the day. Some companies had only three, i.e., from 7 a.m. to 7 p.m., from 7 p.m. to midnight, and from midnight to 7 a.m. Inspectors and dispatchers do not like many changes in running time, as it is inconvenient to them, but it is a step in economy. Running times between time points should also be figured out in the timetable department rather than left to inspectors. He said there was danger also that absolute stops should be continued when the reasons for them had disappeared. A company should constantly be revising its absolute stop marks and making running time checks. It is sometimes helpful also to place the time points farther apart when a company is endeavoring to increase the scheduled speed. Timetables should not be put in the same class as dining room tables and expected to last for fifteen years. His suggestion was constantly to keep checking.

Discussion then turned upon the definition given in the report of the committee on "Analysis of Car-Hours" and "Analysis of Crew-Hours." In this connection William B. Wheeler, superintendent of timetables, Third Avenue Railway, suggested the elimination of the expression "dark hours" in the first definition, as he believes it an inheritance from the old cable cars in New York and not used to any extent outside of that city, and, in the same definition, C. E. Morgan, Brooklyn Surface Lines, said that the term "pull in" was generally used in connection with a defective car and was different from "run on" and "run off."

At this point F. G. Buffe, general manager Kansas City Railways, declared that there was a great call in this country for good schedule makers and that the companies would do well to instruct and break in new men for this kind of work.

Mr. Moser suggested that half a dozen proposed schedules be prepared and be presented for discussion and definite conclusions either at the meeting next year or at the mid-winter meeting. Mr. Jackson explained that the report was not a list of set definitions but was recorded for the purpose of bringing out criticism so as to arrive at a proper name for each item. Mr. Fennell suggested that the committee send out a questionnaire to the member companies for criticism as to the method of preparing the data. He emphasized the need for standardization of definitions. At the suggestion of Mr. Bolen it was voted to appoint a joint committee of the Accountants' and the Transportation & Traffic Associations to carry on the work on schedules.

Following the discussion of the report of the committee on "Economics of Schedules" the session was continued jointly with the Engineering Association and an address on the super-power plan was presented by W. S. Murray, chairman super-power survey, United States Geological Survey. This address which is abstracted elsewhere in this issue explained the work and plans of the survey and what it was expected to accomplish.

Before adjournment a three-reel motion picture showing track construction methods in Cleveland was presented by C. H. Clark, engineer maintenance of way of that property. This film illustrated the pavement plow in action tearing up 1,200 ft. of pavement in three minutes. Cutting rails with the acetylene torch, breaking pavement with a pile driver, and electric riveting and welding of joints were also illustrated. The film showed the electric crane, electric shovel and gantry crane in action.

Thursday's Session

President Collins presided at the final session of the Transportation & Traffic Association Thursday afternoon. The report of the committee on express and freight traffic was presented by T. H. Stoffel, in the absence of P. P. Crafts, chairman. This was followed by the report of the committee on merchandising transportation, which was read by F. G. Buffe, chairman. Abstracts of both of these reports appear on the following pages.

Express and Freight Traffic Facilities and Costs

Information received from the questionnaire of the committee indicates that many electric railway companies do not segregate their costs of handling freight from their other operating expenses, and where the separation is made the methods of accounting vary considerably. General figures for the nine roads reporting are given in Table I. The larger gross earnings shown by the western roads reflect their greater development of the freight business and larger hauls. The greater revenue of the Western roads per car-mile is undoubtedly due to the heavier loading per car in the west.

In connection with Table II, Table III is also included, showing energy consumption and costs per car-mile for operating freight cars, both motor and trail, as determined by actual meter tests extending over distances of from 1,500 to 10,000 miles, the cost of power at the trolley being on basis of 2.92 cents per kilowatt-hour. The cars used varied in length from 38 to 50 feet and in capacity from 20 to 40 tons.

The increased power consumption indicated by these figures for the second and third trailers is undoubtedly due to the fact that the point of maximum efficiency of the motors used was past, or there may have been a reduction in line voltage due to the greater load. Generally speaking, however, trail cars in freight service require but 20 per cent of the power necessary to operate motor cars; in other words, a motor freight car with proper electrical equipment can haul five trailers at a power cost for operating two motor cars. This but emphasizes the economies to be secured through trailer operation in freight service.

Expense of trainmen is the highest item in the cost of electric freight operation, and this also emphasizes the desirability of trains.

The next largest item is the labor cost of handling freight at stations and terminals, and where terminals are adequate in size and sufficient rolling stock is available this expense can be considerably reduced. Another help is the provision of adequate team trucks where carload and less than carload freight may be loaded directly from the trucks into freight cars. This may be done with many classes of freight which do not require weighing or where weight agreements are in effect. An expense of from 1 to 2 per cent of revenue for loss and damage is not excessive.

The average total expense for the group being made up of only a small number of roads, especially in the Western group, is probably not representative.

TABLE I—GROSS EARNINGS AND REVENUE OF NINE ROADS

Road No.	Gross Earnings	Freight Car Miles Operated	Total Tons Handled	Tons per Car-Mile	Revenue per Ton	Revenue per Car Mile
Eastern Group:						
1	$99,681	266,755	65,000	0.244	$2 44	$0.37
2	649,967	678,877	373,073	0.550	1 74	.96
3	132,541	175,423	50,943	0.290	2.60	.76
4	264,681	400,836	110,036	0.276	2 40	.66
Average*	$286,718	380,473	149,763	0 340	$2.29	$0.69
Western Group:						
5	$265,842	311,352	48,060	0.155	$5.52	$0.85
6	1,514,238	1,323,925	299,363	0.227	4 97	1.14
7	100,476	82,000	17,112	0 209	5.78	1.23
8	428,184	†	116,455	†	3.68	†
9	511,162	900,841	113,039	0.114	4.52	0 52
Average*	$563,980	677,030	118,805	0.176	$4 89	$0.94

* Average not weighted. † Figures not available.

TABLE II—UNWEIGHTED AVERAGE EXPENSES OF SPECIFIED NUMBER OF EASTERN AND WESTERN GROUPS OF LINES

	Expense per Car-Mile		Expense per Ton	
	Four Eastern Roads	Three Western Roads	Four Eastern Roads	Four Western Roads
Maintenance of way	$0.0519	$0.0535	$0.162	$0.390
Maintenance of equipment	.0355	.0415	.112	.284
Power	.0518	.0490	.157	.401
Train labor	.1851	.1587	.575	.791
Station	.1332	.1604	.406	839
Other station expenses	.0215	.0137	.195	063
Loss and damages	.0105	.0286	.013	.167
Miscellaneous transportation expense	* .0094	* .0354	* .009	* .508
Traffic	.0049	.0119	.024	.039
General and miscellaneous	.0692	.0538	.145	.381
Total	$0.5680	$0 5928	$1 748	$3 462

* Averages of two roads only.

TABLE III—ENERGY REQUIREMENTS AS STATED BY TESTS

	Average Kw.-Hr. per Car-Mile	Cost of Power per Car-Mile per Train	Separated Cost of Power per Car-Mile for Each Trailer
Single motor car	2.80	$.0819	
Motor car and one trailer	3.40	.0994	For first trailer 0.0175.
Motor car and two trailers	4 12	.1205	For second trailer 0.0225
Motor car and three trailers	5 00	.1463	For third trailer 0.0244.

It is generally admitted that outside of the lack of equipment, the greatest need of electric lines engaged in freight handling is terminal facilities, and as a rule, far more business is being offered such lines daily than they are able to take care of, with the result that it becomes necessary to issue frequent embargoes, with consequent loss in revenue.

Studies of steam railroad less carload freight terminals indicate that where a terminal loads twenty cars of freight per day there should be track standing room for the same number of cars per day, and the average area required for one-story, single-deck freight terminals, including driveways, tracks and buildings, is approximately 2,000 sq.ft. per car. In many instances electric roads are loading daily two or three times the number of cars they have standing room for.

TABLE IV—PRINCIPAL TERMINAL FACILITIES

Road No.	Total Area in Square Feet	Area Occupied by Building	Cars Standing Capacity	Number of Cars Using Terminal per Day	Square Feet per Daily Car Standing Capacity	Square Feet per Cars Using Terminal Daily	Total Yearly Tonnage Inbound	Total Yearly Tonnage Outbound	Average Loading per Car in Tons Inbound	Average Loading per Car in Tons Outbound
1	16,890	7,425	5	18	3,630	938	20,000	45,000	4	8
2	*	*	*	*	*	*	*	*	*	*
3	3,781	*	10	7	378	540	31,22	10,312	3	8
4	92,597	10,080	10	11	9,260	8,418	142,91	23,111	5	8
5	44,584	23,640	20	22	2,229	2,027	289,50	41,884	18	29
6	150,880	44,440	67	100	2,252	1,509	†2751,85		7½	7½
7	8,850	3,600	4	6	2,213	1,308	31,32	6,836	1+	4+
8	196,150	12,030	32	20	6,129	9,807	134,44	60,098	*	*
9	*	4,000	10	12	*	*	11,40	1,502	10	10

* No figures received. † Includes both inbound and outbound.

The conclusions of the committee follow:

1. There is a great and profitable field for electric railways in handling freight.

2. To handle freight with a profit it is necessary to provide adequate facilities, including ample equipment and well planned terminals.

3. Every effort should be made to handle freight in trains consisting of a motor car or electric locomotive, depending on the class of business handled, and as many trailers as may be practicable, in order to reduce (a) investment in equipment, (b) trainmen's expense, (c) cost of power.

TABLE V—HANDLING COST PER TON AT PRINCIPAL TERMINAL FOR EIGHT ROADS

Road No.	Warehouse truckers	Warehouse foremen and checkers	Agent, cashier and clerical force	Station heating, lighting, etc.	Total	Wages Paid Warehousemen
1	.....	.....	.....	.....	$0.27	$105 to $125 per month.
2	No data	.....	.....	.....	.....	
3	0.257	0.104	0.156	0 05	.622	42 and 43 cents per hour.
4	.....	.....	.....	.....	....	41 cents per hour.
5	.73	0.11	.22	0 005	1.065	Foremen and checkers $125 to $140 per month; truckers 50 cents per hour.
6	.80	.....	.....	.....	.80	49 to 53 cents per hour.
7	.....	0.48	0 48	.....	.96	50 to 55 cents per hour.
8	0.196	0.21	0 168	.....	.574	Truckers, 30 to 33 cents per hour; foremen $85 to $105 per month.
9	.....	....	.....	.....	.....	All on monthly basis, $85 to $100 per month

4. Every effort should be made tending to the heavier loading of cars.

5. It is evident that the accounting methods used on the majority of roads are not such at this time as to permit of definite determination of the cost of handling freight.

In conclusion, the committee recommended a thorough investigation of the cost of handling freight business similar to that worked out by F. W. Doolittle in 1916 for passenger traffic.

The report is signed by the committee, consisting of P. P. Crafts, chairman; T. H. Stoffel, vice-chairman; J. H. Crall, E. W. Fowler, R. B. Hull, F. D. Norviel, W. S. Rodger, C. E. Thompson and H. B. Titcomb.

Merchandising Transportation

An extended report was presented by the committee on this subject and was devoted to methods whereby the service to be sold could be made more attractive, to the education of employees in the capacity of salesmen, to advertising through different mediums to attract business, to the help possible from public and civic bodies, and to the advantages offered by the widespread use of tickets. The report pointed out that formerly the idea of using merchandising methods to dispose of rides never occurred to railway managers, but now salesmanship is necessary. Not only is there competition from privately owned and public automobiles, but increased fares have developed another very likely competitor, *i.e.*, the sidewalk, although it is a relief to know that the public is now beginning to think of rides in terms of service and cost and that in spite of higher fares riding has increased. The report was accompanied by reproductions of selected publicity. Several of these are reproduced. The following summary of the methods of merchandising transportation is from the report:

Direct Methods of Merchandising Transportation

Advertising: The electric transportation industry must advertise its service and use the copy plan to overcome the effects of competition and induce more car riding.

Of all the advertising mediums the daily newspaper is probably the best.

Another excellent medium is the space provided by the car itself, such as cards on dash, frames inside hangings from the car roof.

When advertising makes a sale it should also make a friend.

This direct advertising should enlarge on service changes.

A good feature to be emphasized is the cost of operating an automobile, for it has been demonstrated that no type of car can be operated for less than 10 cents a mile.

Another feature which can be utilized is the fact that the street railway in many communities is essential, and this being the case, every citizen should see that the local line is supported.

The moving picture theater should be a prospective field. Shops, power plant, carhouses, inspection force, track department, all should be brought to the notice of the public.

Publications circulated through boxes in the cars have proved to be effective.

Billboards offer a medium heretofore but little used.

Statements to employees and to the public should be easily understood.

Service: Service is the most important thing to be considered.

Service must start in the carhouses and shops.

Cars must be swept and kept cleaned.

Mechanical inspections must be rigid.

Rearrangement of stops in the downtown districts in some instances have increased speed 100 per cent.

Education of Employees: The greatest field ahead of street railway operators lies in the training of their transportation forces.

Such training involves courtesy, politeness and careful operation.

Company publications have proved valuable in obtaining the co-operation of the employees, which is a vital feature.

Care must be taken in the selection of men. Pleasing appearance and an understanding of the salesmanship features of his work are important.

Those types which are morose or easily irritated should not be hired.

A period of probation has, in some instances, seemed advisable.

The employment manager should be a specialist.

It should be a part of the trainman's job to be polite under all circumstances and he should be helped or penalized to overcome any other inclination.

Company meetings, lectures, service, codes, inspection reports, rigid enforcement of rules, and gradual elimination of those who cannot adapt themselves, must all be depended upon to maintain a proper standard of courtesy and service.

Shop committees have proved to great advantage, and even where a union force is maintained such committees can be formed. If union contracts prevent this being used as a medium for changing working conditions at least it should be used for the purpose of securing co-operation between the management and the employees.

Some form of disability or retirement plan should be seriously considered.

The job should be made as nearly fool proof as possible.

Ticket Fares: Tickets offer a more complete form of merchandising transportation because there is something concrete to merchandise.

Tickets do not have the same mental effect as money, and they have a widespread effect on the short hauls.

Sale of tickets should be pushed through agencies, advertising, street salesmen, and in some companies even a sales manager has been appointed to handle this department.

Jitney Competition: If street railways must compete with the jitney they should be allowed to do so on equal terms, and monopoly restrictions should be removed.

Jitney competition can be met and overcome only by closer economies of operation and a service which meets the public need.

The safety car seems to offer a near solution.

The Safety Car: Safety cars should be built not only from the standpoint of economy, but from the standpoint of merchandising transportation. Interiors should be pleasing; seats should be upholstered, and the ride made as comfortable as is consistent with the nature of the car.

The small safety car has proved to be one means of helping to meet jitney competition.

Some safety car operating figures show an increase in car-miles of 30 per cent, decrease in headways 30 to

37 per cent, and in actual saving of approximately $2,000 per year per car in power and platform costs.

The jitney competition will be met with the safety car through its frequency and regularity of service and high speed.

Safety features can be stressed in contrast with the conditions under which the jitney operates, as well as the fact that it promised superior comfort in all weathers and temperatures.

Public utility commissions and chambers of commerce can materially assist in keeping before the public the fact that prosperity to the railroad means better service to the public.

Company representatives should have membership in Kiwanis clubs, Rotary clubs, employers' organizations and business men's organizations.

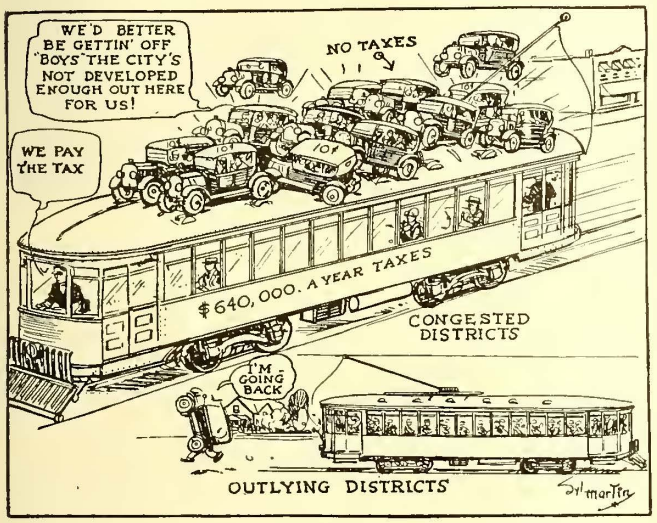
Hotels, department stores and steam railroad stations can be utilized in various ways to merchandise transportation, a particularly effective method being the placing of pocket schedules in information booths or maps showing car routings.

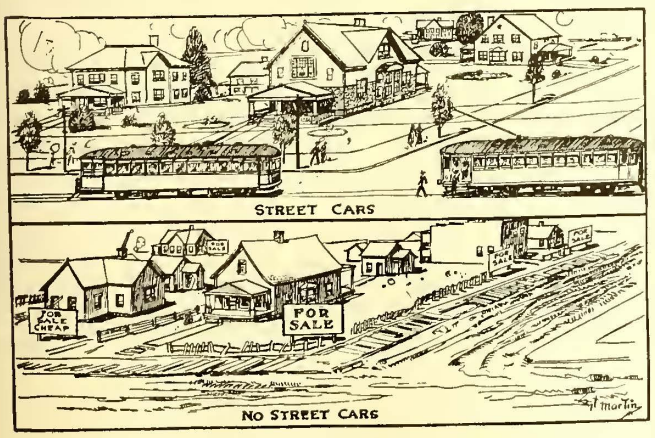
The committee in conclusion expresses the belief that while it is probable that all of the recommendations cannot be carried out on all lines, some of the suggestions made are suitable to every railway system and that the sale of good service can be increased if a scientific effort is made along these lines. The committee which presented the report consisted of F. G. Buffe, chairman; W. J. Flickinger, W. H. Boyce, F. R. Coates, M. B. Lambert, A. Stuart Pratt, S. L. Vaughan, B. W. Frauenthal, A. L. Kempster and Joseph H. Alexander.

After the report on merchandising transportation was concluded, a motion-picture film, prepared by the Kansas City Railways under Mr. Buffe's direction, was shown to the meeting. The film had just been completed and this was its first exhibition. It was made for the purpose of informing the residents of Kansas City, Mo., and Kansas City, Kan., on the great plant and investment, with which the public has little knowledge, required to furnish transportation. The picture was well received by the delegates, many of whom gained therefrom a new idea of how the public can be approached in a manner both interesting to it and valuable to the utility.

L. H. Palmer, Baltimore, reported for the committee appointed to consider the suggestion made earlier in the convention for co-operation of this association with the Claims Association in appointing a joint committee to work with the National Safety Council. The committee recommended the appointment of such a committee and that the association become a member of the National Safety Council. These recommendations were adopted.

J. P. Barnes, chairman committee on resolutions, presented a resolution thanking the officers and committee members for efficient work performed by them during the past year.





TYPICAL CARTOONS PRESENTED BY THE COMMITTEE ON MERCHANDISING TRANSPORTATION

Officers for the Ensuing Year

J. N. Shannahan then read the report of the nominating committee, which was as follows:

President, R. P. Stevens, president Republic Engineers, Inc., New York, N. Y.

First vice-president, L. H. Palmer, assistant to the president United Railways & Electric Company, Baltimore, Md.

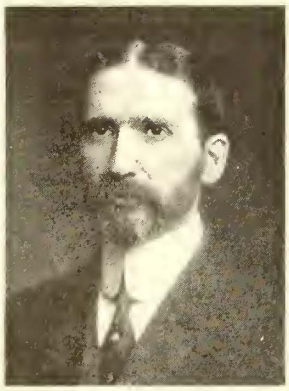
Second vice-president, Garrett T. Seely, vice-president and general manager Pennsylvania-Ohio Electric Company, Youngstown, Ohio.

Third vice-president, J. K. Punderford, vice-president the Connecticut Company, New Haven, Conn.

Executive committee: G. H. Clifford, Fort Worth, Tex.; A. Gaboury, Montreal, Canada; T. C. Cherry, Syracuse, N. Y.; and J. V. Sullivan, Chicago.

President Collins expressed his sincere appreciation of the prompt and efficient co-operation given him by the members all the year. The meeting then adjourned *sine die*.

Engineering Association Proceedings



E. R. HILL
Retiring President

Outstanding Features of the Convention of the Engineers Were Addresses on the Proposed "Super-Power System," by W. S. Murray, and on the Problems of Heavy Electric Traction, by A. H. Armstrong. The Safety Car Was Considered Jointly with the Transportation Men. Committee Reports Were of High Quality

W. G. GOVE
President-Elect

THE Engineering Association opened its meeting on Oct. 11 with an address by President E. R. Hill, which was in part as follows:

"In some respects the past year has been uneventful, in that no sensational development either at home or abroad has occurred to disturb, broadly speaking, the normal activities of the country. The year, however, has been a very important one in the history of the country and of the electric railway industry, as it has marked the climax of many of the unhealthful influences which followed the war and were the direct result of it. Among these are low efficiency and high cost of labor in industry, resulting in high prices of materials and products, high cost of living and a tendency toward gross extravagance and waste on the part of a large proportion of the American people.

"To illustrate: Since 1914 the average advance in cost of building material has been 126 per cent, machinery 75 to 100 per cent, railway equipment such as cars and locomotives 87 per cent and foodstuffs 110 per cent. The advance in the cost of living has been estimated by responsible authorities at from 95 to 130 per cent, while wages of skilled and unskilled labor have advanced respectively 119 and 110 per cent. On top of all this, according to the testimony of large employers, the efficiency of labor has seriously declined, in some cases being put as low as 50 per cent.

"It has now become obvious, however, that the climax has at last been reached and that a decline in prices of materials and products has set in and will not stop until all costs, including the very important item of labor, have reached a reasonable, stable and thrifty level. Doubtless the decline will not bring us back to conditions prior to 1914, certainly not for a long time to come, but we shall presently reach a point where the value of the dollar, the rate of interest charged on loans and the efficiency of labor of all kinds will be such that business can be carried on in a normal, constructive and profitable manner.

"Specifically applying war and post-war conditions to the electric railway industry, it is worth our while to look for a moment away from purely engineering matters and to note some of the conditions that confront the properties in which we are interested. The following outstanding facts and figures are convincing:

"(a) As to the magnitude of the electric railway industry: At the beginning of the war there were some 963 electric railway companies in the United States, with a total trackage of 44,000 miles and outstanding stocks and bonds of more than $5,035,000,000 par value.

"(b) Fares on electric railways in some 540 localities, representing a population of 38,000,000, had, up to Oct. 1, 1920, been increased by 1 to 5 cents, the average increase being of the order of 40 per cent. Other lines serving perhaps an equally large population have had no increase in fares.

"(c) Operating revenues of twenty-three important electric railway systems in the five years 1914 to 1919 increased 27 per cent, while expenses increased 56 per cent in the same period and the net income suffered a decrease in 72 per cent.

"(d) Abandoned service and lines dismantled and junked, either of necessity or in order to minimize losses and keep afloat financially, since 1914 have occurred in 130 cases, aggregating 1,226 miles of track.

"(e) Receiverships and foreclosures affecting electric railway properties as of August, 1920, numbered 88 cases, representing 5,160 miles of track and stocks and bonds aggregating $759,162,625 par value.

"The situation indicated above, while primarily due to increased cost of service and inadequate fares, has also been affected by competition of motor vehicles and the general condition of the securities market and the prevailing high rates of interest.

"We are, as an association of engineers, charged chiefly with the solution of engineering problems; what can we accomplish either through our engineering talent or otherwise toward establishing the properties in which we are individually interested and the electric railway industry as a whole on a sound, enduring and profitable basis and make it one of the most useful public institutions in the country? If the definition that 'engineering is the science of controlling the forces and utilizing the materials of nature for the benefit of man and the art of organizing and of directing human activities in connection therewith' is accepted as correct, the importance of the engineer in this work of reconstruction can scarcely be overestimated; in fact, the scope of his work becomes vastly broader than most of us have usually been accustomed to think.

"Both as individual engineer and as an association I think we can do much to bring about this greatly desired result:

"1. We can offset by engineering skill some of the losses and high costs of operation by developing or applying more efficient and economical appliances and methods which will result in lower cost of service; for example, the reduction in the cost of electric power by adopting special fuels, the consolidation of power plants, the purchase of power in bulk and shutting down of obsolete plants, and the use of automatic machinery and devices; subjects of this character have been treated by our committees and will be reported on during the convention.

"2. We can employ improved types of construction materials and apparatus in connection with new work and can follow best established practices and adopt the highest standards. The work of our committees toward standardization is in line with this suggestion.

"3 We can adopt improved methods of maintenance of plant and equipment which will not only reduce the cost but will raise the standard of maintenance. To this end each committee this year has been assigned and will report on a subject dealing with maintenance methods and practices in its field.

"4. We can develop and recommend types of equipment, such as cars and stations, and methods of operation that conduce to public comfort and convenience, thus rendering the service more attractive, increasing the travel and adding to the revenue. The importance of pleasing the public is greater now than ever before in the history of the industry.

"5. We can be well balanced and comprehensive in our point of view and learn to weigh every question from all angles, thus striking a happy medium between progressiveness and conservatism; too much conservatism has hurt many a good property and too radical an attack has sometimes killed a good engineering project before its real merits were understood or appreciated.

"6. Lastly, we can be optimists. There is little use for a pessimist in any line of business. Some one has truly said, 'What the world needs is not more of us but a better brand of us,' and optimism improves the brand. If we can have the courage of our convictions, put product ahead of policy or politics and see the bright side of life and better times ahead, we will keep in condition to do our best work and accomplish the largest results.

"I feel that the Association is to be congratulated not only on its past achievements and the present excellent state of its affairs but especially on the broad field for activity that lies just before it and the as yet uncharted realm of opportunity that the future holds."

The Secretary's Report

Following the address by Mr. Hill, J. W. Welsh read the report of Secretary-Treasurer E. B. Burritt. The latter stated that as a result of the inclusion of manufacturers in the association a full personnel in all committees was provided. In view of the fact that reports must be in the hands of the standards committee early, it is desirable that the secretary have them by June 1, and to that end committees should be appointed immediately after the convention. As an indication of the scope of committee activities he stated that a total of eighteen days of committee meetings has been held, an average of three for each committee. Seven data sheets had been sent out for the following committees: Way, two; power generation, two; equipment, two; and buildings and structures, one. Further, President Hill had secured the approval of the executive committee for application for representation on the American engineering standards committee by one member at present, corresponding to annual dues of $500. During the year the subject of maintenance practices and life of wearing parts had been assigned for consideration by all committees. The prices of the Engineering Manual have also been increased from $2 to $3.50, complete, to members, and the binders, to all, from $1.50 to $2. To non-members the price remains $5 complete.

Early in the year a code of instruction was sent to all members of all committees. Later, in order to permit committee work to start early next year, a letter was sent to executives of member companies asking for suggestions and a large number were received. Early in July a nominating committee was appointed as follows: F. R. Phillips, J. H. Hanna, C. R. Harte, J. H. Libbey, and N. B. Trist. [This committee reported the following nominations as required by the constitution: For president, W. G. Gove; for first vice-president, C. L. Cadle; for second vice-president, C. S. Kimball; for third vice-president, C. F. Bedwell; for secretary-treasurer, E. B. Burritt; for members of executive committee, H. A. Johnson, L. C. Datz, E. H. Scofield, A. B. Stitzer.—EDS.] Finally Mr. Burritt reported the individual membership in the association as 544 and the company section membership as 769.

Next, President Hill appointed as a committee on resolutions C. W. Stocks, F. R. Phillips and J. C. Thirlwall. The report of the way committee was then presented by R. C. Cram. An abstract follows:

Way Matters

In presenting the report of the committee on way matters the chairman called attention to the increase in membership of the committee and to the size of the report which is due to the nature of the subjects and to the large number of revisions in Engineering Manual data proposed. The stoppage of committee work during the war has heretofore prevented presentation of the accumulation of revisions needed as time elapses and experience requires.

The most important two subjects covered are a recommended system of uniform track spirals and curved heads for the Association standard girder grooved rails. The report presented a uniform system of spirals for adoption, completing the work begun last year. It included all necessary engineering data, together with instructions for use. It is believed to be a big step forward in the Association's efforts to secure maintenance economies. A suggestion was made that the work be continued with the view to standardizing track-center distances and branch-off frogs as a means toward greater economies in costs of special trackwork.

A standard design of curved head placed upon existing association standard girder grooved rails was proposed. The design is one already in use and calls for no new rolls for the rails. This subject was treated exhaustively and illustrations given which help to explain the text. There are about 150 miles of single track in the United States laid with rails having curved heads. The committee inspected installations in several cities and the engineers visited all agreed that the curved head is of great benefit. The curved-head design has not prevented corrugation but has extended the time required for its formation. The committee on equip-

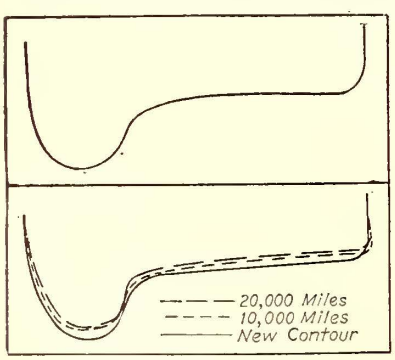
ment concurs with the way committee in the design recommended.

The subject of progress made in rail joints was too broad to be covered in the time available. The committee believes that the association should undertake a test of all types of welded joints, working in co-operation with the United States Bureau of Standards. Unfortunately no funds are available for this kind of research work. The belief was expressed that the application of the arc-weld joint should not be taken up generally until more is known as to its performance in extended service.

A revised specification for plain bolted special trackwork was submitted. Considerable existing matter was withdrawn and the revisions cover use of American Railway Engineering Association standards for split-switch design, fixtures and spring rail frogs. This should lead to a considerable saving through use of common standards.

Conferences were had with representatives of the American Wood Preservers' Association in reference to specifications for wood-block paving but no conclusions were reached and the subject was suggested for continuation.

Under review of existing standards and recommendations, some nine subjects were discussed and important changes proposed. Among these are changes in titles of the specifications for girder grooved rails; specifications for special trackwork; specifications for splice bars; rules for government of way department employees, and designs of plain girder and standard section rails. Three different rails are proposed for the latter in substitution for existing designs. A study of the use of substitute ties for tracks in streets is proposed as a subject for the ensuing committee's attention.



AT TOP, COMPOSITE DRAWING OF AVERAGE WORN WHEEL. AT BOTTOM, DEVELOPMENT OF CURVED CONTOUR OF STEEL WHEEL

The committee presented an abstract from the report of the American Society for Testing Materials for 1919 covering the proposed substitution of the so-called impression test for the existing drop test in the specifications for girder grooved and high T-rails. The committee discussed this with the representatives of the A. S. T. M. and with manufacturers' representatives. It appears that the proposed test does not provide a test for brittleness, which is considered necessary with the testing of girder rails. The committee was not prepared to report favorably or unfavorably and recommended further investigating by the ensuing committee along lines suggested in its report, one of which calls for the addition of a test which will provide a test for brittleness which can be used as a substitute for the drop test.

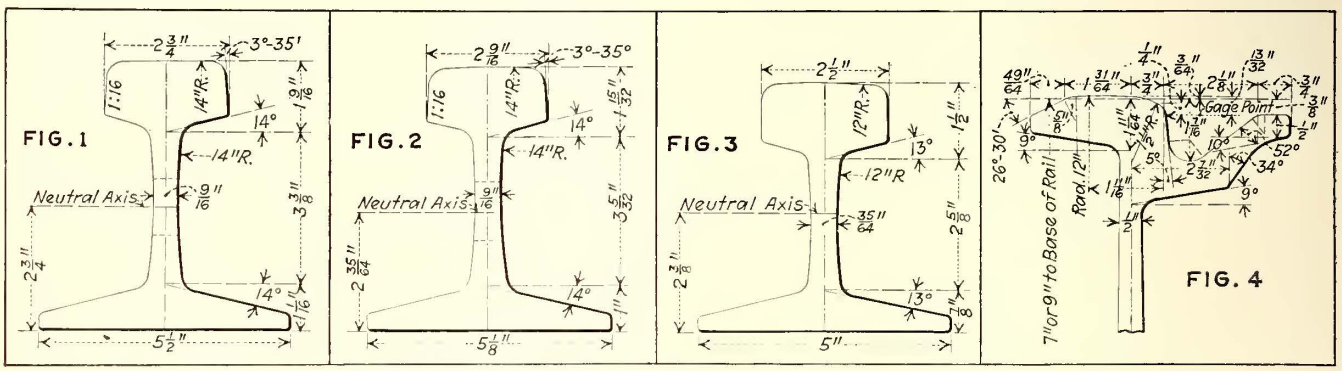
The committee recommended the use of the term "special trackwork" instead of the term "special work" now generally used in referring to parts of special track construction and proposes a new definition of special trackwork. The new definition was believed to be more indicative of the nature of special trackwork.

The presentation of reliable data on safe limits of wear in rails and special trackwork and on life of track construction was practically impossible. Records are not available. An interesting monograph on life of special trackwork by Victor Angerer was included in the appendix to the report. The committee recommended that the subject be discontinued.

There were, all told, twenty-eight recommendations submitted by the committee, fourteen of which call for changes in the Engineering Manual.

Mr. Cram then gave the reasons for the recommendations in his report, pointing out that the changes in rail sections were designed primarily to provide standards which were more readily obtainable from the rail mills. He also urged the investigation by the association of substitute ties, declaring that in some respects the electric railways were in a better position to use such ties than steam railroads.

President Hill then suggested that the recommendations of the way committee should be taken up and that those which affected standards should first be considered. The first subject considered was the recommendation on a uniform system of track spirals, which was approved. Following this, approval was given to the other recommendations of the committee in connection with standard 7-in. and 9-in. girder rails, plain bolted special trackwork and standard section rails, as well as the recommended changes in wording contained in the "summary of recommendations" appearing at the conclusion of the report. In connection with these changes in standards, Mr. Cram explained that they had received the approval of the manufacturer members of the committee, and in the discussion Messrs. Angerer, Alden and Entwisle, speaking for the manufacturers, ex-



FIGS. 1, 2 AND 3—STANDARD T-RAIL SECTIONS, 100 LB., 80 LB., 90 LB. FIG. 4—STANDARD DESIGN FOR HEAD OF 7-IN. AND 9-IN. GIRDER GROOVED RAIL

plained the benefit which would be derived from the proposed changes. At the conclusion of this portion of the discussion a vote of thanks was extended to the committee, H. H. Adams adding that in his opinion the work had been done in a very thorough manner and would be of great benefit to the association.

Charles H. Clark, Cleveland, expressed the opinion that it is impossible to go very far in standardization of crossing frogs, because it had been his experience that nearly every one needed had to be made special in order properly to meet the crossing angle requirements. But the body of delegates generally manifested a different opinion about this. The motion before the body to adopt the reinsuring recommendations of the committee was carried.

The report of the committee on buildings and structures was then presented by D. E. Crouse, chairman. The committee had made one definite recommendation as to the method of inspecting and maintaining bridges and making reports thereon, which had been placed before the standards committee for action. H. H. Adams reported for this committee that it recommended the association adopt the recommendation of the bridges and building committee as recommended practice. An abstract of the report follows:

Buildings and Structures

The committee on buildings and structures reported that bridge inspection and maintenance had been considered by it and as a result of its study and a digest of replies to a questionnaire the following outline was proposed: Bridges should be inspected by the track force daily, by a bridge foreman once a month and by the engineering department in conjunction with the bridge foreman semi-annually or annually. A suggested form for the monthly inspections formed a part of the report, and it was also recommended that the bridge foreman should make a monthly report summarizing the work done on structures. The committee recommended a continuation of the work on inspection and maintenance of buildings and structures.

The sub-committee on lag screws versus bolts in timber-decked structures attempted to find what the experience of steam roads had been in connection with the subject since 1918, but, due to the war, was unable to obtain many data and recommends a continuation of the work.

The sub-committee on fare collection at terminals obtained drawings and diagrams of all known methods. The post-payment method was found to have been discontinued. Three drawings were submitted showing forms of prepayment schemes now in use; turnstiles, change booth and coin box, and ticket booth and cancellation box. The turnstiles are in more general use, due to the requirement of only one attendant, but the other methods expedite the flow of traffic. The subcommittee proposed specific methods for the installation of a prepayment system and recommended such a system where the traffic density warrants its use. The suggestions submitted were as follows: When a prepayment scheme is to be designed for an industrial plant, an effort should be made to anticipate traffic and loading conditions by conferring with plant officials. An attempt should be made to concentrate the load at a minimum number of points, but sufficient track room should be available to reduce the loading time to a minimum. In all runways there should be sufficient reservoir capacity to permit an even flow of traffic. The plant employees should be utilized in handling gates and turnstiles during peak hours. Due consideration should also be given to the storage of cars, as often the prepayment loading point is the train terminal.

The committee report contained an appendix by D. W. Smith covering the use of lag screws in trestle construction, with drawings and data. The committee recommended that its work be continued.

The report was signed by D. E. Crouse, chairman; G. P. Legare, B. R. Brown, E. D. Smith, James Link, J. R. McKay, E. H. Berry, S. J. Steiner and R. C. Bird.

Martin Schreiber in discussing the committee report spoke of the economy of maintaining building structures, saying of the many different ways brought up as to how best to carry on this work that there was no plan which worked so well as to execute the small amount of maintenance work necessary each year. He believed that when the small repairs are deferred, the expense of doing it ultimately is far greater, for, once deterioration is started, it advances with great rapidity. He also expressed the thought that it would have been well for the committee to have carried this investigation a little further to include waiting rooms, shelters, etc., which are necessary as soon as a company begins the use of prepayment terminals. He suggested that next year's committee might take this up.

R. C. Cram called particular attention to the form of report included in the committee's work for use in reporting to state commissions and similar bodies. He thought that this was an important thing, for many public bodies are very particular about the form of reporting and insist on promptness as well. He urged railway men to be very particular to have all bridges used by them inspected by their own men whether the company was responsible for this inspection or not. He thought that it was well to do this to protect the company's interest with the public, for a bridge failure resulting in serious accident was very difficult to explain away even though some one other than the company was responsible.

The recommendation of the standards committee and the report of the committee on building and structures as a whole were adopted.

Tuesday's Session

The first part of the meeting of the Engineering Association Tuesday afternoon was taken up by a joint session with the Transportation & Traffic Association.

The engineers met at 4.30 Wednesday afternoon at the conclusion of the joint session of the Transportation & Traffic Association to hear a paper by E. P. F. McCall, storekeeper South Side Elevated Railroad, Chicago, but unfortunately neither Mr. McCall nor his paper was present, so this had to be postponed until Thursday.

The attention of the meeting was then directed by President Hill to the appointment of a standing committee on purchasing and storekeeping. This was discussed briefly by several delegates and was brought to a head by J. H. Hanna, who moved that a recommendation be made to the executive committee that such a standing committee be appointed. This motion was carried after a discussion in which it was brought out that there had been a movement heretofore to organize a separate association of purchasing agents and storekeepers, which was not wanted, but that the formation of such a standing committee was highly desirable. It

was also brought out that the personnel of this committee should be composed of representatives of both small and large properties, for the practices used in the storekeeping departments of large properties are not applicable at all on small properties. The meeting then adjourned.

Wednesday's Session

At the third session of the Engineering Association held Wednesday afternoon reports of the committees on power distribution, power generation and the national electrical safety code were presented. The report of the committee on power distribution was read by Charles Rufus Harte, chairman. This was principally a report of progress and is abstracted below. The specifications and form of contract for electrical conduit construction which formed a part of this report were approved for publication in the Engineering Manual under miscellaneous practices.

Power Distribution

The committee on power distribution reported regarding seven subjects as follows: Revision of overhead line specifications, crossing specifications and specifications for catenary line construction, standard stranding of cables, standard threads on pins and insulators, electrical conduit construction and standard wires and cables.

The report stated that the sub-committee on overhead line material had continued the work begun in 1917 and recommended further study of the subject, and the sub-committee on overhead line crossings recommended that a joint committee of the Engineering Association, the American Railroad Association and the American Railway Engineering Association study this subject. The latter sub-committee presents fourteen points for the consideration of this joint committee in connection with the existing specifications.

No material was presented by the sub-committee on catenary line construction, but the sub-committee on standard stranding of cables submitted a very complete set of specifications and a complete stranding table which it recommended for acceptance as standard only after they are adopted by the American Institute of Electrical Engineers, which was largely instrumental in developing the subject.

The sub-committee on specifications for standard threads for pins and insulators found that there was a growing tendency toward the use of cemented metal pins, so that the importance of thread accuracy is decreasing. It found that no trouble was experienced with the pins and insulators furnished by reputable dealers. In view of these facts the committee recommended standards along general lines.

The sub-committee on conduit specifications and contract forms recommended the appointment of a joint committee representing the various associations to prepare standard contract forms and specifications. It presented some charts and drawings showing manhole and conduit construction.

The sub-committee on specifications for wires and cables reported that it had carried on the revision of the existing specifications in an attempt to treat the subject as a whole rather than in sections. Five of the seven items included have been recommended for adoption as standard.

The committee stated that it was unable to obtain satisfactory data on the subject of safe limit of wear on trolley wire, frogs, life of insulators, life of cable insulation, etc., and reported progress, with a recommendation that the work be continued.

The report was signed by Charles Rufus Harte, chairman; C. C. Beck, J. H. Drew, R. W. Eaton, H. H. Febrey, C. J. Hixson, C. H. Jones, J. H. Libbey, F. McVittie, M. B. Rosevear, W. Schaake and A. Schlesinger.

TABLE I—PROPOSED STANDARD CABLES

Number and size *	Individual Strands Nominal Diameter Mils	Individual Strands Nominal Cross Section Circ. Mils	Total Nominal Cross Section Circ. Mils	Total Diameter Inches
127—No. 8	128.5	16,510	2,097,000	1.671
127—No. 9	114.4	13,090	1,662,000	1.487
91—No. 8	128.5	16,510	1,502,000	1.414
91—No. 9	114.4	13,090	1,191,000	1.258
61—No. 8	128.5	16,510	1,007,000	1.157
61—121 mils	121.0	14,641	893,100	1.089
61—No. 9	114.4	13,090	798,500	1.030
61—107 mils	107.0	11,449	698,400	.963
61—No. 10	101.9	10,380	633,200	.917
37—116 mils	116.0	13,456	497,900	.812
37—No. 10	101.9	10,380	384,100	.713
37—97 mils	97.0	9,409	348,100	.679
37—No. 11	90.74	8,234	304,700	.635
19—No. 9	114.4	13,090	248,700	.572
19—107 mils	107.0	11,449	217,500	.535
19—No. 11	90.74	8,234	156,400	.454
19—No. 12	80.81	6,530	124,100	.404
19—No. 13	71.96	5,178	98,380	.360
19—No. 14	64.08	4,107	78,030	.320
7—No. 10	101.9	10,380	72,660	.306
7—No. 11	90.74	8,234	57,640	.272
7—No. 12	80.81	6,530	45,710	.242
7—No. 14	64.08	4,107	28,750	.192
7—No. 16	50.82	2,583	18,080	.152
7—No. 18	40.30	1,624	11,370	.121
7—No. 20	31.96	1,022	7,154	.096
7—No. 22	25.35	642.4	4,497	.076
7—No. 24	20.10	404 0	2,828	.060

*—Sizes are expressed as A. W. G. gage numbers except where diameters are given in mils.

TABLE III—PROPOSED STRANDING—FLEXIBLE CABLES

Nearest A. W. G. Size	Cross Section Circ. Mils.	Diameter of Cable Mils.	No. of Wires	Size of Each Wire A. W. G.	Size of Each Wire Diameter	Construction
....	2,039,000	1 885	703	15.5	53.9	37 x 19
....	1,816,000	1 779	703	16.0	50.8	37 x 19
....	1,617,000	1 679	703	16.5	48.0	37 x 19
....	1,440,000	1 584	703	17.0	45.3	37 x 19
....	1,284,000	1 496	703	17.5	42.7	37 x 19
....	1,103,000	1 372	427	16.0	50.8	61 x 7
....	874,600	1 222	427	17.0	45.3	61 x 7
....	693,600	1 088	427	18.0	40.3	61 x 7
....	550,000	969	427	19.0	35.9	61 x 7
....	436,200	863	427	20.0	32.0	61 x 7
....	345,900	768	427	21.0	28.5	61 x 7
....	274,300	684	427	22.0	25.3	61 x 7
....	264,600	671	259	20.0	32.0	37 x 7
0000	209,800	598	259	21.0	28.5	37 x 7
000	171,300	538	133	19.0	35.9	19 x 7
00	135,900	479	133	20.0	32.0	19 x 7
0	107,700	427	133	21.0	28.5	19 x 7
1	82,780	332	91	20.5	30.2	Concentric
2	65,650	295	91	21.5	26.9	Concentric
3	52,060	263	91	22.5	23.9	Concentric
4	39,190	228	61	22.0	25.3	Concentric
5	31,080	203	61	23.0	22.6	Concentric
6	24,650	181	61	24.0	20.1	Concentric
8	17,410	152	61	25.5	16.9	Concentric
10	10,560	118	37	25.5	16.9	Concentric
12	6,640	94	37	27.5	13.4	Concentric
14	4,176	74	37	29.5	10.6	Concentric
Smaller	.....	.....	To equal required size....	30.0	....	Bunched

TABLE II—PROPOSED STRANDING—CONCENTRIC LAY CABLES

Size (See Note 1)		Number of Wires (See Note 2) A Bare Insulated or Weatherproof Cables for Aerial Use	B Insulated for Other Than Aerial Use
2.0 circular inches	1,013	91	127
1.5 circular inches	760	61	91
1.0 circular inches	507	61	61
0.6 circular inches	304	37	61
0.5 circular inches	253	37	37
0.4 circular inches	203	19	37
0000 A. W. G.	107	19 or 7 (See note 3)	19
00 A. W. G.	67.4	7	19
2 A. W. G.	33.6	7	7
7 and smaller	10.5		7

NOTE 1.—For intermediate sizes use stranding for next larger size.

NOTE 2.—Conductors of 0000 A. W. G and smaller are often made solid and this table of stranding should not be interpreted as excluding this practice.

NOTE 3.—Class A cable sizes 0000 and 000 A. W. G. is usually made of seven strands when bare and nineteen strands when insulated or weatherproof.

The subjects considered by the committee on power generation this year were as follows: Form of power contract for the purchase of power, comparative cost of steam production in power plants using coal, oil, gas or other fuels, statistics of cost of power generated by member companies. These subjects were handled by sub-committees and the results were presented in detail by means of tables and charts.

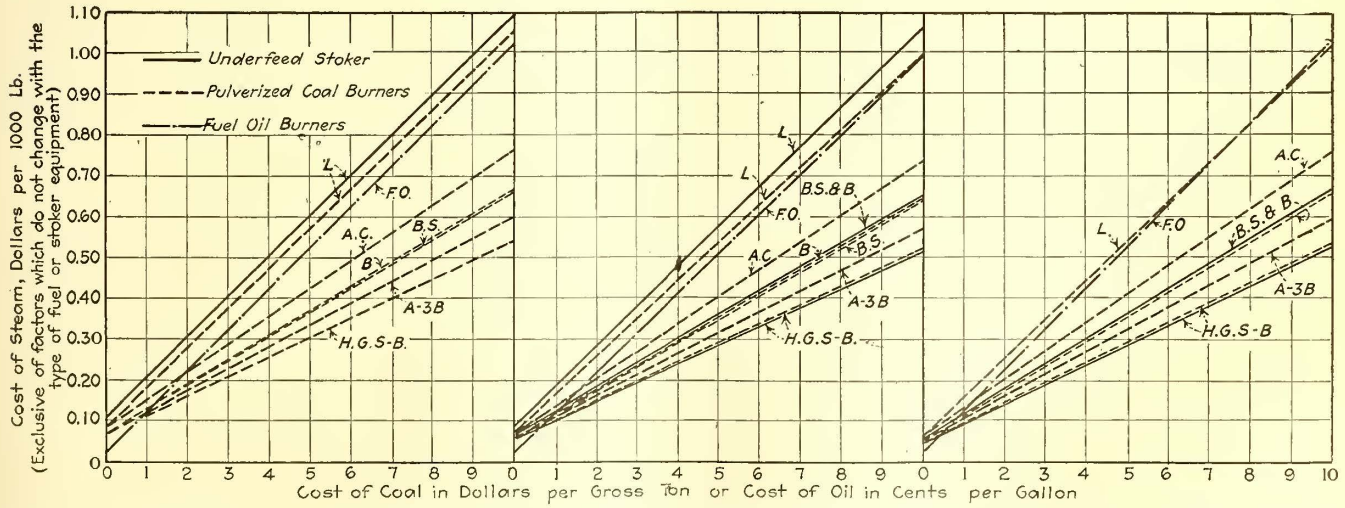
The form of power contract recommended covers the subject in detail and may be modified to suit particular conditions. The contract deals with demand and demand charges and also contains a clause which considers the effect of power factor on charges to be made. A coal clause is incorporated in the section covering the energy charge. The committee comments on each clause of the proposed contract and outlines its reasons for the wording of the clauses.

W. S. Finlay, Jr., submitted the main paper on the comparative costs of steam production in power plants using various fuels. In order to limit the scope of the subject to reasonable bounds, a medium-sized boiler plant was assumed, with equipment of known characteristics and operating under certain fixed conditions. The costs and comparisons were compiled from the results of a questionnaire sent to manufacturers and member companies. The sub-committee on that subject found that the status of chain grates and overfeed stokers was unchanged during recent years, but that the underfeed stoker had developed rapidly. The sub-committee maintains that the underfeed stoker holds the premier position in power service, but that modern developments and increased labor costs make it imperative that the stoker manufacturers develop the stoker as a system rather than as a mechanical unit, *i.e.*, coal-handling apparatus and methods must be included.

The committee discussed the use of pulverized fuel and incorporated written statements received from manufacturers. It appeared that there is no decided difference in the commercial success of a good stoker plant and a good pulverized-coal plant when all elements of cost are considered. The pulverized-fuel equipment cannot be used on an economic basis in small plants having a capacity of less than about 2,000 b.hp. From an operating standpoint the pulverized-fuel plant presents many advantages in regard to cleanliness, possibility of using low-grade fuel, standby savings and sanitation, but great care is required to avoid slagging troubles when high boiler ratings are desired. The pulverized fuel permits a higher combustion temperature, but it appears that a better adaptation of the boiler and furnace must be made to utilize fully this increased temperature and to avoid slagging.

The question as to the civic nuisance caused by ash dust from the stacks of plants using pulverized fuel was raised by the committee for discussion. It seemed to the committee undesirable to change a modern stoker plant to a pulverized-fuel plant, but pulverized fuel should be considered on its merits in remodeling an old plant or when installing a new plant.

In discussing oil Mr. Finlay stated that the situation today is that oil is a local fuel in so far as the general power situation is concerned. H. P. Bell stated that even in California the increasing price and decreasing production of oil is causing the development



PLANT DESIGNED FOR MAXIMUM BOILER RATING OF 100 PER CENT. YEARLY OUTPUT 1,022,000,000 LB. OF STEAM NET, LOAD FACTOR 50 PER CENT

PLANT DESIGNED FOR MAXIMUM BOILER RATING OF 200 PER CENT. YEARLY OUTPUT 2,044,000,000 LB. OF STEAM NET, LOAD FACTOR 50 PER CENT

PLANT DESIGNED FOR MAXIMUM BOILER RATING OF 300 PER CENT. YEARLY OUTPUT 3,066,000,000 LB. OF STEAM NET, LOAD FACTOR 50 PER CENT

DIAGRAMS FOR USE IN COMPARING COST OF STOKER EQUIPMENT AND FUEL

Boiler Equipment 12,600-hp., inclined header, longitudinal-drum, B. & W. boilers, 21 tubes wide and 14 tubes high, with no superheater; baffling, three vertical passes, steam pressure 200 lb. gage, feed-water temperature 200 deg. F.

Fuels: A 3 B, anthracite coal No. 3 buckwheat; A C, anthracite culm; L. lignite; B S, bituminous slack; H G S B, high grade semi-bituminous; B, bituminous; F O, fuel oil.

Cost Factors Included—The costs do not include factors which are the same for all classes of fuel and fuel-burning equipment, such as cost of boilers, buildings, etc. The cost of auxiliary power is included by assuming that 1 kw.-hr. requires 1.75 lb. of coal or 1.3 lb. of oil.

of hydro-electric power as a relief measure, and the trend is to use oil only on the peaks, in low-water periods and under emergency conditions.

The committee briefly discussed colloidal fuel and gas also, but considered them unavailable for general power purposes. The colloidal fuel promises good results, but gas is limited to auxiliary and emergency service.

The report contained statements from manufacturers which outline the developments made in stoker equipment, in pulverized-coal equipment and in oil-burning equipment.

In comparing costs, an assumed plant was considered with assumed conditions of operation. Twelve 600-hp. B. & W. boilers without superheaters, 200 lb. steam pressure, 200 deg. Fahr. feed-water temperature, 50 per cent load factor, a load curve and three maximum loads were features of the hypothetical plant. At 100, 200 and 300 per cent boiler rating the weights of steam produced per day were assumed to be 2,800,000, 5,600,000 and 8,400,000 lb. respectively.

A chart was prepared as a result of the comparisons, covering all items which would be taken into consideration when comparing various types of fuels and fuel-burning equipments. This is reproduced herewith.

In a summary the sub-committee drew only general conclusions, but stated that the graph will provide data that may be applied to a particular case.

Underfeed stokers, the committee reported, will hold their own where high-grade bituminous or semi-bituminous coal can be obtained and the pulverized-fuel burning equipment will yield a saving where low-grade fuels are available. They will become more and more important, due to the increasing scarcity of high-grade fuel.

The sub-committee on the analysis of power plant costs had available complete data from eleven plants operating under nearly the same conditions and ranging in size from 7,250 kw. to 50,000 kw. Operating expenses were considered on a five-year basis under the headings of labor, fuel, lubricants, water and miscellaneous power plant supplies and maintenance. Table I was given to show the average costs on a five-year basis for the items listed and the total operating cost.

Table II was given to show the outputs and load factors for the plants considered on a five-year basis.

The labor costs diminished only slightly in 1919 and the data indicate that they will increase. The same conclusion can also be applied to maintenance costs. The peak in fuel costs seems to have been reached and the committee concluded that the peak in operating costs is not far away. Charts and tables were submitted showing the data from which the tables are derived.

The committee recommended a continuation of the work on power contracts and statistics on power costs, but advised a temporary cessation of work on comparative costs of steam production using various fuels.

TABLE I—POWER GENERATION COST DATA OVER A FIVE-YEAR PERIOD

	1915	1916	1917	1918	1919
Labor:					
Cost per kilowatt-hour, cent	0.12	0.12	0.122	0.164	0.188
Relative cost compared to 1915, per cent.	100	100	102	137	157
Fuel:					
Cost per kilowatt-hour, cent	0.375	0.375	0.573	0.672	0.675
Relative cost compared to 1915, per cent.	100	100	153	179	180
Water, lubricants, etc.:					
Cost per kilowatt-hour, cent	0.28	0.28	0.28	0 26	0.31
Relative cost compared to 1915, per cent.	100	100	100	93	111
Maintenance:					
Cost per kilowatt-hour, cent	0 049	0.044	0.061	0.096	0.104
Relative cost compared to 1915, per cent.	100	90	125	196	212
Total operation:					
Cost per kilowatt-hour, cent	0 572	0.567	0 784	0 958	0 998
Relative cost compared to 1915, per cent.	100	99	135	167	174

TABLE II—POWER-PLANT OUTPUTS AND LOAD FACTORS OVER A FIVE-YEAR PERIOD

	1915	1916	1917	1918	1919
Output in kilowatt-hour	52,500,000	61,700,000	70,200,000	74,000,000	79,000,000
Relative changes in outputs compared to 1915, per cent	100	118	134	141	150
Load factor, per cent	41.4	41.9	44.6	43.1	46

The report was signed by A. B. Stitzer, chairman; E. H. Scofield, C. W. DeForest, N. A. Carle, W. C. Slade, H. P. Bell, F. A. Scheffler, F. C. Hanker, A. H. Kruesi, W. S. Finlay, Jr., H. E. Davis and C. A. Greenidge.

In the discussion of this report N. A. Carle, chief engineer Public Service Electric Company, Newark, N. J., said in regard to the question of pulverized fuel that he is a firm believer in its use and he sees a largely increased field for it and believes that the burning of coal will in the future be as a pulverized substance. A. T. Perkins, manager for the receiver of the United Railways Company of St. Louis, said that he had a number of minor comments on the form of power contract which is a part of this report and these will be submitted in writing to the committee for their action. E. R. Hill, president of the Engineering Association, said that in regard to the time interval for demand readings that he suggested that a blank space be left in the form of contract so that this could be inserted by users as conditions warranted. The report was accepted and was referred to the committee for the ensuing year for further consideration and report.

C. A. Greenidge read the report of the committee on National Electrical Safety Code in the absence of J. H. Libbey, chairman. It was a brief progress report. The delegates then adjourned to meet in the Greek Temple and listen to an address on "Our Proposed National Power Policy," by W. S. Murray, chairman Super-power Survey U. S. Geological Survey. An abstract of this address is given in another part of this paper.

Thursday's Session

The closing session of the Engineering Association was held on Thursday afternoon, at which three committee reports and two papers were presented. The first paper was on standardization and its effects on stores. This paper was prepared by P. F. McCall, Chicago South Side Railroad. An abstract of the paper which was read by J. W. Welsh follows:

Standardization and Its Effect on Stores

On the subject of standardization and its effect on stores, P. F. McCall, general storekeeper Chicago Elevated Railroads, said in his paper that in discussing this topic he had assumed that the word standardization refers to such parts of equipment and road maintenance as applies to material carried in store stocks. The rapid progress of the electric railway business up to the present time has made standardization more or less difficult, but, with the work which has been done by the several associations, standards of materials are being given the attention they deserve.

Mr. McCall referred to the consolidation, some eight or nine years ago, of the properties with which he is connected. Upon acquiring the various stores he found a large assortment of similar rolling-stock materials, each of which had a slight difference which would not permit of exchange from one equipment to another. This was equally true with a certain amount of maintenance-of-way materials. It soon became evident

that with certain changes a single standard covering all properties could be had on a great many items. Sometimes this necessitated a slight change in design, or merely a reduction or addition in measurement, and, as these items were brought to the attention of the engineering department, an attempt was made to standardize. Work along this line was soon reflected on the stores stocks, as where it was previously necessary, in some cases, to carry four items for certain equipment parts this stock was reduced to one standard.

In acquiring new equipment certain standards were maintained, and where this could be done the numbers of items to be carried in stock were reduced. It was found necessary to carry a larger supply of the same item, but multiplicity of parts carried were brought to a minimum.

Mr. McCall said, further, that it goes without saying that where the numbers of parts carried are reduced the amount of capital invested is likewise reduced. Standardization helps to improve the method of keeping stores, as it is much easier to maintain a stock of standardized materials than it is to maintain a large assortment of materials for which standards have not been arrived at. Facility of supply is greatly improved by the adoption and maintenance of standards by various manufacturers throughout the country. The whole effect of standardization on stores is one of economy of materials and effort, and the further standardization of materials can be carried in harmony with progress of the electric railway business the more evident will that economy become.

To bring about such economy however, the writer did not advocate obsolescence of good serviceable equipment, but said that in acquiring additional equipment attention must necessarily be paid to standards now in existence or to standards which could be used in connection with present property.

Departure from existing standards should be seriously considered by all engineers as to effect on stores stocks and should only be permitted when it has been demonstrated that such a step means a greater benefit to all concerned. Mr. McCall concluded thus: "As I view it, the 'Litany of the Storekeeper' should include: Blessed are the engineers who bring about lasting standards, as they very materially aid in the facility of supply, reduction of stocks carried, with a subsequent reduction of capital invested, and help bring about a more orderly method of stores handling."

The report of the committee on equipment was presented by the chairman, Daniel Durie. An abstract of this report follows:

EQUIPMENT

The report of the committee on equipment covered eight subjects. Four were reports of investigations on helical gears, standard cars, life of wearing parts and the effect of severe weather conditions on car equipment; three dealt with the standardization of equipment parts, and one involved co-operation with the way committee on rail heads.

Previous standard designs of brake heads, brake shoes and keys were adopted by the Association in 1907 and were revised in 1916. This year's committee submitted revisions from previous standards for three brake heads, shoes and keys, two additional designs for brake heads, shoes and keys, one revision in design of limit gages for brake-head and shoe design, and one new design of limit gage.

The subject of the standardization of motor parts was carried over from last year and much work was done by this year's committee in an endeavor to decide on some definite parts that would permit of standardization, but no definite progress was made. The investigation of the committee indicated that motor manufacturers seemed to have a certain reluctance to agree on standard parts which the operating companies seemed to consider as most desirable to have standardized.

The third subject consisted of a report on the development and use of helical gears and may be summarized as follows: Prior to 1914 there was an effort made to reduce the destructive effects of vibration from railway motor gearing on locomotives and heavy multiple-unit equipments by the use of flexible gears. These involved high first cost and when they were considered for small motors, additional problems were presented due to the space limitations and excessive weight. During the latter part of 1914 an investigation of the railway gearing situation in the United States indicated the desirability of obtaining some better type of gearing for railway motors; first, to produce longer life, and, second, to reduce the destructive effects resulting from gear vibration.

Early in 1915 one manufacturer started tests on helical gearing for use in interurban service. The results obtained indicated that more extensive tests and investigations were warranted, and to obtain information on the numerous variables, helical gears were placed in city, interurban and electrified steam-road service. Gears were installed having a helix angle varying all the way from 5 to 23 deg. Early in 1919, after an analysis of the results obtained, this company adopted a 7½-deg. helix angle as standard for its equipments. Another manufacturer is supplying helical gears with an 8-deg. helix angle on equipments. It appears desirable that an effort should be made to induce all manufacturers to decide on the same helix angle.

When helical gearing was first introduced it was thought that its use might necessitate some special provision to care for end thrust. Numerous tests of end thrust on the equipments now in service, however, show that the existing designs are adequate and that no additional provisions are necessary.

To obtain information regarding results obtained in service from helical gearing the committee addressed a questionnaire to a number of railways operating this type of gearing. As a result of the information thus obtained the following conclusions are of interest:

First—There appears to be a decided reduction in gear noise and a reduction of vibration in favor of helical gearing and even with a worn condition of the bearings or pinions there appears to be an absence of noise with helical gearing.

Second—There appears to be no appreciable difference in the wear on the axle and armature bearings due to end thrust from helical gearing.

Third—The life obtained from helical gearing will undoubtedly be somewhat greater than that now obtained from spur gearing.

Up to Aug. 1 approximately 16,000 7½-deg. helical gears and pinions have been purchased for railway service on approximately 170 railways.

There are possibilities of very great complication if helical gearing with a variety of angles and forms of teeth is used, and a standardization of the helix angle and tooth forms is extremely desirable.

An investigation was made as to the feasibility of adopting a standard car design and the committee reported that it is not feasible at this time to design

or adopt a standard car. There was a feeling, however, that there is a wide field of usefulness for such a car, but in order to have it generally adopted it would be necessary for the operating companies to accept general types of construction instead of insisting upon the incorporation of their individual ideas in the cars which they purchased.

The committee reported that it had co-operated with the way committee in preparing and sending out a questionnaire on rail heads to obtain information in assisting to decide on a standard design of girder rail head.

A report on the life of wearing parts gave the line of investigation which had been used by this year's committee and a summary of conclusions. This work was directed along two lines, first toward the determination of the class of information that would be of most benefit, and, second, toward formulating methods for obtaining and recording the data.

The life obtained from car equipment wearing parts was shown to vary widely in different localities due to local operating conditions, service requirements, weather conditions, age of equipment, maintenance methods, etc. The number of variables involved is so great that this year's committee considered it advisable to concentrate its efforts on the more essential parts. An attempt was made to choose a few of the most important wearing parts and to formulate a questionnaire for obtaining information.

As the motor is the prime mover of car equipment the committee decided to obtain information on the life of five essential motor parts, armature bearings, axle bearings, gears, pinions and carbon brushes.

The questionnaire was sent out to 110 railways in the United States and Canada, those that operate one hundred or more cars. The replies received were tabulated and analyzed, and while the tabulations are not included in the report, a bulletin has been prepared which the Association will furnish upon request.

As a result the committee found as follows:

1. The replies to the questionnaire indicate the advisability of continuing the study of the life of wearing parts of car equipment.

2. The general opinion of the committee is that the replies received are rather inconsistent, and in many cases misleading and possibly useless as far as containing information for comparisons of different operating companies. The committee therefore feels that sufficiently accurate and reliable information cannot be obtained through the use of the questionnaire method.

3. The variation in the life given for the same part under similar service conditions as indicated by the answers was very great. For example, the figures given for the life of 40-hp. motor armature bearings varied from 5,800 to 200,000 car-miles in city service.

4. It is evident that the conditions existing on the different properties, such as service requirements, types of rolling stock, character of roadway, grades, curves, climate conditions, age of equipment and maintenance methods, are vital factors in the life of wearing parts. To permit the reaching of reliable conclusions these conditions must be known and their effect considered.

5. It appears that many roads are not keeping reliable records, so that it is impossible for them to give information of value. Some of the answers received give the life of wearing parts as the total number of parts used during the year 1919 divided by the car-mileage made during that year. Manifestly this is not the correct life. In regard to the limits of wear it appears that this subject should be properly studied in connection with the life obtained. From some of the answers received it appears that by using some parts after their useful life has been exceeded, the life of other parts is often reduced. A careful analysis and study of reliable operating data should decide the limits of useful wear and should prove of much benefit to operating companies.

The committee recommended that the subject of the life of wearing parts of electric car equipment be followed up and information collected by the Association so as to be available to the member companies, and that the work be carried on during 1920 and 1921 by at least two men reporting to the equipment committee who are either operators or men who have had operating experience. The report made should be based on about a three-month field survey, during which time the men would visit at least ten or twelve properties.

This year's committee made a careful study of the existing standards as adopted by the Association, together with proposed standards which were referred back to it by the committee on standards at the beginning of the year. As a result of this study the committee recommended revisions in the dimensions and designs as follows:

(a) Dimensions for A.E.R.E.A. steel-wheel designs.
(b) Standard tread and flange contours for steel wheels.
(c) Limit of wear gage for flange ⅞ in. in thickness.
(d) Association standard journal boxes and brasses.
(e) Journal box and contained parts for 3¼-in. x 6-in. journal.
(f) Gages for journal bearings and wedges.
(g) Standard specifications Et 12A—Specifications for solid wrought carbon steel wheels for electric railway service.

The eighth subject was a report on the effect of severe weather conditions on car equipment. This year's committee sent out a questionnaire on the subject. From the replies the following among other conclusions were drawn:

Few electric railways have a definite snow-removal program, but it is evident that those which have outlined such a program and adhere to it receive much benefit. The answers received indicate that these companies have fewer equipment troubles than others.

Very few companies have a continuous snow condition. The general method seems to be to clear to the pavement between tracks in city districts and a few remove the snow from the outside areas.

It appears that a majority of railways have definite obligations regarding snow removal specified by the city, but that the cities through which they operate assume no obligations themselves.

Most railways remove snow with their own crews and very few contract for snow removal by carts or other vehicles.

In a few cases sewer manholes have been used on main streets to good advantage, and the general opinion seems to be that it is very desirable to use sewers where they are of sufficient capacity and when the consent for their use can be obtained readily.

Difficulties with frost lifting of track or pavement are quite general and an apparently satisfactory method of reducing this appears to be through maintaining good drainage, cementing the pavement in where possible, and sealing the pavement to the rail to prevent water getting in.

Very few railways have taken any measures to keep traffic off the tracks in winter. In most sections this appears to be entirely impossible. There are a few places, however, where city ordinances prohibit vehicles running on the rails during snow periods, and in some sections troubles are reduced by urging co-operation with drivers of teams, automobiles, motor trucks, etc.

The use of salt seems to be quite general for keeping spring switches open, but with an accumulation of snow it is necessary to use broom and shovel in addition. Outside of the use of salt for switches it is used very sparingly at the other points.

The principal types of snow-fighting equipment used by electric railways consist of wing plows, spreader plows, machine plows, push plows, pilot plows, flangers, drags, ice cutters and snow sweepers.

Sweepers are used quite generally and to good advantage for light snow and for city work. Plows appear to have some advantage for deep snow and opening up suburban lines.

Very little attention has been given to developing apparatus for cutting ice from between rails. This appears to

be a field of development to which considerable attention should be given as it is evident that a large amount of equipment trouble comes from high ice conditions between the rails. The clearances between the motors and roadbed are small at best and with an accumulation of ice it is difficult to obtain the necessary tractive effort, so that spinning of wheels takes place with serious results to the motor windings. Such troubles are particularly in evidence on equipments with small-diameter wheels. There seems to be a great need for some efficient equipment that will cut down and remove ice from between rails.

The principal equipment failures resulting from extreme winter conditions consist of water in motors, roasted armatures and fields, grounded rheostats and cables and general burn-outs to electrical wiring and equipment. Some trouble has been experienced due to breakage of resistors when they are suddenly cooled when splashed with cold water or slush. Most roads have provided shields to protect resistors.

It appears that ventilated motors have performed fully as well as closed motors during the extreme weather conditions. In this connection, however, the consensus of opinion seems to be that closed motors are much to be preferred for operating snow-removal equipment, as the advantages of a ventilated motor cannot be fully utilized in this service, and often in extreme conditions the equipment should be as fully protected as possible. On few roads the ventilating holes are covered during extreme conditions of snow and water, and no evil effect results from this procedure.

Considerable difficulty has been experienced due to collection of snow in motors and to the clogging of drain holes. Frequent inspection and cleaning out of these holes have produced good results.

A few roads report hot bearings as a result of the entry of water into housings, its freezing preventing proper lubrication. With the later equipments, however, no particular difficulty is reported.

Most of the railways which sent in information are dipping and baking armatures and fields. The opinion is general that less trouble is experienced with motors that have their armatures and fields dipped and baked than with those not so treated.

In general there appears to be a greater breakage of gears and pinions during severe winter weather, but these breakages are not excessive.

A few roads report damage to gear cases by high pavement and ice conditions between rails, but there appears to be nearly as much trouble from wearing through of gear cases at the sides due to neglect to keep the gear cases lined up properly. The damage to gear cases appears to be about equally divided between malleable iron and pressed-steel types.

Very few roads use any special methods for testing the equipment which has operated through water. A few dry out water-soaked equipment over heated pits, but the general practice seems to be to remove water-soaked fields and armatures and to bake them in an oven to prevent trouble.

Discussion of the Report

The first subject opened for discussion was "Dimensions for Steel Wheels," which had been approved previously by the committee on standards. There was some discussion as to how railway companies would benefit by the adoption of these standards and how they would reduce costs and secure better deliveries. H. H. Adams stated it was not right for the association to set up standards so that the manufacturer can use them to the disadvantage of a company, and it did not seem right for member companies to be penalized for not using standards. R. H. Dalgleish said all had been led to believe that by adopting standards the ultimate costs to users would be reduced and also better deliveries could be obtained, as manufacturers could keep standardizd wheels in stock. He cited a case where a manufacturer had refused to make wheels other than standard unless an additional cost per wheel were added to the price. Mr. Dalgleish said it would be better not to adopt standards than to have these used by manufacturers to penalize the railways.

W. G. Gove said that there was no question that the adoption of standards would reduce costs to users, secure better deliveries and be of great advantage to all concerned, and that he was certain no manufacturer would increase the costs unnecessarily. On motion, the standard dimensions for steel wheels as recommended by the committee were approved.

The design of tread and flange contour for steel wheels as submitted by the committee was referred back for further consideration and study so as to see if any interference existed in connection with the standard rail sections, switches, mates and frogs of the association.

The next subjects discussed were: (1) The limit of wear gage for flange ⅞ in. in thickness, (2) revision of association standard journal boxes and brasses, (3) journal boxes and contained parts for 3¼-in. x 6-in. journal, and (4) gage for journal bearings and wedges. The recommendation of the standards committee for adoption of these reports was adopted without discussion.

On the subject of revision of specifications for solid wrought carbon steel wheels for electric railway service Norman Litchfield, American Car & Foundry Company, suggested that the proper action was to secure joint action between Engineering Association and the American Society for Testing Materials. It was decided to refer this report back to the equipment committee for the ensuing year. The same action was taken on the subject of gaging points and terms for wheel and track. The subject of brake shoes, brake shoe heads and brake shoe keys was also referred back to the committee. In the discussion of subject No. 4, "Investigate the feasibility of adopting standard cars," H. H. Adams, Chicago Surface Lines, emphasized the desirability of uniformity of car design. He suggested standards of varying length for cars (by one or more car windows) and of varying width to suit local track centers. Later it was moved and passed that the executive committee be requested to appoint a special committee composed of representatives of the Enginering Association and of the manufacturers to consider anticipatory standards, with special reference to cars and car equipment.

Concerning subject No. 3, "Report on helical gears," E. D. Priest, General Electric Company, stated that the last sentence recommending the adoption of a 7½-deg. helix angle was erroneously included, as the committee never acted upon this point. It was moved and passed to omit this sentence and the remainder of the report was accepted.

The report of the committee on heavy electric traction was briefly abstracted by Sidney Withington, New York, New Haven & Hartford Railroad, chairman.

Heavy Electric Traction

The committee on heavy electric traction has this year reported on the following assigned subjects: Recent developments and progress in the design of motors and motor drives for heavy traction, both alternating current and direct current, with comparison of weight, space, efficiency, etc.; description and illustrations of recent types of electric locomotives and comparison of electric and steam switching engines in freight yards.

The first two subjects were treated in the form of a general discussion. As to gear drive the committee stated that the major limitations are as follows: Gear reduction, necessary clearance about motor and gearing, maximum safe locomotive speed and permissible dead weight on the axle. The length of the motor is limited

by the space between the backs of the drivers, less the space required for the gear and gear case. The clearance between the bottom of the motor and gear cases and the rail should not be less than 5 in., which limits the motor diameter, gear diameter and number of teeth. The power limitations are fixed by the size of the motor and the gear ratio.

The quill drive, with spring supports between the motor and the wheels, was introduced to relieve the track distress due to heavy dead-axle loading, and has been successful for passenger, light freight and switching service. This type of mounting also affords opportunity to use larger motors than could be applied to axle mounting. The size is limited by the cab space occupied by the motor. The torque capacity is limited by the quill spring and the speed by the velocity of the armature, spring parts, gearings, journals or wheels.

In order to secure better weight efficiency the twin-motor quill drive has been developed; the pinions on each armature meshing into a common gear. The smaller armature diameter permits higher armature velocities, and by suitable gearing this secures higher horsepower rating per axle. The side-rod locomotive without gears permits axle loading similar to that of steam locomotive practice. This design necessitates the use of a few large motors and is economical for high-speed passenger service. It is not economical for low speeds, 15 to 20 m.p.h., because the speeds of driving wheels and armatures are the same and too low for the most economical design of motors. The geared side-rod locomotive has been developed for heavy freight service. It permits economy in motor design and also makes possible the driving of two or three axles from a pair of motors. The gearless motor has been successful in passenger service since 1906 and is economical in such service for reasons already outlined.

The single-phase commutator motor has been developed by stages for heavy traction service. Resistance leads were used in the early designs and gave trouble due to the use of improper materials in the construction. Monel metal is now used and most of the trouble has been eliminated. Another type has been developed, which starts as a repulsion motor and omits the use of resistance leads. The neutralization of the sparking voltage is secured by exciting the commutating winding in shunt with the main field and armature circuit. Commutation is improved by the use of interpoles and power-factor correction is obtained by means of an auxiliary winding distributed across the pole face. This motor, used on the Pennsylvania electrification out of Philadelphia, represents a 25 per cent increase in weight efficiency over previous designs of commutator motors.

An interesting design is the three-phase induction motor used on the Pennsylvania. This has wound secondaries, and the collectors are mounted on a shaft extension outside of the motor windings, which permits ready inspection. The leads to the collectors pass through a portion of the rotor spider and axially through the shaft and at the end of the shaft are connected to the collector rings by means of flexible copper connections. This design secures a maximum of active motor material between the side-frames of the locomotives.

The development of the 3,000-volt direct-current locomotive has carried with it every important development in direct-current motor design and important progress has been made in the use of insulation for this voltage.

The committee stated that it had found difficulty in obtaining exact data on steam and electric switching service. Where a considerable amount of switching is done, both passenger and freight, the electric switching offers several economies and advantages. Three electric switchers accomplish easily the work of five or six steam switchers. No relay engine is required and no time is lost for coaling, watering, cleaning fires, etc., as is the case with steam operation. The yard tracks are more intensively used, the yard capacity is increased and labor cost is decreased. Smoke is also eliminated by the use of the electric operation.

The use of electric switching offers more advantages in passenger service than in any other, particularly in the case of multiple-unit equipment. A chart introduced by the committee shows that the electric motive power tonnage per mile of track electrified has been nearly constant since 1905 in heavy electric traction.

In conclusion the committee advocated a "clearing house" for heavy electric traction study to avoid duplication of effort by the several organizations interested in the subject. The report was signed by Sidney Withington, chairman; L. S. Wells, C. H. Quereau, J. H. Davis, J. C. Davidson, R. C. Taylor, R. Beeuwkes, A. M. Eaton and J. V. B. Duer.

Following the heavy traction report A. H. Armstrong, General Electric Company, presented an address on "Electrification of Railroads," illustrated by lantern slides. An extended report of Mr. Armstrong's address will not be given here as this paper expects to report fully the address which he will give on the same subject at the joint meeting of the A. I. E. E. and A. S. M. E. in New York Oct. 22.

The committee on resolutions expressed the appreciation of the association to E. R. Hill, president; E. B. Burritt, secretary; James W. Welsh, special engineer, and other officers for their untiring work. The thanks of the association were given to the manufacturers for their earnest co-operation, to A. H. Armstrong and W. S. Murray for their interesting addresses, to the technical committees for their services and to the citizens of Atlantic City, who had helped to make the convention a success. Appreciation of the excellent attendance at the meetings was expressed and sympathy was extended to the families of deceased members.

OFFICERS ELECTED

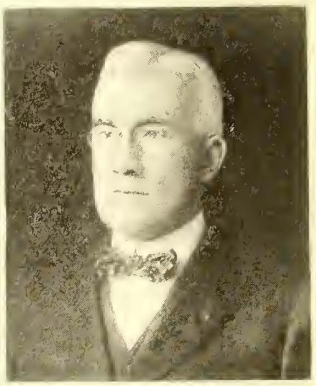
The nominating committee announced the selection of officers for the ensuing year and the following were elected: president, W. G. Gove, superintendent of equipment Brooklyn (N. Y.) Rapid Transit Company; vice-president, C. H. Cadle, chief engineer New York State Railways, Rochester; second vice-president, C. S. Kimball, engineer way and structures Washington (D. C.) Railway & Electric Company; third vice-president, L. C. Datz, chief engineer American Cities Company, Birmingham, Ala.; executive committee, H. A. Johnson, superintendent shops and equipment Chicago (Ill.) Elevated Railways; E. H. Scofield, engineer power and equipment Twin City Rapid Transit Company, Minneapolis, Minn.; A. B. Stitzer, chief engineer Republic Engineers, Inc., New York, and C. H. Clark, engineer maintenance of way Cleveland (Ohio) Railways.

Upon the seating of the new president H. H. Adams moved a rising vote of thanks to Mr. Hill. Mr. Gove in accepting the chair said that he appreciated the handicaps under which he assumed the duties, first, by virtue of succeeding such a man as Mr. Hill and, second, due to the condition of the industry.

Accountants' Association Proceedings

I. A. MAY
Retiring President

How to Collect and Register Fares Under Present Conditions; Accounting and Its Relation to Stock Regulation; Cost-of-Service Accounting and Its Difficulties in Cleveland, and Some of the Financial and Accounting Problems of Utilities in These Tight-Money Days from the High Points of the Accountants' Discussions, Were the High Spots of This Meeting



J. J. LANDERS
President-Elect

THE Accountants' Association opened its session on Monday afternoon, Oct. 11, with the annual address of its president, I. A. May, comptroller the Connecticut Company, New Haven, Conn.

ADDRESS OF PRESIDENT MAY

In his presidential address Mr. May spoke of the past year as having been pre-eminently one of readjustment. The great World War, he said, has brought changes in all lines of business, and especially in the railway business. It has been a hard year for all operators, and of course this has reacted upon the accounting department and brought demands upon it that have been hard to meet. Mr. May, at this point, paid a tribute to the self-sacrifice of the committee members and all those who have spent time in contributing to the work of the association, in view of the pressure of work upon them in the corporations with which they are connected.

He said that he looked forward with great hopes for the future and believes that the opportunities to do more constructive work for the association were greater even than ever before. It seemed to him that this work for the immediate future would be centered largely upon what might perhaps be termed "cost accounting." The method of business control of electric railways, he said, is entirely different from that followed a few years ago. The companies are now being asked the cost of operating a certain line, or the cost of operating a particular type of car, and under these conditions there will be plenty of material for the accountants to work on during the coming year.

He recommended that the three joint committees as well as the two standing committees of the association be continued, and to illustrate the kind of work he had in mind for committee activities he referred to the committee on accounting-engineering. He believed good work could be done if this committee could work out some method whereby more detailed cost of operation could be furnished to the engineers and other operating officials. For example, in the first group of operating accounts, namely, way and structures, he believed that the accountants and the engineers could work out some simple method of accounting that would furnish the maintenance engineer with prompt and accurate detailed cost data; that is, the cost of maintaining a particular piece of track and the cost of maintaining different types of track in any one system.

Again, in the next group of accounts, maintenance of equipment, unit costs are wanted by the engineers and officers in charge of equipment. Unit shop costs have been developed in the manufacturing plant, and the cost to operate certain machines is definitely known. Similar data should be compiled for the railways so that the management might know, for example, whether to manufacture trolley wheels or to buy them. The same remarks in a general way apply to energy accounts, such as power stations, certain costs of the transportation department, and even in the general and miscellaneous groups.

Cost accounting, Mr. May said, has been developed in the large manufacturing industries to a fine art, and his message to the association was that it should develop cost accounting in the railway industry in advance of requests that are bound to come to the department for this kind of information.

After Mr. May's address the report of the executive committee was read, the principal feature of which was the committee's effort to encourage joint committee work with other affiliated associations. The report covered two meetings of the executive committee, one in Cleveland Jan. 8, 1920, and one in Atlantic City, Oct. 11, 1910. The first meeting was largely devoted to assignment of subjects to committees and the assignment of subjects for papers to be presented. The most important act of the second meeting was the appointment of a permanent committee to represent the Accountants' Association at the annual conventions of the National Association of Railway & Utility Commissioners. This committee consists of C. S. Mitchell, comptroller Pittsburgh Railways; B. W. Fernald, auditor San Francisco-Oakland Terminal Railways, and John M. G. Horn, comptroller Illinois Traction System, Champaign, Ill. The executive committee reports as follows with reference to this action: "In the past these annual conventions of the National Association of Railway & Utility Commissioners have been held during November, and at our annual convention in October it has been the practice hurriedly to appoint a committee of three members with short notice for these members to arrange their affairs to permit of their attendance at

the National Association of Railway & Utility Commissioners' meeting. By adopting the permanent committee idea the former practice will be eliminated."

The plan outlined for the permanent committee provides:

"That it will not meet during the year; that not more than one of the members will attend the annual convention of the above-named association, and the committee member located nearest to the city selected for the annual convention will be the accountant and association representative in attendance."

COMMITTEES FOR 1921

With two or three slight changes in committee membership, which have taken place during the year, the following committees were continued for the ensuing term: Joint committee on claims accounting—H. J. Davies, co-chairman, Cleveland; George B. Cade, Asbury Park, N. J., and Walter Shroyer, Anderson, Ind. Joint committee on engineering accounting—W. E. Jones, co-chairman, Providence, R. I.; B. E. Bramble, Champaign, Ill.; Charles H. Lahr, Akron, Ohio; J. C. Collins, Rochester, N. Y., and F. H. Sillick, co-chairman, New York City. Joint Transportation & Accountants' Associations committee on collection and registration of fares—M. W. Glover, co-chairman, Pittsburgh, Pa.; R. H. Stevenson, New Haven, Conn.; W. A. Doty, Denver, Col.; John J. Duck, Chicago, Ill.; F. E. Webster, Haverhill, Mass.; G. G. Kalweit, Milwaukee, Wis. Standing committee on standard classification of accounts—H. L. Wilson, chairman, Boston, Mass.; W. F. Ham, Washington, D. C.; W. H. Forse, Jr., Anderson, Ind.; R. N. Wallis, Fitchburg, Mass., and P. S. Young, Newark, N. J.

The annual report of the secretary-treasurer, Frank J. Davis, was then submitted and showed a growth of membership from sixty-one to sixty-two individual members and from 165 to 168 company members.

The Accountants' Association then adjourned to attend the joint meeting with the Transportation & Traffic Association on the subject of registration and collection of fares. The discussion at this meeting is reported under the proceedings of that association.

Tuesday's Session

At the opening of the second session President May announced the membership of the convention committees. He named as members of the committee on resolutions T. P. Kilfoyle, J. J. Duck and D. J. Strouse. As members of the committee on nominations M. W. Glover, W. E. Jones, H. L. Sanders, W. K. Zinsmeister and A. M. Curtiss.

The chairmen of the committees on claims accounting and engineering accounting stated they had nothing to report.

STANDARD CLASSIFICATION OF ACCOUNTS

The report of the committee on a standard classification of accounts was read by Secretary Davis in the absence of the chairman. The report stated that during the past year the committee had received either through the Interstate Commerce Commission or direct some thirty communications, some of which embodied several questions asking for decisions. With the exception of two cases, which are now pending, they have all been given attention.

Accounting Bulletin No. 14, the last issued by the Interstate Commerce Commission, was effective on May 1, 1917, and the committee some time ago suggested to Alexander Wylie, director of the Bureau of Accounts, that it would be advisable to publish a new bulletin embodying all decisions that had been made to date, but unfortunately, owing to the pressure of work upon his bureau in connection with the duties imposed by the transportation act of 1920, Mr. Wylie said it was necessary to defer such publication.

The committee also believed that the Standard System of Accounts, the text of which was prepared previous to 1914, had proved fairly satisfactory, but that time and experience had shown that there were portions, owing to changed conditions, that might be revised. This matter was also taken up with Mr. Wylie and for the same reason he believed a new edition could not be issued for some time. The committee is to keep these two matters in mind and is prepared to take up the work at the earliest date agreeable to Mr. Wylie.

It was a source of no little pride, said the committee, that the classification of accounts had been adopted so generally by the different state commissions and that bankers and others interested had shown confidence in the financial statements made in accordance with the rules laid down. It is beyond question that its general use has been of great help in improving public relations and has materially assisted in the proper presentation and consideration of the numerous rate cases that have been under investigation during the recent period of abnormal conditions affecting the electric railway industry.

STORE ACCOUNTING

A paper on store accounting as a means of stock regulation was presented by R. A. Weston of New Haven. The plans outlined followed to a large extent the recommendations of the Association of Railway Storekeepers. An abstract of this paper appears elsewhere in this issue.

B. J. Yungbluth, Philadelphia, in discussing the report stated that a similar system based very largely on this plan had been used for some years by the Pittsburgh Railways and had recently been established by the Public Service Company. The Philadelphia Rapid Transit Company is now installing a similar system. Good results had been obtained through the use of this system, and in some instances the amount of stock necessary to be carried had been materially reduced. Mr. Yungbluth also urged that the suggested plan be used to a greater extent by the electric railways, as it allows accounting officers to keep any records they choose, but absolutely puts it up to the storekeeper to know what he has on his shelves without any guesswork.

Mr. Weston in answer to several questions stated that this plan should not take the place of the regular inventory, which should generally be taken at least once a year.

On motion of T. P. Kilfoyle a committee of five is to be appointed by the incoming president to study and report on the subject of stores accounting.

COST-OF-SERVICE ACCOUNTING

The second paper presented was by H. J. Davies, Cleveland, on "Some of the Imperfections in the Cleveland Franchise," an abstract of which is also printed elsewhere in this issue. In answer to questions Mr. Davies stated that the property written off on retire-

ment from service was not at the original investment figure but at reproduction new prices. This plan, he stated, was satisfactory only so long as prices for reproduction are in excess of the original cost. With falling prices, and he believes they are at hand, this plan of retirement of property will make the value of new additions less than the capital invested and the result will be overcapitalization.

Mr. Davies also outlined in detail the various steps in the attempt made by the company to secure a higher rate of return at the time the increase in wages of employees was granted, the final result being that the voters in referendum had refused by a vote of 35,000 to 10,000 to approve the action taken by the City Council in allowing a 7 per cent return. As a result of this the company is no longer able to float any stock at par for needed extensions and bonds cannot be sold at a discount unless the total interest and discount is kept within the 6 per cent requirement of the franchise.

Wednesday's Session

The closing session of the Accountants' Association was held on Wednesday afternoon. Two papers were read, the first of which was by Harry G. Mendes of Cleveland on financial problems confronting public utilities during the period of reconstruction. An abstract of this paper appears elsewhere in this issue.

The second paper was presented by George L. Vannais of Hartford on the accounting profession. An abstract of this paper is also printed elsewhere in this issue.

The committee on nominations next reported and on motion its selection for officers was voted. The officers elected were: President, J. J. Landers, auditor York (Pa.) Railways; first vice-president, F. E. Webster, vice-president and treasurer Massachusetts Northeastern Street Railway, Haverhill; second vice-president, W. G. Nicholson, secretary and auditor Omaha (Neb.) & Council Bluffs Street Railway; third vice-president, W. A. Doty, auditor Denver (Colo.) & Intermountain Railroad; secretary-treasurer, F. J. Davis, auditor's department Public Service Railway. P. L. King, auditor San Antonio (Tex.) Public Service Company; L. T. Hixon, Terre Haute, Indianapolis (Ind.), and Eastern Traction Company, and R. H. Stevenson assistant to comptroller the Connecticut Company, New Haven, were elected as members of the executive committee.

After the installation of officers the meeting adjourned, *sine die*.

Entertainments at the Convention

ALL the entertainments at the convention this year were at the pier with the exception of the ladies' obstacle golf tournament which was held on the lawn of the Marlborough-Blenheim Hotel. The evening entertainments consisted of the annual reception Monday night, informal dancing Tuesday night, the "County Fair" Wednesday night and the annual ball Thursday night. Of these, the most unique was Wednesday evening's entertainment, which was staged under the direction of R. C. Cram. Besides the main exhibition there were many side shows and opportunities for those so inclined to hit the African dodger, knock the cats from the fence or ring a cane. Only "bolshevik" money, with which the guests were freely supplied, passed current.

The ladies were entertained in the afternoon by a bridge tournament on Tuesday, with Mrs. W. F. Ham as hostess, an obstacle golf tournament on Wednesday with Mrs. Frank Donohoe as hostess and a tea Thursday afternoon with Mrs. John H. Pardee as hostess.

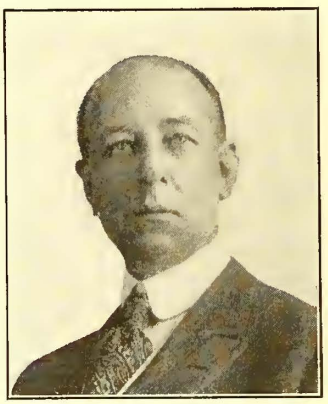
Meeting of Committee of 100

AT A meeting of the members in Atlantic City of the Committee of 100, held Tuesday afternoon at 4:30 in the Greek Temple, it was resolved to continue to function and that the work of the committee will be largely in the direction of the dissemination of information, as suggested by President Pardee in his address at the meeting of the association on Tuesday morning.

President Pardee presided at the meeting Tuesday afternoon, in the absence of General Tripp, who was detained by illness. H. G. Bradlee and B. C. Cobb were among those who advocated the plan adopted.

Public Representatives of Urban Transit

THE former American Association of City Representatives of Electric Railways met at the Traymore Hotel in Atlantic City on Oct. 13. The name of the organization was changed to Public Representatives of Urban Transit, as being more inclusive than the former name.



W. C. CULKINS

The officers elected for the coming year were: W. C. Culkins, Cincinnati, Ohio, president; Judge Fielder Sanders, Cleveland, Ohio, first vice-president; Carl D. Jackson, New York City, second vice-president; J. S. Goodwin, Detroit, Mich., third vice-president; delegates-at-large, W. S. Twining, Philadelphia, Pa.; Col. J. L. Wickes, Baltimore, Md., and M. M. O'Shaughnessy, San Francisco, Cal.; secretary-treasurer, C. R. Barnes, Rochester, N. Y. Messrs. Twining, Barnes and Sanders were appointed as a committee on constitution and by-laws. Robert P. Woods, formerly city member of the Kansas City Board of Control, now consulting engineer and also general manager of the Kansas City, Clay County & St. Joseph Electric Railway, was elected as the first honorary member. Following organization work the members had an instructive and animated discussion on their experiences in the operation of their local traction agreements. Plans were also started for a mid-winter meeting.

Celluloid tokens will shortly replace tickets on certain lines of the Glasgow Corporation Tramways. It was originally intended to make the change at the time of the recent increase in fares, but the manufacturers could not supply a sufficient number of the tokens at that time. The tokens will be accepted as payment for the two-stage fares. So far as is known this is the first occasion on which celluloid tokens have been placed in general circulation by a British tramway. They have been used previously by special classes of riders.

Vancouver Solves Information and Complaint Problem

Patrons of the British Columbia Electric Railway Show Increasing Appreciation of the Facilities Afforded Them

A DEPARTMENT of the British Columbia Electric Railway which has proved itself worth while during the past few months is the Bureau of Information and Complaint. This is located in a large booth at the Terminal Building. The accompanying illustration shows the bureau in action, but gives no idea of the volume of business transacted by it.

An actual count was made recently on an average day, after the bureau had been in operation for about two months, to determine the number of inquiries and complaints which were being handled and their nature. On this day there were 783 inquiries, an average of more than one a minute during the working hours between 8:30 a.m. and 8:30 p.m. These were answered by the bureau staff, consisting of two men. The questions were distributed thus: Regarding railway matters, 229; light and power, twenty-eight; gas six; miscellaneous, fifty-eight; referred to office upstairs (the company office being located in the terminal), twenty-three; calls on the two telephones, 428. The complaints regarding railway service numbered one; light and power, five, and, gas five.

Form No. 4042 12m. 29-6-201

British Columbia Electric Railway Company, Ltd.

Name .....

Title .....

Room No. ..... Floor No. .....

INTRODUCING .....

INFORMATION AND COMPLAINT BUREAU

Per .....

CARD USED IN INTRODUCING PATRONS TO COMPANY OFFICERS

Many of the queries and requests made of the bureau are amusing and serve to add interest to the work of the men connected with it. The following questions chosen at random will serve to indicate the nature of these requests: "When does the Chilli-wack train leave?" "What is the fare to Abbotsford?" "Where is Wall Street and how can I reach the 2500 block?" "When does the Victoria boat get in?" "Why is my light bill higher than my neighbor's?" "How often do the trains leave Victoria on the Saanich Line?" "How can I get to Ladner?" "Where is the best place to go fishing?" "When does the last ferry leave for North Vancouver?" "When does 'Teddy Lyon' (conductor of the company's sightseeing car) leave Robson and Granville?" "How is a good way to spend the evening?" "I've lost my daughter; she left here two hours ago on a Robson car; can you help me find her?"

One effect of the new bureau which the company officials noted is the increase in the number of complaints regarding service. This is due to the fact that the place where such complaints may be lodged is much more readily accessible than before. To illustrate, in June Assistant General Manager W. G. Murrin received sixty-seven railway department complaints as against forty-two in May. This was considered a very satisfactory result for the reason that, had the patrons not been able to lodge their complaints easily they would have nursed any resentment they had against the company, whereas a brief explanation might have cleared up the difficulty in almost every case.

Form No. 4043 (2m. 29-6-20)

BRITISH COLUMBIA ELECTRIC RAILWAY COMPANY, LIMITED.

INFORMATION AND COMPLAINT BUREAU

COMPLAINT OR SUGGESTION

1. Name .....
2. Address ..... Phone No. .....
3. Date of Incident ..... Time ..... Date reported .....
×4. Car No. ..... Employees' No. ..... Direction .....
×5. Route ..... on at ..... off at .....
×6. Description of employee if above particulars are lacking:

.....

.....

Particulars of Incident: .....

.....

Signature of Complainant .....

Time received by Complaint Bureau ..... K.

Time received by Department Head ..... K.

Information and Complaint Bureau

Per .....

× Questions 4, 5 and 6 apply only to Railway Department Complaints.

FORM USED FOR FILING COMPLAINTS AND SUGGESTIONS

The bureau also exerts a wholesome influence upon the departments affected by the complaints received. While many small misunderstandings which might never have come to light but for the convenience and accessibility of the bureau are satisfactorily cleared up at the wicket, a full report of all complaints is made to the management, and they are then directed to the officials affected, enabling them to determine and remedy the causes for complaint. Incidentally this acts as a check upon the efficiency of the departments concerned, for where a cause of misunderstanding or dissatisfaction has been thus brought to the attention of the official responsible, he cannot do otherwise than see that it is remedied and its recurrence prevented.

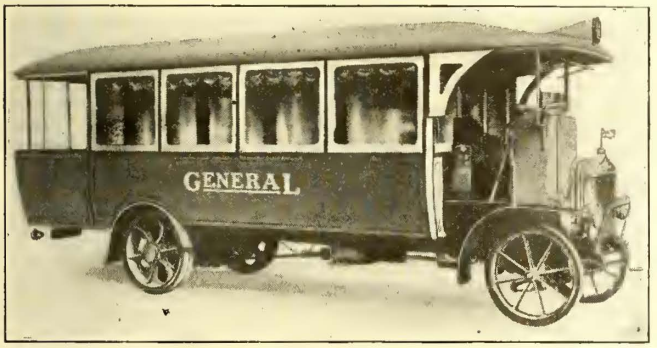
PATRONS OF THE BRITISH COLUMBIA ELECTRIC RAILWAY, VANCOUVER, UTILIZING THE NEW INFORMATION AND COMPLAINT BUREAU

Entrance to waiting room at left and entrance to company offices at right.

The Information and Complaint Bureau is well supplied with time-tables and other literature for distribution. In handling inquiries and complaints a few simple printed forms are used, of which two are reproduced. One is a 3 x 5-in. slip used in referring a complainant or inquirer to the proper company official when the matter cannot be handled by the bureau itself. The other is a letter sized form for filing complaints or suggestions in a rather formal manner.

A Camel-Back Motor Bus

THE Associated Equipment Company, designers and builders of the London General Motor Company's omnibuses, had a unique and new design of single-deck two-man bus on exhibition at the Antwerp Exposition.



A UNIQUE MOTOR BUS AT THE ANTWERP EXPOSITION

The driver is placed at the side of the engine, instead of behind, which increases the loading platform by 3 ft. 6 in. without adding to the over-all length of the bus. It also gives a more uniform distribution of weight between the front and rear axles and decreases the overhang of the body on the rear. A special spring is used which produces a very comfortable riding vehicle. The height of the top frame from the ground is 2 ft. 5 in. The chassis weighs about 3,000 lb. and will carry a total load of 7,000 lb., including the body, on the frame.

Another feature of the bus is the rear platform, which permits of twelve standees. The bus proper seats twenty-five, so there is a total capacity of thirty-seven. The roomy rear platform, the low step and the seating arrangement expedite loading and unloading passengers and the camel-back design permits the elimination of a bulkhead and a great reduction in weight, to say nothing of placing the driver closer to the traffic and eliminating a great deal of waste space found in earlier designs.

Steam Versus Electric Locomotives

AT A JOINT meeting of the New York section of the American Institute of Electrical Engineers and the metropolitan and railroad sections of the American Society of Mechanical Engineers at the Engineering Societies Building on Oct. 22 a number of prominent engineers will discuss the relative advantages of modern steam and electric locomotives.

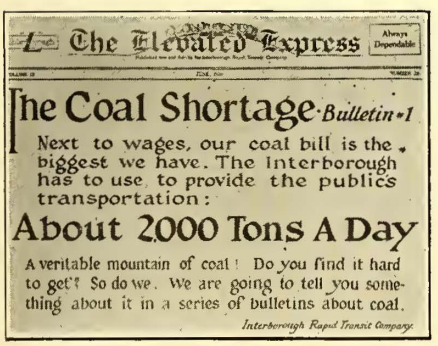
The subject will be introduced by Frank J. Sprague, consulting engineer. The advantages of electric locomotives will be presented by A. H. Armstrong, chairman electrification committee, General Electric Company, and F. H. Shepard, director of heavy traction Westinghouse Electric & Manufacturing Company, and the advantages of steam locomotives by John E. Muhlfeld, of the Railway and Industrial Engineers, Inc., and another speaker to be announced at the meeting.

The electric point of view will be discussed by C. H. Quinn, chief electrical engineer Norfolk & Western Railway Company; A. L. Ralston, mechanical superintendent New York, New Haven & Hartford Railroad; R. Beeuwkes, electrical engineer Chicago, Milwaukee & St. Paul Railway, and E. B. Katté, chief engineer electric traction New York Central Railroad, and the steam point of view by W. L. Bean, assistant general mechanical superintendent New York, New Haven & Hartford Railroad; A. W. Gibbs, chief mechanical engineer Pennsylvania System; F. H. Hardin, chief engineer of motive power New York Central Railroad and W. F. Kiesel, Jr., mechanical engineer Pennsylvania Railroad.

The discussion will be closed by George Gibbs, consulting engineer Pennsylvania Railroad.

Coal Story Told by Interborough

The Interborough Rapid Transit Company has been telling the story of coal scarcity to the people of New York through a series of bulletins carried in the subway and elevated railway cars of its system. The series began with No. 26 of the "Subway Sun" and "Elevated Express" published during June, and ran through five issues of these bulletins. The entire series is reproduced for the benefit of other railway companies which may want to present the facts in regard to their coal supply to the public.


The Elevated Express

The Coal Shortage - Bulletin #1

Next to wages, our coal bill is the biggest we have. The Interborough has to use to provide the public's transportation:

About 2000 Tons A Day

A veritable mountain of coal! Do you find it hard to get? So do we. We are going to tell you something about it in a series of bulletins about coal.

Interborough Rapid Transit Company


The Subway Sun

Getting Coal - Bulletin #2

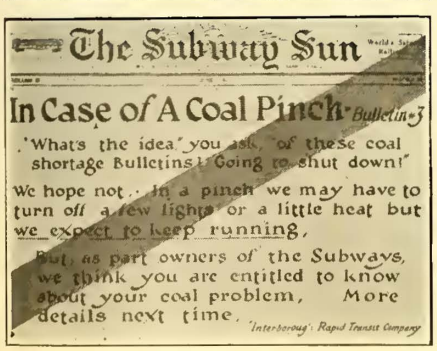
Do you find coal hard to get?

Read this from a report of the United States Bituminous Commission:

"An acute shortage of coal cars at the mines has retarded movement *** Anxiety has been expressed over the supply of coal for next winter."

Some of the biggest dealers have been forced to decline a contract with us for a steady supply.

Interborough Rapid Transit Company


The Subway Sun

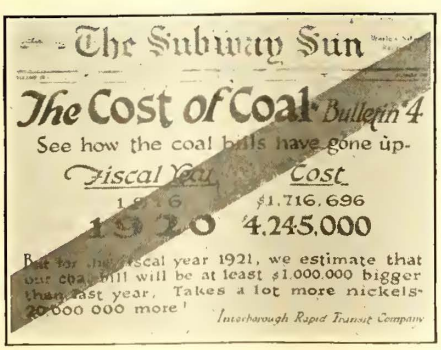
In Case of A Coal Pinch - Bulletin #3

"Whats the idea" you ask, "of these coal shortage Bulletins? Going to shut down?"

We hope not. In a pinch we may have to turn off a few lights or a little heat but we expect to keep running.

But, as part owners of the Subways, we think you are entitled to know about your coal problem. More details next time.

Interborough Rapid Transit Company


The Subway Sun

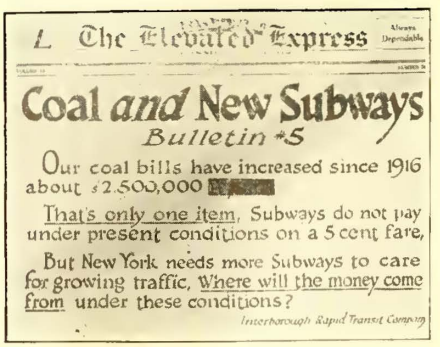
The Cost of Coal - Bulletin #4

See how the coal bills have gone up-

Fiscal Year	Cost
1916	$1,716,696
1920	4,245,000

But for the fiscal year 1921, we estimate that our coal bill will be at least $1,000,000 bigger than last year. Takes a lot more nickels-20,000,000 more!

Interborough Rapid Transit Company


The Elevated Express

Coal and New Subways

Bulletin #5

Our coal bills have increased since 1916 about $2,500,000

That's only one item. Subways do not pay under present conditions on a 5 cent fare.

But New York needs more Subways to care for growing traffic. Where will the money come from under these conditions?

Interborough Rapid Transit Company

News of the Electric Railways

FINANCIAL AND CORPORATE • TRAFFIC AND TRANSPORTATION

PERSONAL MENTION

City Will Run Lines

Plans to Take Over Staten Island Midland for One Year—Will Charge Nickel Fare

Mayor John F. Hylan of New York City will shortly be given an opportunity to try out his theories of municipal ownership. An agreement has been reached by Grover A. Whalen, Commissioner of Plant and Structures, and Jacob Brenner, receiver of the Staten Island Midland Railway, Richmond Borough, under which the city will take over the company's lines and will operate them beginning about Dec. 1. A 5-cent fare will be charged.

The plan provides in brief for taking over the property for one year. During the first six months the profits, if any, will go to the city, which will also have to make up for probable deficits. During the second six months the profits, if any, are to be divided evenly between the city and the company. A clause in the agreement provides that the Richmond Light & Railroad Company, which has been supplying electric current to the road, shall continue doing so at cost, which is to be fixed by an expert for the city and another for the company. If these two experts fail to agree Federal Judge Chatfield will decide the question.

City to Furnish Equipment

The city agrees to operate the cars on the schedules in force prior to the cessation of operation last January and to provide the necessary rolling stock and equipment to make this possible. It is also provided that either party to the agreement may terminate it on thirty days' notice.

The city has at its disposal $300,000 appropriated by the Board of Estimate for the purchase of rolling stock and equipment and to start the lines running. It was said on Oct. 9 that the Midland Company has only about half a dozen cars, and that if the city intended to operate on the schedules of last January it will be obliged to have at least twenty cars, which was the number owned by the company.

The Midland company, on the plea that it could not pay expenses with a 5-cent fare, ceased operating last January. This action followed much agitation on the part of the company, the Public Service Commission, the Staten Island public, the Board of Estimate and the various civic organizations. When Mr. Brenner was appointed receiver he tried to take possession of the company's property, but found very little of it. When he was urged to set the cars running he retorted that he could not find any cars.

The Board of Estimate ordered the company to resume operation, and its failure to obey the order resulted in a resolution passed by the board declaring the company's franchise forfeited. At the expiration of the ninety days required before such an order could become effective, action was delayed by the fact that the property was in the possession of the Federal court, that the company was bankrupt and that nothing could be done with it unless the court consented.

Service Resumption Called "Bluff"

Late in September the company resumed operation, but charged an extra 3 cents for passengers to and from St. George, because it operated for a short distance over the tracks of the Richmond Light & Railroad Company. Staten Island citizens objected strenuously to this and declared it was only a trick to save the franchise of the company from being forfeited and to enable it to obtain an 8-cent fare, which the Richmond company is charging by virtue of an order by the Public Service Commission. It was also charged that the receivers of the two railroads were acting as one and were in a plan to mulct the public.

Sixty Cents for Covington Men

After several weeks of investigation the board of arbitration which has been considering the demands of the employees of the Cincinnati, Newport & Covington Railway, Covington, Ky., for an increase in wages, has filed its report granting a 20 per cent advance in the wages of motormen, conductors, shopmen and power house men employed by the company. The report fixes the schedule at 56 cents an hour for the first three months; 57.6 cents an hour for the next nine months and 60 cents an hour thereafter. This is 1 cent an hour more than was recently granted by the Cincinnati Traction Company to its men. The board is composed of Judge John M. Lassing, representing the company; John M. Corbin, representing the carmen, and William L. Glazier, for the public.

Judge Lassing favored granting an 18 per cent increase and objected to granting the employees a higher increase than was given by the Cincinnati Traction Company.

The report recommends that the railway give up its perpetual franchises in Kentucky cities and that the officers of the company seek a conference with the city officials relative to obtaining a uniform franchise in all of the cities which will allow them to increase fares to improve the service.

Would Cost $97,000,000

Rapid Transit System for St. Louis Urged by City Plan Commission—Many Lines Needed

Recommendations for a system of rapid transit for St. Louis, Mo., which call for the utilization of the present Washington Avenue and Eighth Street railway tunnel and the construction of a subway system at a total estimated cost of $97,000,000 are contained in a report which has been submitted by the City Plan Commission of St. Louis to the Board of Public Service. The report, which is the result of a year and a half of study, is a comprehensive digest of the transportation problem confronting the city at present, and is also a frank analysis of the difficulties confronting the United Railways. It also contains much constructive criticism of conditions which have combined to bring about what the commission regards as an unsatisfactory system of transportation.

Would Abandon Some Lines

The plan calls for a gradual development of the local transportation system to meet the city's growth in the next ten to twenty-five years and also suggests a supplementary plan for a rapid transit system of subways and elevated tracks after the reorganized surface lines have been outgrown.

It is recommended that existing surface lines be rerouted, that some lines be abandoned and that new ones be built. These changes are discussed in detail. The construction program would be undertaken in three sections. It is suggested that the plan be carried out slowly for economic and physical reasons. The plan is somewhat similar to the plan submitted to the Department of Public Utilities recently by C. E. Smith, consulting engineer for the city. The cost, however, is estimated at $97,000,000, while the cost of executing Mr. Smith's plan would be approximately $200,000,000.

Many Districts Lack Service

At present 1 per cent of the city's area is more than one-quarter of a mile from a car line. Under the plan proposed this area would be reduced to less than 3 per cent. To accomplish this result many miles of single and double track would have to be constructed and 21 miles of single track and 23 miles of double track would have to be abandoned.

The report touches only briefly on finances. It opposes a uniform fare and points out that there is a tendency toward municipal credit and control in the operation of electric railways.

Seattle Mayor Asks Re-Deal

Demands Revision or Cancellation of Original Contract for Purchase of Lines—Sees $90,000 Monthly Loss to City

Mayor Hugh M. Caldwell of Seattle, Wash., in a recent public address went into details in regard to the municipal railway situation in Seattle and explained the city's peculiar position in operating a railway system in which it has not now, and will not have when the system is paid for, "one dollar invested." Mayor Caldwell stated that the contract entered into with the Puget Sound Traction, Light & Power Company was virtually written in its entirety by the attorney for the company, and was so written as to "protect the vendor." The Mayor expressed himself as in favor of rewriting or canceling the contract, but he would not make any definite statement as to the possibility of this being successfully done until he had completed his inquiry into the transaction. He declined to take the initiative in offering any suggestions to the City Council as to a change in the policy of the city in regard to the operation of the local transportation system.

THE Mayor said that Seattle is trying to do what no other municipal corporation ever attempted and what no public service commission would allow a privately-owned corporation to do, namely, make its patrons (the patrons of its electric railways) pay for the entire system, including depreciation charges, interest on investment and the capital invested.

Mayor Assails Contract

Startling figures throwing light on what the street railway system would cost Seattle were given by Mayor Caldwell in support of his statement. He began with the capital investment of $17,215,000, made up, he said, of $775,000 of general bonds voted by the people, and of $16,440,000 in utility bonds which are a lien on the lines, and payable solely out of the receipts of the railway lines. A monthly depreciation charge of $56,415 has to be made against the lines by the State Bureau of Accountants, he said, which in the eighteen years required to pay off the principal will amount to a total of $12,185,776. This depreciation charge, according to City Comptroller Carroll and Mayor Caldwell, really does not exist. "No money has been paid in the depreciation fund," said Mayor Caldwell. In explaining this situation the Mayor said:

> In conferring with representatives of the State Bureau of Accountants I attempted to learn what should be done with this money, if any was in the fund. The bureau's suggestion was that the money be invested in income securities, a course I consider doubtful when the system is paying interest on its own bonds.

Sees $90,000 Monthly Loss

At the rate of present expenditures by the city for upkeep and maintenance of the city lines, the Mayor said that at the end of the eighteen-year period the city will have put back into the lines in upkeep a total of $21,886,552. In discussing the item of depreciation, the Mayor used figures for August. In that month, the city spent approximately $100,000 for upkeep of the lines, but to this figure would have to be added the $56,000 monthly depreciation charge demanded by the State. As a result, August would show a net loss of $26,538. If the same plan is followed, he said, and adding the $64,000 a month which must be set aside beginning Jan. 1 next as payment on the principal, the city will be something like $90,000 "in the red" every month.

The Mayor arraigned the present agreement as follows:

> The present scheme is to have the car riders pay all operation, upkeep, maintenance, depreciation, dividends on capital investment, and retire the entire capital investment in eighteen years, at which time the car patrons will not own the lines, but they will belong to the corporation of the city of Seattle, which will at that time, under the present plan, not have invested a dollar therein. Even if we concede that those who ride upon the street cars are the only ones interested therein and that the merchants and property owners of the city find it of no financial benefit to them to have a going street car system, for which they would be willing to pay nothing, it is still a human impossibility successfully to navigate the fatuous course that we are now embarked upon. Shall we continue to raise the street car fares during the next eighteen years, until they reach a point where an insufficient number will ride on the street cars to make their operation worth while, or shall we give the Stone & Webster people a better contract than they made by making an entrance into the general fund in order to keep the system going?

Vacations for employees, a 5 per cent return on the capital—greater than the former owners of the line said they made—and other factors underlying the present situation were scored by the Mayor as contributing to the city's dilemma. The city, to date, according to the Mayor, has not had to pay any of the principal due on the bond issues. It is at the present time, however, paying out of its railway revenue all operating and maintenance expenses and is paying dividends of $72,138 a month on the capital valuation of $17,215,000. These dividends are being paid in the form of interest on bonds, that on the general bonds being 4½ per cent and 4¾ per cent; on all of the utility bonds except $100,000, 5 per cent; and on this $100,000 issue, 6 per cent. The Mayor said:

> These dividends, amounting to $865,658 plus per annum, are certainly much greater than were paid by the Puget Sound Traction, Light & Power Company before we took over its system. In addition to the dividends we are paying operating expenses, which for the eight months ending Sept. 1 amounted to $3,772,255. Included in this amount was the expense incurred in maintenance of track and structure, $308,507, and in the maintenance and upkeep of equipment, $502,105. In other words the amount that was set aside and used monthly for the upkeep of track and equipment averaged for the first eight months of this year, $101,325.

Mayor Caldwell called attention to the fact that under the contract of purchase of the lines the city agreed to pay all operating expenses and charges, including interest, out of the receipts and, moreover, agreed to pay the $15,000,000 out of the receipts at the rate of $833,000 a year, beginning March 1, 1921. Under these terms, he pointed out, the payment of the principal is made a first lien upon the gross receipts. The city is thus confronted with this situation:

> The depreciation charge which the State Bureau insists upon amounts to $676,987 a year; the principal to be paid the bondholders for the Puget Sound Traction system amounts to $833,000, exclusive of the interest, which is now $750,000 a year, but which will decrease in proportion to the number of annual payments on the principal. During the eighteen years that will be required to pay the principal the city will have charged as depreciation a total of $12,185,776. These figures indicate that the city will, during the eighteen years in question, have charged off the entire value of the lines, and will have put back into the system the sum of $21,886,552 for upkeep and maintenance, besides having retired the entire capital stock of $17,215,000.

The Mayor pointed out that the lines are being operated this year under a general wage increase of 11.38 per cent over the scale of August, 1919. The item of vacation expense was also referred to, the Mayor stating that the vacation expense for next year for the employees, giving them a vacation with full pay, will amount to about $100,000.

"Dividend" of 5 Per Cent

Mayor Caldwell referred several times to the fact that the private company, according to its own statements, at no time paid anything like 5 per cent on the capital invested. He stated that the company claimed that at no time during the last few years was it able to pay more than 3 per cent plus on the money invested. Also, under the system of charging depreciation by the private company, the charge was only a small amount compared to the $56,000 advised by the State Bureau of Accounts.

Mayor Caldwell pointed out that the number of passengers carried has fallen off, the figures for the month of August showing that 2,000,000 fewer persons were carried than during August, 1919. Notwithstanding this fact, the gross revenue for the month showed a net increase of $31,741. More than $16,000 of this amount was consumed in vacations, which were not a charge in 1919.

In referring to the jitney situation Mayor Caldwell stated that since thousands of people depend upon this form of transportation the city should not, in his opinion, abolish jitneys unless it can offer some other form of satisfactory and rapid transportation, merely to increase the revenues of the railway lines.

Calvin H. Hagan, financial expert, has written a letter to Mayor Caldwell in which he supports the stand taken by the Mayor. Mr. Hagan suggests the adoption of an amortization plan under which the city would be able to make the required payments for the railway lines and which he believes would be satisfactory to the Stone & Webster interests. No formal action will be taken by the Mayor until the completion of his investigation into the purchase of the property.

Utility Board Ousted

Governor Removes New Jersey Commissioners for Neglect of Duty—General Incompetency Charged

Gov. Edward I. Edwards of New Jersey on Oct. 14 removed from office upon charges of misconduct and neglect of duty the four members of the State Board of Public Utility Commissioners. At the same time the Governor appointed three members of a new commission and called a session of the State Senate for Oct. 19 to act upon his nominations. The three new commissioners are Col. Walter F. Whittemore, Republican, an engineer and a member of the State Highway Commission; Representative James A. Hamill, Democrat, a lawyer; and Arthur A. Quinn, Democrat, president of the State Federation of Labor.

The four commissioners removed from office are President John W. Slocum, George F. Wright, Harry L. Knight and Andrew Gaul, Jr., of Ridgefield. In announcing his decision, Governor Edwards sent the following letter to each of the ousted commissioners:

> You will please take notice that I have found and determined that you are guilty of neglect of duty and misconduct in office as a member of the Board of Public Utility Commissioners of this state and for this reason have and do now remove you from such office. A copy of the conclusions as reached by me is inclosed.

Charges Brought by City

The ousted commissioners were appointed by ex-Gov. Walter E. Edge. The board has long been under criticism. The complaint is that it has favored the Public Service Corporation as against the public interest. A year ago the town of Montclair preferred charges against the commission. Acting Governor Runyon heard those charges, but dismissed them. Then last spring Jersey City preferred other and more serious charges and it is on the basis of these that the Governor acted.

Summarizing his findings, Governor Edwards made the following statement:

> The facts disclosed in this case, upon which I have arrived at my conclusion, show not only that these men (the ousted commissioners) have been guilty of neglect of duty and misconduct in office, but they explain clearly why these men have lost the confidence of the public. The powers intrusted to this commission are extensive and affect not only the rights of the public, but the immense investments that have been made in the construction of these properties.
>
> The delays and vacillations of these commissioners have created a serious condition of doubt as to the safety of existing and future investments. It is as important to the capitalists who invest money in the construction of a public utility, and to the financial institutions which lend money upon the securities of public utilities, that there should be a definite rule of law and procedure, promptly and impartially applied, at all times, for the protection of these investments, as that there should be protection for the public against exactions of capital.

Among the outstanding charges sustained by Governor Edwards as cause for the removal of the commissioners were failure to require setting aside of adequate depreciation accounts; favoritism and bias toward subsidiary companies of the Public Service Corporation; delay in valuing the property of the Public Service Railway and the Public Service Electric companies; fixing increased retroactive rates for the Public Service Electric Company; establishing seven rates on Public Service Railway lines in one year without sufficient reason; failure to recommend changes in the utilities law shown to be necessary by experience; permitting diversion of proceeds of bond issues to the account of working capital; establishing unnecessarily long and extensive processes; retention of experts biased toward corporate interests, and discrimination in granting promptly applications of public service companies and delaying decisions in other cases.

Governor Edwards began his conclusions by meeting the arguments of counsel for the commissioners that he lacked power to remove them from office. He took the position that if such action on his part was an invasion of judicial powers vested in the courts, it would be equally an assumption of judicial power for him to hold the public utilities act unconstitutional. On this point the Governor said:

> The first answer to the objection is that the statute establishing the Board of Public Utility Commissioners provides that the Governor may remove any commissioner for neglect of duty or misconduct in office, giving to him a copy of the charges against him and an opportunity of being publicly heard in person or by counsel in his own defense upon not less than ten days' notice. The legislative intent, therefore, is clear, and that is not questioned by the counsel for the accused commissioners.
>
> If I decline to consider charges against these commissioners, or if I find them guilty and neglect to remove them, it is plain that I am violating a duty laid upon me by the Legislature. I am unwilling in this case to take the responsibility of declaring this provision of the public utility act unconstitutional.

Receivers Denied Increased Compensation

An application by the three receivers of the Rhode Island Company, Providence, R. I., for increased compensation on account, has been denied by Judge Chester W. Barrows in Superior Court. The receivers, Frank H. Swan, Theodore Francis Green and Zenas W. Bliss, presented the petition asking for an increase of $450 each a month, through their attorney, Clifford Whipple.

The receivers of the Rhode Island Company were each allowed $12,000 on account for the first year of the receivership when the matter came before Presiding Justice Tanner for a hearing, no one having presented any objections to the sum fixed by the court. In their petition presented to Judge Barrows recently, the receivers asked for an allowance of $1,450 each a month on account, for the period of seven months which has elapsed since the last settlement was made.

In arguing for increased compensation, Mr. Clifford reminded the court that at the time the receivership was established prospects for an early reorganization of the railway was very bright, but that with the present uncertainty of the situation the receivers should be allowed compensation more nearly approaching the sum that would finally be requested.

Eight Cents in New Orleans

Advance in Fare Adopted as Means of Averting Threatened Strike—Wage Award Met

Beginning Oct. 21, the people of New Orleans, La., will be charged 8 cents for car fare. This decision was reached by the Commission Council, at the instance of a committee appointed by the board of directors of the Association of Commerce, after a long drawn out conference with Assistant Attorney General Hall, Major Behrman and Receiver O'Keefe, of the New Orleans Railway & Light Company, as the only alternative to prevent another strike of trainmen.

Mayor Behrman was unwilling to give the men the award made by the Special Masters, awarded by Federal Judge Foster, before giving the public a hearing in the matter, being undecided in his mind whether a strike or an 8-cent fare would be more expensive to the Community.

Eight-Cent Fares for Six Months

The representative of the men and attorneys alleged, however, that the men were insistent on the carrying out of the award made to them by the Special Masters and that unless the matter was decided forthwith and the award executed, they could not be restrained in their determination to abandon work. It was hinted their course would be followed by the employees of the gas light company, a contingency which would make the strike all the more trying and vexatious, since it would curtail one of the city's chief sources of power, heat and light.

The agreement provides that an 8-cent fare shall be charged from Oct. 21, for a period of six months, leaving to the incoming administration the solution of the service-at-cost plan, the valuation of the property and other controvers in question.

Accidents Decreased in Seattle

In a report by D. W. Henderson, general superintendent of the Seattle (Wash.) Municipal Railway, marked reduction is shown in the number of accidents on Seattle's railway lines. In the first eight months of 1920, accidents were cut down from 3 to 53 per cent in all classes. The effects of weekly conferences for instruction and caution conducted by Mr. Henderson are reflected in the report. The percentage of claims against the gross earnings for accidents are said to be considerably less in Seattle than in other cities of the country of the same class, with one or two exceptions, and these in cities where railways are operated on level streets. The report gives the following table covering eight months of 1919 and 1920:

	1920	1919	Reduction Per Cent
Car collisions	172	368	53
Auto collisions	2016	2446	17
Pedestrians	136	210	35
Accidents on cars	204	317	35
Step accidents	341	342	3
Derailments	166	205	19
Ejectments	70	87	15

Men Accept Five-Cent Advance

The 800 employees of the Middlesex & Boston Street Railway, Newtonville, Mass., have accepted the company's offer of a wage increase of 5 cents an hour. The old agreement under which the men have been receiving 45, 50 and 55 cents per hour, according to term of service, expired on June 30. The men then submitted demands for 75, 80 and 85 cents. It is understood that the increase will be retroactive. The company announced that an increase of 5 cents an hour will not necessitate a fare increase. Pitt F. Dred, president of the company, in a statement regarding the acceptance of the increase, said:

I am very glad to learn that the men have voted to accept the increase offered by the company. I have always had a strong conviction that the great majority of the men on our system are intelligent, level-headed and reasonable, men ready to do what they believe to be right and fair when they are in possession of all the facts. For this reason I refused to make an offer to their committee unless they would send an accountant to examine our books and report the facts to the men.

The cost to the company is more than should be paid from a business standpoint and I believe the men realized it. On the other hand they, no doubt, felt that they too were making a sacrifice. It is this spirit of fairness and co-operation on the part of the men that gives me courage.

We have been passing through very hard times for the management and for the men, to say nothing about the patient and unfortunate stockholder. The men agreed with me that it would be unfortunate to have a raise in fares and certainly no general increase will be asked for until we have made every reasonable effort to work the proposition out on the present basis.

News Notes

Demand That Service Be Restored.—An ordinance requiring the Atchison Railway, Light & Power Company, Atchison, Kan., to resume service on its lines or to pay a forfeit of $500 a day has been passed by the City Council. The road has recently been tied up by a strike.

Begin Work on Vehicular Tube.—Ground was broken on Oct. 12 for the vehicular tube under the Hudson River which is to connect Manhattan Island, New York City, with the state of New Jersey. Gov. Edward I. Edwards of New Jersey and Lieut.-Gov. Harry C. Walker of New York attended the ceremony. The cost of the project is estimated at $28,000,000.

Labor Shortage Halts Improvements.—A shortage of labor in Dallas, Tex., is seriously interfering with the improvement work being carried on by the Dallas Street Railway. Richard Meriwether, vice-president and general manager, recently stated that, in spite of the fact that the company was paying 40 cents an hour to common laborers, sufficient help of this class could not be obtained. Work on various betterments is therefore being delayed.

Interurban Tie-up Ends.—A strike which tied up the lines of the Northwestern Ohio Railway & Power Company, Toledo, Ohio, operating interurban trains between Toledo and Marblehead, Ohio, ended on Oct. 8 when trainmen returned to work, adjustments having been perfected on a new time schedule which caused the trouble. Trainmen brought from Cleveland to operate the cars have returned. The strike began on Oct. 3.

Towns Would Take Over Line.—The towns and villages served by the Exeter, Hampton & Amherstburg Street Railway, Hampton, Mass., have opened negotiations with the company with a view to taking over its system for joint municipal operation. The company some time ago announced its intention of closing its lines and removing the tracks because of lack of funds. The State Department of Public Utilities has fixed $105,000 as fair value of the property.

City Ownership Favored. — Acquisition of the property of the Ottawa (Ont.) Electric Railway by the city of Ottawa is proposed in a report recently submitted to the City Council by the Board of Control. The board recommends that the rate-payers pass upon the question of the city's taking over the system at a referendum election to be held in January. If the voters should approve the proposition, the Council would have the power to ask the Provincial Legislature to grant permission for the city to borrow the necessary funds without a second appeal to the rate-payers.

Service Not Quite Normal.—Complaints from the officers of civic organizations, churches and schools in Brooklyn, N. Y., that as a result of the recent strike the Brooklyn Rapid Transit Company is still withholding surface cars from a number of important lines have been filed with the Public Service Commission for the First District. During a hearing on the complaints the company produced a letter from Federal Judge Julius M. Mayer, addressed to W. S. Menden, general manager of the B. R. T., which showed that the Federal Court was not only cognizant of the lack of street-car service, but had authorized it.

Big Toledo Vote Forecast.—W. L. Milner, author of the new service-at-cost franchise for the Toledo Railways & Light Company, which is to be submitted to the voters of the city at the general election on Nov. 2, is leading a campaign for the passage of the measure. He has addressed several public meetings, among them a rally at the Women's Building, which was largely attended by women. So far registrations have indicated that there will be a vote of more than 75,000 on the ordinance and on the twin bond measures for municipal ownership, as compared with a total of little more than 20,000 at the last election. The Toledo Railways & Light Company is taking no active part in the campaign in behalf of the service-at-cost measure.

Program of Meeting

National Association of Railway & Utility Commissioners to Hold Convention Nov. 9

The thirty-second annual convention of the National Association of Railway & Utilities Commissioners will be held at Washington, in the rooms of the Interstate Commerce Commission, on November 9, 1920, at 10 o'clock. The convention will last four days.

The address of welcome will be delivered by Edgar E. Clark, chairman of the Interstate Commerce Commission. Other addresses will be delivered by President Shaw, Clyde B. Aitchison of the Interstate Commerce Commission and George W. Anderson, a former member of that commission and now Judge of the United States Court in Massachusetts.

Discussion of Public Ownership

Among the subjects to be treated are: Public ownership and operation, safety of railroad operation, safety of operation of public utility companies, railroad service, accommodations and claims, railroad rates, public utility rates, car service and demurrage, express companies, statistics and accounts, grade crossings, capitalization and state and federal legislation. When these reports are presented they will be discussed upon the floor of the convention, and commissioners from various states will exchange views.

As a departure from the usual program, the convention this year will devote the afternoon sessions on Nov. 10 and 11 to informal or round-table discussions of a number of topics, among them "Local Street Railway and Interurban Transportation." The chairman of this meeting will be Charles E. Elmquist, of Minnesota, who headed the Federal commission which investigated the street railway situation early in the year. Among the speakers will be E. O. Edgerton, of the California Commission, and Noah W. Simpson, of the Missouri Commission.

Would Safeguard Powers

Attention is called to the efforts to minimize the influence of the state commissions, and the movement by certain interests to seek freedom from state control. On this subject the call says:

This association has not and never can have any quarrel with Federal regulation in the field of Federal jurisdiction. It has repeatedly placed itself on record as in favor of the closest co-operation between the states and the Interstate Commerce Commission. But it resents the efforts of those who seek to curtail the rightful powers of the sovereign states over strictly intrastate matters.

Against attempts to disarm the states this association must be constantly on its guard. It is only fair to state that the Interstate Commerce Commission itself has not shown any disposition to encroach upon the state field, and its chairmen frequently have urged closer co-operation between Federal and state commissions. In the recent advanced rate case three state commissioners selected by this association at the invitation of the Federal commission sat with it. The association is earnestly desirous of continuing these harmonious relations, but will stand firm, in the future as in the past, for the right of each state to control in matters of purely local regulation.

Financial and Corporate

Income Drops 200 per Cent

Railways in New York City Report Decline from Profit of $5,000,000 to Deficit of $5,000,000

For the year ended June 30, 1919, the provisional report issued by the Public Service Commission for the First District, covering the railways in New York City taken as a whole, shows that the net corporate income changed more than $11,000,000. The net income for 1918 was $5,780,958 as compared with a deficit of $5,583 820 for 1919, or a decrease of very nearly 200 per cent. The large decrease is due to the increased cost of materials and operations with no increase in fares. The operating revenues increased only about $7,000,000, or 6.5 per cent over 1918. At the same time the total operating expenses increased twice as much as did the revenue.

This increase was more than $15,000,000, or 25.2 per cent over 1918. This allowed the net operating income to fall approximately $8,000,000 short of the same item in 1918. The taxes were decreased slightly and the non-operating income remained the same, so the gross income was decreased $8,500,000 over 1918. Deductions from the gross income increased approximately by $3,000,000, thereby making the total difference in the net corporate income for the two years was very close to $11,000,000.

In 1919, 77,811,385 more passengers were carried than in 1918, an increase of 3.4 per cent. At the same time the car miles increased about 12,000,000, or 3.6 per cent over 1918.

TRAFFIC AND MISCELLANEOUS STATISTICS OF NEW YORK CITY COMPANIES

Year Ended June 30:	1919	1918	Percentage Change
Miles of track, exclusive of storage and yard track	1,793 21	1,733 82	3.4
Average daily maximum number cars operated (June)	8,480	8,013	5 8
Passenger car-miles (active)	334,938,289	322,957,219	3.7
Car seat-miles	16,823,199,459	15,889,141,428	5.9
Total revenue car-miles	341,342,293	329,538,712	3.6
Passenger car-hours	28,591,562	28,939,839	— 1.2
Ratio C.M. to C.H. (speed M.P.H.)	11.7	11.2	45
Revenue passengers	2,079,754,393	1,975,511,690	5.3
Transfer passengers	293,988,420	320,419,738	— 8.3
Total number passengers	2,373,742,813	2,295,931,428	3.4
Operating ratio	69.0	58.5	10.5
Statistics per car-mile	11 7	11.2	
Operating revenue (cents)	32.3	31.5	2.5
Operating expenses (cents)	22.3	18.4	28.1
Net income (cents)	1.64	1.76	— 6.8
Number of passengers (total)	7.0	7.0	
Car-miles per revenue passenger	164.0	166.7	— 1 6
Statistics per car-hour			
Operating revenue	$3.85	$3.58	7.5
Operating expenses	$2.65	$2 09	26.8
Net income (cents)	19.5	20.0	— 2.5
Number of passengers (total)	83.1	79.4	4.7

EARNINGS OF NEW YORK CITY COMPANIES

Year Ended June 30 (Provisional):	1919	1918	Percentage Change
Passenger revenue	$103,199,657	$97,394,225	6 0
Other transportation revenue	710,594	545,943	30.2
Total revenue from transportation	$103,910,251	$97,940,168	6.1
Other railway operating revenue	6,281,431	5,560,021	13.0
Total railway operating revenue	$110,191,682	$103,500,189	6.5
Operating expenses:			
Maintenance expended	$20,898,872	$16,007,110	30.6
Depreciation reserve	Cr. 2,112,793	96,617	—2279.0
Operation of power plant	14,590,859	11,195,756	30 4
Operation of cars	34,507,458	26,209,281	31.6
Injuries and damages	4,340,019	3,751,412	15.7
Traffic and general expenses	3,721,297	3,346,362	11.2
Total operating expenses	$75,945,712	$60,606,539	25.2
Net operating income	$34,245,970	$42,893,650	—20.2
Street railway taxes	7,909,679	8,232,322	— 3.9
Operating income	$26,336,291	$34,661,328	—24.0
Non-operating income	4,247,358	4,498,531	— 5.6
Gross income	$30,583,649	$39,159,859	—21.9
Deductions from gross income			
Interest	$18,317,105	$16,902,067	8.4
Rents	16,097,054	15,802,682	1.9
Miscellaneous	1,753,310	674,152	160.0
Total deductions from gross income	$36,167,469	$33,378,901	8.4
Net corporate income	*5,583,820	5,780,958	—196.4

* Deficit.

Ticket Ratio Declines

Chicago "L" Reports Results of 10-Cent Fare—32 per Cent of Riders Now Pay Cash

The figures for the first month's operation of the Chicago Elevated Railways under the 10-cent cash fare, with four tickets for 35 cents, which went into effect on Aug. 4, are now available. During August of this year 15,025,599 passengers were carried, with a resulting revenue of $1,370,864.

Small Falling Off in Passengers

This compares favorably with the month of August, 1919, the rate of fare then being 8 cents, when 13,578,959 passengers were carried, producing a revenue of $1,063,068. In July, 1920, when the rate of fare was 8 cents cash with two tickets for 15 cents, the number of passengers carried was 17,024,667, the passenger revenue amounting to $1,319,677.

During July, 1920, 4,204,932 passengers, or 25 per cent of the total number carried, paid the cash fare of 8 cents. During August, 1920, 4,826,697 passengers, or 32 per cent of the total, paid the cash fare of 10 cents.

While the number of passengers carried in August was practically 2,000,000 less than the number carried in July, the falling off is attributed more to the fact that July was an abnormal month than to the increased rate of fare. The number of passengers carried in June, 1920, which was 15,659,350, would probably be a better figure with which to compare the number carried in August, 1920.

Reason for Decrease

This would show a reduction of about 600,000 passengers, which might be reasonably attributed to the higher rate of fare, as this many might easily be driven to the steam road suburban service and the surface lines, the latter having an 8-cent cash fare.

Scranton Valuation Fixed

A report has been filed with the Pennsylvania Public Service Commission fixing the physical valuation of the Scranton Railway. The valuation figures were determined by Drum & Company, Chicago, engineers, who represented the railway, and Dr. F. Herbert Snow, engineer for the commission. These figures, as submitted to the commission, are: Valuation on Nov. 1, 1919, $9,049,264; average for 1914 to 1912, $6,876,891; for year of 1914, $5,543,216. The historical valuation is placed at $11,319,156.

Attempts were made by complainants in the case to show that the high price area has passed and prices are dropping, and that there is considerable inflation in the country today.

The valuation of the property of the Scranton Railway was ordered by the commission in April, 1919, when it authorized the company to charge a 7-cent fare. It recently refused the petition for a 10-cent fare.

St. Louis Deficit Decreased

United Railways, in Receivership, Decreases Its Deficit From $400,000 in 1918 to $265,800 in 1919.

The results of the operation of the United Railways, St. Louis, Mo., in the hands of a receiver, show some improvement for the year ended Dec. 31, 1919. The revenue from passenger traffic increased by nearly $3,000,000, or 21.8 per cent over 1918. The improved showing was due largely to an increase of 32,024,602 in passengers carried, bringing the total of 376,985,727 passengers in 1918 up to 409,010,329 in 1919, or 8.5 per cent more.

Operating expenses were $16,592,680, an increase of 26.4 per cent over 1918. Taxes increased 30 per cent. Gross income increased $277,424 and deductions from the gross income increased $142,905. The net income transferred to profit and loss increased $134,519. The net income for 1918 was $400,299. The deficit for the year 1919 was only $265,780.

The Public Service Commission awarded, effective Sept. 20, 1919, cash fares of 8 cents for adults and 4 cents for children, with the sale of adult tickets at two for 15 cents, seven for 50 cents, and fifty for $3.50, and children's tickets at the rate of two for 7 cents. It was found impossible to secure the necessary number of metal tickets (over 4,000,000 being needed) on Sept. 20, 1919, and a flat rate of 7 cents was charged from that date until Oct. 31, 1919. On Nov. 1, 1919, bronze tickets, two for 15 cents, were sold on the cars only, and alloyed-silver tickets, in greater quantities, were sold at some 800 different stations. The result was that fares gradually settled down to a basis of approximately 3 per cent cash fares, 35 per cent 7-cent tickets sold off the cars, and 62 per cent of 7½ cent tickets sold on the cars. For the first few weeks traffic fell off on account of the increase in fares, but this was more than offset by the increased proportion of fares turned into the treasury and by increased business activity.

Interest Payment Authorized

An order for the payment of interest by the receiver of the United Railways, St. Louis, Mo., on bonds of the St. Louis Transit Company and the St. Louis & Suburban Railway, amounting to $357,250, has been issued by Judge C. B. Faris in the United States District Court at St. Louis. The bonds bear 5 per cent interest which fell due on Oct. 1. St. Louis Transit Company bonds total $9,790,000 and the St. Louis & Suburban Railway bonds amount to $4,500,000.

Judge Faris also issued an order granting the receiver an extension of time in which to annul or adopt contracts of the United Railways. The orders were issued as a result of petitions asking six months' extension for the United Railways, the Florissant Construction & Investment Company, the Merchants' Express Company, and the Missouri Electric Company, all of which are in the hands of Rolla Wells, as receiver.

The United Railways was granted the right to enter into a contract with the Union Electric Light & Power Company for steam-generated current. The contract which the company now holds expires on Dec. 31, and the new contract will begin Jan. 1 and run for three years. Through the terms of the contract the United Railways will pay $15 per kilowatt per annum plus the energy charge of 89 cents per kilowatt hour. The energy charge is subject to change under the contract.

INCOME STATEMENT—UNITED RAILWAYS OF ST. LOUIS

Year Ended Dec. 31:	1919	1918	Percentage Change
Revenue from transportation	$16,497,932	$13,551,542	+21.7
Revenue from other railway operations	94,748	88,077	+ 7.6
Total railway operating revenue	$16,592,680	$13,639,619	+21.7
Current operating expenses	11,533,460	9,126,513	+26.4
Net operating revenue	$5,059,220	$4,513,106	+12.1
Taxes assignable to railway operations	1,110,911	852,476	+30.3
Operating income	$3,948,309	$3,660,630	+ 7.9
Non-operating income	106,442	116,697	— 8.8
Gross income	$4,054,751	$3,777,327	+ 7.4
Deductions from gross income:			
Interest and miscellaneous charges	2,661,263	2,540,872	+ 4.7
Depreciation reserve	1,659,268	1,636,754	+ 1.4
Total deductions from gross income	$4,320,531	$4,177,626	+ 3.4
Net income transferred to profit and loss	*$265,780	*$400,299	+33.6

* Deficit.

STATISTICAL INFORMATION—UNITED RAILWAYS OF ST. LOUIS

Year Ended Dec. 31:	1919	1918	Percentage Change
Revenue passengers	263,221,899	245,876,910	+ 7.1
Transfer passengers	145,788,430	131,108,817	+11.2
Total passengers	409,010,329	376,985,727	+ 8.5
Percentage of revenue passengers using transfers	55.39	53.32	+ 3.9
Passenger revenue	$16,463,312	$13,516,790	+21.8
Average fare per revenue passenger (cents)	6.25	5.50	+13.6
Total miles of single track	461.57	460.90	+ 0.1
Amount track reconstruction, renewal and extension	25.01	15.80	+58.3
Total kilowatt-hours	179,011,395	174,686,259	+ 2.5
Number passenger cars owned	1,460	1,480	— 1.4
Average number passenger cars operated daily	1,132	1,107	+ 2.3
Number of employees	5,605	5,295	+ 5.9

New Haven's Trolley Ventures Costly

The sale at auction of the New York, New Haven & Hartford Railroad's 96,855 shares of the Rhode Island Company, carried at a book value of over $24,000,000, for $2,200 marks a final chapter in the New Haven's venture in New England trolleys. The Boston *News Bureau* explains as follows:

It has for some time been apparent to the New Haven people that practically a total loss would have to be sustained on the Rhode Island street railway investment. The trolley situation there has gone from bad to worse. The outcome is not a surprise but it is sad commentary on the status of street railways in some parts of New England.

In additional to the original investment which was carried at slightly over $251 per share the New Haven had advanced the Rhode Island Company $3,746,037 in loans and held notes for that amount so that the total investment was above $28,000,000, as shown below:

	Par value	Book value
Stock	$9,685,500	$24,352,336
Notes	...	3,746,037
Total	...	$28,098,373

The Rhode Island Company was incorporated by special act of the Rhode Island Legislature in April, 1902, to consolidate all the street railway, gas and electric light properties of Providence and vicinity. It operated over 354 miles of street railway and 8.41 miles of steam railroad lines. Of the total mileage 39.93 miles were owned and 322.64 operated under lease.

Under the government dissolution decree for the New Haven the stock and obligations of the Rhode Island Company were put in the hands of trustees who were to exercise their best efforts to complete the sale of the securities before July 1, 1919. in March, 1919, however, Federal Judge Mayer extended the period during which the trustees might dispose of the securities to July 1, 1921.

New Haven's other big trolley investment —the Connecticut Company—should work out considerably better than the Rhode Island venture. It carries the 400,000 shares of stock of the Connecticut Company at $40,000,000 book value and holds over $3,000,000 notes and debentures of that company.

It is obvious that it will have to take a large loss on this valuation but should be able to salvage a portion of its investment here. Trolley conditions in Connecticut are not entirely satisfactory but a great deal has been done toward establishing street railways on a paying basis.

The New Haven's total investment in trolley, electric light and properties of similar character aggregates about $106,000,000. On a portion of this it will undoubtedly be able to realize to substantial degree, but even assuming that the whole amount had to be written off, the New York, New Haven & Hartford Railroad could show, on the basis of cost of reproduction and bare original cost of land, an equity above all obligations equal to $133 per share on the $157,000,000 stock.

Power Bonds Offered

William A. Read & Company and Spencer, Trask & Company, New York, N. Y., are offering for subscription at 99 and interest $5,000,000 of Wisconsin Electric Power Company first mortgage 7½ per cent sinking fund gold bonds, Series A, dated Oct. 15, 1920, and due Oct. 15, 1945, principal and interest guaranteed by indorsement by the Milwaukee Electric Railway & Light Company.

All Bids Rejected

Court Refuses Tenders for Buffalo & Lake Erie Property—Road to Quit Nov. 30

Upon the recommendation of George Bullock, as receiver for the Buffalo & Lake Erie Traction Company, Buffalo, N. Y., Supreme Court Justice Louis W. Marcus has rejected all of the bids for the purchase of the property of the company. The court has authorized the receiver to continue the operation of the line until midnight of Nov. 30, 1920.

Justice Marcus reserves final disposition of the application of the receiver of the road to dismantle the property. Included in the order of the court is a provision authorizing the receiver to operate over the lines of the company after Nov. 30, such cars or trains as will be necessary for the purpose of disposing of freight then on hand and of closing up the stations and of collecting property belonging to the railway.

Further advertisements for bids will not be postponed, but the receiver is authorized to conduct such further negotiations looking to the sale of the property as he may deem desirable and to report to the court the result of the negotiations.

The proceedings were brought originally by the New York Trust Company, New York City, against the Buffalo & Lake Erie Traction Company, Buffalo; the Erie Electric Motor Company, Erie, Pa.; the Erie City Passenger Railway, Erie, Pa.; the Erie, Reed Park & Lakeside Street Railway and the Buffalo & Lackawanna Traction Company.

Would Rehabilitate Binghamton Lines

It is reported that persons interested in the receivership of the Binghamton (N. Y.) Railway are attempting to secure funds to be used in the rehabilitation of the system, and that their efforts promise to be successful. The proposed refinancing will carry with it the raising of sufficient funds to pay in full bonds aggregating $500,000 due in 1923. Receiver Phelps has announced that he expects to pay the interest on the company's consolidated mortgage bonds, due Nov. 1, amounting to $40,000. Federal Judge George W. Ray in an order issued several months ago directed that in the period ending Oct. 30 the receiver should pay off certain debts of the company. This order also provided for the ultimate discharge of the receiver.

Interborough Deficit Decreased

The Interbourough Rapid Transit Company, New York, N. Y., for the month of August, 1920, shows a deficit for its net corporate income of $658,482 against a deficit of $632,976 for the corresponding month of last year. For the two months ended Aug. 31, 1920, there was a deficit of $1,201,908. This was a decrease of 15 6 per cent over the same period last year. For the month of August, 1920, the number of passengers carried increased more than 10,000,000, or 17 per cent over the number carried in the same month of 1919. For the two months' period ending Aug. 31, 1920, the revenue passengers per car mile increased from 131,350,416 to 150,587,186, or 14.6 per cent.

SUMMARY OF EARNINGS OF INTERBOROUGH RAPID TRANSIT COMPANY

Month ended Aug. 31, 1920	1920	1919	Percentage Change Over 1919
Total operating revenue	$4,032,388	$3,482,685	15.8
Total operating expenses	2,812,625	2,285,582	23.0
Net operating revenue	1,219,763	1,197,103	1.9
Total taxes	215,752	211,114	2.2
Operating income	1,004,012	985,989	1.8
Non-operating income	51,940	45,046	15 3
Gross income	1,055,952	1,031,034	2.4
Interest, rentals, etc., including Manhattan guarantee	1,714,434	1,664,010	3.0
Net income	*$658,482	*$632,976	4 1
Operating ratio (per cent)	69 75	65.63	6 2
Revenue passengers carried	74,797,650	63,988,828	17.0

Two months ended Aug. 31, 1920	1920	1919	Percentage Change Over 1919
Total operating revenue	$8,116,013	$7,122,071	13 9
Total operating expenses	5,576,796	4,518,990	23 5
Net operating revenue	2,539,218	2,603,081	2.5
Total taxes	435,769	427,073	2.0
Operating income	2,103,448	2,176,008	3.4
Non-operating income	104,478	91,961	13.7
Gross income	2,207,927	2,267,969	2.6
Interest, rentals, etc., including Mahmattan guarantee	3,409,834	3,307,453	3 1
Net income	*$1,201,907	*$1,039,485	15 6
Operating ratio (per cent)	68 71	63 45	8 2
Revenue passengers carried	150,587,186	131,350,416	14 6

*Deficit.

Suburban Line Suspends

The Providence & Danielson Railroad, Providence, R. I., on Oct. 3 discontinued service on its Providence-Danielson and its Chepatchet lines. The owners of the property have been experimenting with it since Sept. 7, when it was turned over to them in the hope of continuing operation. Negotiations have been opened with the representatives of the towns interested, looking toward their operating the line.

Financial News Notes

Branch Tram Line Sold.—The Montmorency branch of the Quebec Railway, Light, Heat & Power Company, Quebec, Que., is said to have been sold to an English syndicate for a price estimated at $2,500,000.

Municipal Lines Show Gain.—Receipts of the Toronto (Ont.) Civic Railway for the month of September were $46,558, an increase over the same month of 1919. During September, 1920, the municipal lines carried 2,775,708 passengers, as compared with 2,332,674 during September of last year.

Railway Sold at Auction.—The property of the South Morgantown (W. Va.) Traction Company was sold at auction on Oct. 2 to James H. McGrew, D. H. Courtney and Aaron J. Carlow, all of Morgantown. The price paid was $40,100. The property disposed of comprised 4 miles of track, two interurban cars, an amusement park of 16.5 acres and the buildings and fixtures, a carhouse and miscellaneous equipment. The railway has been operating for about a year under direction of A. J. Carlow, receiver, and in that period has paid all running expenses, taken up several obligations and has considerable cash to its credit. The new owners will continue to operate the line.

Bondholders Urged to Accept.—Bondholders of the St. Louis (Mo.) Railroad (Broadway Line) are urged in a second circular issued by Rolla Wells, receiver for the United Railways, St. Louis, to accept his offer to retire the $1,900,000 outstanding 4½ per cent bond issue of the St. Louis Railroad by turning over to the bondholders an equivalent par value of the three-year 7 per cent receiver's certificates. The date for the expiration of the bonds was May 1 of this year, but by agreement they were extended for six months. Under the provisions of this extension they would become due Nov. 1, but in his circular Mr. Wells says that a written demand for payment of principal was not served until June 14, 1920. In consequence an action for the foreclosure on account of default in payment of the principal could not be maintained until Dec. 1, 1920. According to the opinion of Charles W. Bates, attorney for the receiver 4½ per cent is the rate of interest that the bonds will legally bear from May 1, 1920, until they are paid. It is known that some of the bondholders have objected to the acceptance of the receiver's offer on the ground that they believe the bonds should bear interest at the rate of 6 per cent during the time of the six months' extension. Other phases of the company's finances are referred to on page 845.

Traffic and Transportation

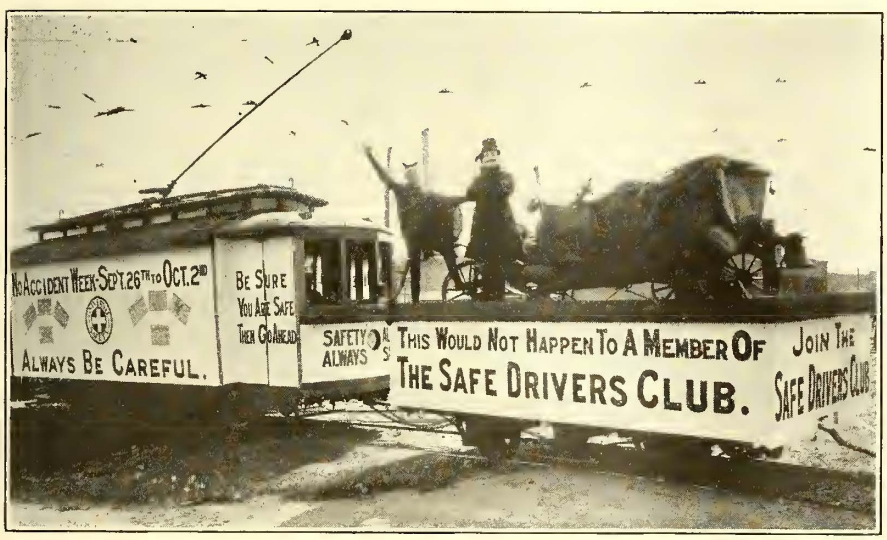
Boosting for Safety

Railway Takes Active Part in "No Accident" Week in Milwaukee—Autoists More Careful

In connection with the Ninth Annual Congress of the National Safety Council, held in Milwaukee, Wis., from Sept. 26 to Oct. 2, there was conducted in the city a "No Accident Week" campaign. Among those organizations participating in the campaign was the Milwaukee Electric Railway & Light Company. The city cars of the company carried on the bumpers large posters reading as follows: "No Accident Week—Help Make Our City Safe From Accidents." The 1,700 trainmen read: "This accident would not have happened to a member of the Safe Drivers' Club."

The Safe Drivers' Club is a local organization of automobile owners and chauffeurs who have pledged themselves to observe fundamental safety rules in the operation of their cars. This organization was founded and is being conducted under the auspices of the local Association of Commerce.

The company's safety exhibit was operated in residential districts during non-rush hours and in the downtown district during the rush hours. It attracted a great deal of attention and is believed to have taught a useful lesson. The exhibit was prepared under the direction of P. A. O'Keefe, chief safety inspector for the company.



SAFETY EXHIBIT OF MILWAUKEE COMPANY

of the company were furnished with celluloid buttons 2.5 in. in diameter with the same slogan inscribed upon them, the buttons being mounted on ribbon badges.

During the week the company also operated a two-car train especially designed to teach a lesson of safety. The motor-car of the train bore upon its sides large banners with the standard safety motto in the center and such safety slogans as, "Don't Kid With Safety—You May Be The Goat." The trailer was a flat car with a built-up platform on which was placed a wrecked automobile, in the driver's seat of which was an employee of the Company dressed to represent the devil, while in the tonneau was another employee dressed to represent an undertaker. The trailer was equipped with a large bell and a fire siren which were operated to attract the attention of the public to the exhibit. It bore on its sides two banners, one reading: "This gentleman is not a member of the Safe Drivers' Club," while the other

The company has a permanent safety organization known as the Central Safety Committee. This was started about six years ago. It is composed of the heads of various departments and meets from time to time for the discussion and initiation of such safety measures in connection with the company's varied activities as may be needed. The chief safety inspector is its secretary. He is also the executive head of the safety enforcement committee, which was organized in January 1920, and whose duties are to enforce the safety rules promulgated from time to time for the benefit of the system's employes. It is on a military basis and the organization is such that there is always at least one safety representative of the safety enforcement committee present at the execution of any construction work that is being done by the Company. This representative is responsible for the observance of safety regulations.

Favors One-Man Cars

Tri-City Railway Proposes to Change Equipment as Means of Saving—Seeks Higher Rate

Installation of one-man cars on the Illinois lines of the Tri-City Railway & Light Company, Davenport, Iowa, was proposed at a hearing on Sept. 28 before the Illinois Public Utilities Commission. The hearing had been called by the commission to consider the company's petition for authority to charge a permanent fare of 10 cents in Illinois. Company officials declared that the use of "safeties" would help to solve the railway's financial difficulties.

It was estimated by officials of the company that such a system of operation would save the company $100,000 annually on its Illinois lines and $200,000 in Davenport over the same period. Cost of new safety car equipment makes the purchase of new cars out of the question, but cars in present use could be converted for one-man operation at an approximate cost of only $40,000. Two-man car operation in Illinois would be necessary during peak hours, it was stated. In Iowa this continuation of the present system would be unnecessary because of lighter traffic, it is estimated.

To test the accuracy of the estimate of savings under one-man operation, four cars will be put in service on the Prospect Park line in Moline if the Illinois commission recommends the experiment. It is understood that the city of Moline will welcome the test.

Carmen File Protest

Illinois trainmen, representing the viewpoint of organized labor on one-man car operation, have filed a protest with the Illinois commission against this system of operation. The petitioners call it dangerous to the public and also state their belief that many men would lose their jobs if the new plan were put into force.

On July 20 an 8-cent fare was placed in effect in Moline and Rock Island as a temporary relief measure. Since that time the scale of trainmen's wages has been increased from 60 to 70 cents an hour. This increased labor cost has eaten up the additional income derived from the 8-cent rate. To such an extent have net revenues decreased that the company withdrew its application for a clause by which three tickets could be sold for 25 cents and made its plea for a straight 10-cent fare. In Davenport the fare is now 9 cents, three tickets for a quarter.

Seven Cents in Colorado Springs

The Colorado Springs & Interurban Railway, Colorado Springs, Col., has been authorized by the City Council of Colorado Springs to raise its fare to 7 cents cash. The company has been ordered to sell eight adults' tickets for 50 cents and eight children's tickets for 25 cents. Before taking effect new rates must be approved by the State Public Utilities Commission.

Eight per Cent Return Allowed

Georgia Commission Authorizes General Increase in Rates—Seven-Cent Cash Fare in Atlanta—Orders Service Improved

Holding that the Georgia Railway & Power Company, Atlanta, is entitled to a return of 8 per cent upon a total valuation of $41,000,000, the Georgia Railroad Commission on Sept. 22 authorized the company to charge a 7-cent cash fare on its railway lines in Atlanta. The company was directed to sell fifteen tokens or tickets for $1. The company has been charging a 6-cent fare since April, 1919. The commission also authorized an 8-cent cash fare with thirteen tickets for $1 on the company's lines in Gainesville. Free transfers were ordered continued. Charges for electric power and for gas were also substantially increased. The new rates took effect on Oct. 1. Fares on the lines in Decatur and College Park remain at 5 cents, since contracts between the company and the municipalities prevent any increases in these cities.

BY THE terms of the commission's order, the company is directed to place in service on its city and suburban routes, during the morning and afternoon rush hour periods as now established, additional seating capacity equal to 20 per cent of that now provided. This increased service is to be furnished at as early a date as practicable and, if the necessary equipment can be secured, within six months from the properties under the new valuation is placed at $850,000. The commission found that for the year 1919, the company's net income amounted to approximately 6.2 per cent, and for the six months period ending June 30, 1920, to approximately 6.5 per cent on the $41,000,000 valuation. The smallest percentage of returns occurred in the railway department and in the outside electric department.

WAGE SCALES, GEORGIA RAILWAY & POWER COMPANY

	Wage Scales in Effect July 1 — 1915		1918		1920	
Inspectors, per month	$95.00		$125.00		$172.50 to $185.00	
Motormen, per hour	1st 3 mos.	.17	1st yr.	.25	1st 3 mos.	.42
and	2nd 3 mos.	.18	2nd yr.	.27	next 9 mos.	.44
Conductors, per hour	2nd 6 mos.	.19	3rd yr.	.29	thereafter	.46
	2nd yr.	.21	4th yr	.30		
	3rd yr.	.23	5th yr.	.31		
	4th yr.	.24	6th yr	.32		
	5th yr.	.25				
Linemen, per hour	$0.30	$0.31 $0.36½	$0.31 to $0.40		$0.57 to $0.63½	
Common labor, per hour		.20		.21½		.35
Machinists, per hour	39 to	.44		.50	.83	.85
Carpenters, per hour	27	.32	.42	.45	.70	.80
Painters, per hour	18	.39	25	.48	.63	.80
Car cleaners, per hour				.20		.35

Oct. 1, 1920. Commenting upon this stipulation, Walter T. Colquitt, counsel for the company, said:

Under a provision allowing only a 7-cent carfare and providing for large improvements of service, the Georgia Railway & Power Company would be far better off without the rate increase and without having to make the service increases. It would take a carfare of 20 cents for the company to make ends meet on an order requiring the company to make 20 per cent service increases and other improvements the commission considered. The company stands to lose close to $400,000 a year under such provisions.

We recognize that some of the lines ought to be improved and they will be improved, but there are other lines where decreases in service are imperative.

$41,000,000 VALUATION

The company had applied for an 8-cent cash fare and for increases in power and gas rates amounting to approximately 33⅓ per cent. The commission, after an exhaustive inquiry, fixed the sum of $41,000,000 as a fair value of the combined properties owned, leased and devoted to the public use on April 30, 1920. Two years ago the commission estimated the fair value of the properties at $35,000,000 and the necessary working capital at $666,000, making a total of $35,666,000 upon which the company was at that time entitled to a reasonable return. Between Dec. 31, 1917, and April 30, 1920, the corporation's capital was augmented by the sum of $4,337,815. The working capital required to care for

In support of its petition for increased revenue, the company submitted comprehensive data regarding increases in operating costs. The commission summarized the results of its study in the accompanying tables.

UNIT COSTS—GEORGIA RAILWAY & POWER COMPANY

Commodities and Materials f.o.b. Atlanta	July 1st 1915	1918	1920
Coal, per ton	$2 56	$5 01	$11 80
Copper, per lb.	0.23½	0.27½	0 24½
Steel wire, per lb	0 024	0.037	0 039
Standard poles, each, set	10.50	14.00	20.00
Cross arms and brackets	0.58	0.94	1.67
Y. P. lumber, per 1,000 ft.	16 00	34.00	55 00
Insulators	0.95	2.24	2.80
Creosoted ties, each	0.69	1.07	2 02
Cement, per bbl.	1.25	2.18	4 50
Steel rails, standard wt., per ton	31.43	74.00	70.00
Steel rails, girder, per ton	42.60	none bought	76 40
Spikes, per keg	4.00	7.80	12 00
Ballast, crushed stone	1.00	1.80	3 13
Paving Brick	22 00	none bought	42.00
1 Standard suburban car — complete	5,200.00	7,176.00	13,559.00
1 Standard PAYE Car — complete	4,201.00	5,819.00	11,937.00
1 Standard Trailer car — complete	2,120.00	2,995.00	6,063.00
1 Spl. work 2 piece crossing	1,496.00	2,540.00	2,540.00

Regarding the matter of return, the commission's order said:

A public utility with rates providing only a 5 or 6 per cent return cannot secure new capital in competition with a private business earning an 8 or 10 per cent return. It should be further borne in mind that the cause of the decreased purchasing power of the dollar, a return of 8 per cent now is not the equivalent of a 6 per cent return prior to the war. * * *

This commission is of the opinion, after mature consideration, that a return on the fare value of the property and capital employed by applicant of 8 per cent is reasonable and really needed to enable it to render to the public, under existing conditions, efficient and adequate service, and the schedule of rates established in connection herewith is intended to provide approximately this return. Out of this percentage of net income applicants must meet its fixed charges, such as bond interest, sinking fund requirements, rentals, on leased properties, etc.

Jitneys Ruled Off Hartford Streets

The Board of Aldermen of Hartford, Conn., on Oct. 11 adopted an ordinance barring motor buses from the streets used by the Connecticut Company and from the congested business areas of the city. The measure will go into effect on Nov. 1 unless court action is brought by the jitney men to prevent its execution. It provides that belt-line jitney routes must be established in sections of the city not directly served by trolley lines.

The new ordinance was the work of a special committee consisting of Aldermen Robert C. Buell, Frank K. Daniels and James F. Noonan and Police Commissioners Morris Older and Wilbur Walker of the commission's traffic committee and Corporation Counsel Walter Schultz. It was passed under suspension of the rules, by a vote of 15 to 3. The ordinance provides that:

No person, firm or corporation shall operate a public service motor vehicle popularly termed a jitney, as such, along any other streets or parts of streets than those established and fixed in this ordinance as traffic routes. Any person, firm or corporation violating any of the provisions of this ordinance shall upon conviction be fined $50 for each offense. This ordinance shall take effect Nov. 1, 1920.

"Mass Honesty" Test Successful

Square-dealing is a characteristic of the citizens of Pittsburgh, Pa. That is the opinion of Charles A. Fagan, W. D. George and S. L. Tone, receivers of the Pittsburgh Railways. They base their contention that Pittsburghers are fundamentally honest upon an experiment which they conducted in connection with the recent increase in token fare from 7½ cents to 8¾ cents.

To save unnecessary expense the receivers decided to make no change in the form of token in use. They issued a statement to the public explaining their position and pointing out that, while tokens purchased prior to the increase in price would be accepted when the new rate took effect, car riders could aid the railway by refraining from "stocking up" on the metal discs prior to the advance. Receiver Fagan commented upon the results of this experiment as follows:

A great deal of fun has been poked at the receivers for taking the public into their confidence, under the impression that the public would take advantage of the situation to load up with the metal discs. This possibility was taken into account in the calculations made by the receivers of the extent to which the sales would in-

crease, and we are gratified to say that the sales did not reach our expectations. We felt that in deference to the consideration the public has shown in this unavoidable increase in street car fares, the public was entitled to know in advance that the type of metal token tickets in use were not to be changed. In obviating the confusion of a change in the kind of tickets in use, the irritation of refunds involving a few cents, and ill temper and delays, the experiment was a complete success. We would do it all over.

The returns from the sales of tokens in the two days preceding the increase were upwards of 1,000,000 tokens in excess of the normal number for two days. The so-called bargain-counter rush would not have required us to limit the sales of tokens, as originally intended, if the type of ticket in use had been of the paper kind, as such tickets are used only once and then destroyed. The supply of metal tokens, however, is limited and inasmuch as they are used repeatedly, there necessarily must be some tokens each day in the hands of the conductors for handling the next day's business and also some in the fare boxes.

Approximately 20 per cent of the car riders took advantage of the opportunity to get more than their usual supply of tickets, and thereby caused parts of the system to be without tokens to sell to those who required them and thus created a necessity for limiting the number of tokens to be sold to one person to two at one time.

Transportation News Notes

Eight Cents in Berlin.—The New Hampshire Public Service Commission has authorized the Berlin Street Railway to raise its cash fare from 5 cents to 8 cents. Five tickets will be sold for 35 cents.

Upholds Eight-Cent Fare.—The Pennsylvania Public Service Commission has dismissed complaints of the city of Wilkes-Barre and various boroughs, townships and individuals of Luzerne County against the 8-cent fare charged by the Wilkes-Barre Railway. The commission authorized the company to raise its fare to 8 cents cash two years ago. Four tickets are sold for 30 cents.

Rejects Seven-Cent Fare.—The City Council of Clinton, Iowa, has refused a petition presented by the Clinton Street Railway for authority to raise its fare to 7 cents. The company sought the elimination of workingmen's tickets, which have been sold at the rate of forty for $1. Representatives of local labor unions opposed a higher fare.

Will Vote on Fare Increase.—The voters of Kalamazoo, Mich., will decide at the general election on Nov. 2 the question of granting the Michigan Railway an increase in fare from 7 cents to 10 cents. At a former referendum the rate advance was refused. The City Commission has authorized the company to put the 10-cent fare in effect temporarily.

Municipal Line Raises Fare.—The board of directors of the municipally-owned Norton, Taunton & Attleboro Street Railway, Norton, Mass., has voted to discontinue the sale of sixteen tickets for $1 and to charge a straight 10-cent fare in each zone. The railway's employees are asking for an increase in wages to a maximum of 75 cents an hour.

Tokens in Buffalo.—The International Railway, Buffalo, N. Y., has begun the use of metal tokens. These replace the paper tickets which have been in use since the 7-cent fare went into effect. The tokens are slightly smaller in size than a dime and are sold at the rate of four for 25 cents, the same as the tickets. The company's fare boxes have been rearranged so that the tokens register on a separate dial from the cash fares.

Bus Permit Revoked.—The City Commission of Newark, N. J. has directed City Counsel Congleton to prepare an ordinance rescinding the franchise of the General Omnibus Company. The company was given permission in January, 1919, to operate a number of buses in Newark. Under the terms of the agreement it was to begin service before July 1 last. Failure to comply with this condition led to a demand that the franchise be revoked.

Ten Cents in Waterloo.—A 10-cent cash fare took effect on the lines of the Waterloo, Cedar Falls & Northern Railway, Waterloo, Iowa, on Sept. 15. The fare was formerly 5 cents. The advance was authorized by the board of arbitration which recently awarded the company's employees an increase in wages. Thirteen workmen's tickets or twenty children's tickets are sold for $1, good during designated hours. A similar schedule of rates is in effect on the company's lines in Cedar Falls.

Eight Cents Asked in Johnstown.—The Johnstown (Pa.) Traction Company has petitioned the State Public Service Commission for authority to charge an 8-cent cash fare and to sell four tickets for 30 cents on its Johnstown city lines. The present fare is 7 cents cash with four tickets for 25 cents. The company on Oct. 1 raised the wages of its carmen from 50, 52.5 and 55 cents an hour to 55, 57.5 and 60 cents an hour.

Front-Exit Cars in Twin Cities.—Front-exit cars will soon be operating through the streets of Minneapolis and St. Paul, Minn. Three hundred cars of the old type are being remodeled by the Twin City Rapid Transit Company. Of the reconstructed cars, 175 will be placed in service on the Minneapolis lines and 125 on the St. Paul lines. The equipping of the cars has been delayed by the difficulty of obtaining castings. These are now being received at the company's Snelling shops.

Four Cents a Mile Allowed.—The Southwestern Traction Company, Temple, Texas, which operates an interurban line from Temple to Belton, Texas, a distance of twelve miles, has been granted authority by the Texas Railroad Commission to increase its passenger fares between the two towns from 35 cents to 49 cents, and to make proportionate increases for intermediate stations. The company contended that 35 cents was confiscatory.

Rate Dispute Settled.—The Kentucky Railroad Commission on Oct. 7 entered an order approving the new schedule of interurban rates of the Louisville & Interurban Railroad, Louisville. The commission also rescinded the order requiring the Attorney General and Commonwealth's attorneys in the counties affected to bring an action against the company. Under the new schedule cash passenger fares will be collected on all trips beyond the city limits on a 3-cents-a-mile basis.

More Trains on Subway.—Under an order issued on Sept. 29 by the Public Service Commission for the First District the Interborough Rapid Transit Company, New York, N. Y., has resumed the operation of trains on practically rush hour schedules during nearly the entire day. The order for the improved service was issued last April but was suspended during the past few months. It provides for the maximum of service in all hours except the middle of the day and late at night.

Wants More in New Castle.—The Pennsylvania-Ohio Electric Company, Youngstown, Ohio, has filed with the Pennsylvania Public Service Commission a new schedule of rates, under which it proposes to raise its fare on its lines in New Castle, Pa., from 7 cents to 10 cents. The company contends that the 7-cent fare is insufficient to meet operating expenses and to pay a fair return on the investment. The city authorities have announced that they will oppose any increase in fare.

Busmen May Unite.—An attempt is being made to form one central organization embracing all the large and small jitney buses in Hartford, Conn. The Hartford Public Service Operatives' Protective Association is back of this movement. An association to be known as the Hartford Bus Corporation is being formed. The capitalization will be $50,000. The officers of the corporation are: Harry A. Cohen, president; D. S. Wells, secretary; C. J. Miller, financial secretary, and Joseph M. Namourn, treasurer.

One-Man Cars in Houston.—The Houston (Tex.) Electric Company has received its first consignment of twelve one-man safety cars. Additional cars have been ordered and will be put into service in Houston as rapidly as they are received. The company is still operating at a 7-cent fare under the court decree holding the 5-cent rate to be confiscatory and declaring that the company is entitled to earn 8 per cent on its investment after 4½ per cent has been charged off for depreciation. Efforts so far to negotiate a new franchise have so far failed.

"Safeties" Approved, Fare Reduced.—A 1-cent reduction has been made in the fare charged by the Cedar Rapids & Marion City Railway, Cedar Rapids, Iowa, as the result of the introduction of one-man safety cars. The company recently raised its fare from 6 cents to

8 cents. It subsequently applied to the City Council for permission to use "safeties." The Council consented, the company agreeing to reduce the fare. The carmen objected to this scheme and went out on strike on Sept. 24. They returned to work on Sept. 27. On that date the one-man cars and the 7-cent fare were placed in operation.

May Abandon San Diego Lines.—Service may have to be abandoned on a numer of lines of the San Diego (Cal.) Electric Railway in the near future, according to a statement made by William Clayton, vice-president and managing director of the company, at a recent hearing before the San Diego City Council. Mr. Clayton declared that the railway was willing to make track improvements in so far as it was financially able, but that it was unable to undertake the street paving as requested by the council. It is proposed to abandon the Market Street line between Fifth and Sixteenth and the Spruce Street line because of insufficient patronage.

City May Run Lines.—Operation of the Lowell Division of the Eastern Massachusetts Street Railway by the city of Lowell, Mass., was suggested by Homer Loring, chairman of the public trustees of the company, at a recent conference with municipal officials and the members of the local Chamber of Commerce. Mr. Loring proposed that the city undertake to operate the Lowell lines for a period of three months. The city, in addition to meeting operating expenses, would be required to pay interest at the rate of 6 per cent annually on the value of the railway property. The proposition may be submitted to the voters at the general election on Nov. 2.

Increase Asked in Sacramento.—Asking that the State Railroad Commission investigate the cost of operation of its lines in Sacramento, the Pacific Gas & Electric Company has filed a petition with the commission looking toward an increased fare. The application asks that the commission make an order establishing such rates as will provide a reasonable return upon the property investment. The company gives the value of its railway holdings in Sacramento, exclusive of franchise or going concern value, as $2,449,285. For the fiscal year ended June 30, 1920, it is stated the gross revenue totaled $727,647, and the operating expenses $586,073, leaving a total of $131,574 available for depreciation and returns. The fare is now 5 cents.

Motor Buses as Election Issue.—Establishment by the city of Winnipeg, Man., of municipal motor bus lines is demanded by the Winnipeg labor party, which is making the question an election issue. The labor unions are supporting the candidacy of Councilmen pledged to work for the installation of a motor bus system to be owned by the city and to give service at a fare below that charged by the Winnipeg Electric Railway. They also demand that the railway be compelled to abide by the provisions of its original agreement with the city, limiting the fare to 5 cents, or that it surrender its franchise. A 7-cent cash fare took effect in Winnipeg on Sept. 1, the rate having been 6 cents for the past year. The increase in fare was strongly opposed at the time by the labor element.

Five Cents a Mile Asked.—The Southern New York Power & Railway Corporation, Cooperstown, N. Y., has asked the Public Service Commission, Second District, for permission to increase its interurban passenger rate from 4 to 5 cents a mile and to discontinue the sale of mileage books. The company's petition states that its line is paralleled by improved state highways and that there is competition from auto buses and freight truck lines, and that grades render operation of cars expensive. The company alleges, in support of its application, increases in the costs of materials and labor, stating that subsequent to June 1 there had been wage increases approximating 23 per cent in the operating department and 12 per cent in other departments. Arbitration of the strike in July, in states, added $25,000 to the payroll.

Seven Cents in Pine Bluff.—The Pine Bluff Company, operating the electric railway system in Pine Bluff, Ark., raised its fares from 6 cents to 7 cents on Sept. 21. The increase had been approved by the City Council and the State Corporation Commission. Fifty tickets are sold for $3 at the railway's offices. The company voluntarily reduced the rate for school children by putting on sale fifty tickets for $2.50 good at any hour between 8 a.m. and 5 p.m. There has been no material reduction in the number of passengers since the new rates took effect. In preparation for the increase the management carried on a campaign of education by means of a series of advertisements in the Pine Bluff newspapers. A. G. Whidden, advertising manager of the company, was in charge of this publicity work.

Jersey Busmen Answer Railway.—Thirty-one owners of jitney buses operating in Newark, Paterson, Jersey City and other cities of New Jersey, have filed their answer in the Court of Chancery to a complaint made by the Public Service Railway, Newark, alleging the competition of the buses to be illegal. Several months ago the railway started legal proceedings to have the jitneys ousted from the streets in which it has tracks. In their answer, the busmen disclaim all responsibility for the company's failure to earn a profitable revenue, and throw the blame for such failure upon the corporation. They contend that for the court to restrain the operation of the defendents' buses would not only deprive the defendents of their right to make a livelihood, but would also deprive the public of means of transportation to which it is entitled.

Street Collection Speeds Up Service.—The Chicago (Ill.) Surface Lines has begun the use of front-end street collections at various congested points as a means of speeding up the loading of cars, filling up the front end, and in general improving schedules. Points of heavy transfer where a line stub-ends, such as at Adams and State Streets, Van Buren and State Streets, and Twelfth Street and Wabash Avenue, were the first locations at which auxiliary collectors were provided. The plan will be extended to other heavy transfer points and to industrial plants such as the Western Electric Company, and Sears, Roebuck & Company, where large numbers of employees must be handled in the rush hours. Adoption of this plan was recommended by John A. Beeler, consulting engineer, New York, who is making an extensive study of conditions in Chicago. The collectors are equipped with the usual small portable register, transfers, etc.

Intrastate Rate Powers Argued.—Conflicting opinions as to the authority of the Interstate Commerce Commission to prescribe intrastate rates were presented to the commission on Oct. 12 by representatives of the railroads and state commissions at the hearings on application of the roads of New York and Illinois for an order increasing intrastate passenger fares to the level of the 20 per cent advance granted for interstate traffic. Spokesmen for the railroads contended that the transportation act made the whole rate structure of the country a matter for the consideration of the Interstate Commerce Commission, and that the Federal authority no longer was confined solely to the regulation of interstate traffic. State commissioners, however, argued that the commission was without authority to make blanket increases in the traffic charges within the boundaries of a state and that Congress in passing the new law did not broaden the power of the commission over intrastate regulation.

May Raise Reading Fares.—Reading Transit & Light Company, Reading, Pa., has filed with the Pennsylvania Public Service Commission a new schedule of fares for its entire system, comprising the lines of Reading, Norristown and Lebanon and the suburbs, to go into effect on Oct. 27. The new schedule provides for an increase from 7 cents to 8 cents on thirty lines in Reading and Lebanon, and an advance from 8 cents to 9 cents in Norristown and on all suburban lines of the system. Under the new schedules monthly commutation books and excursion tickets will be discontinued, but there will be no curtailment of the practically universal transfer privileges or other features of the service. Constantly increasing cost of operating the system is given by the company as the reason of the advance. Experts engaged by the city to make a survey of the property of the company have placed the total valuation of the lines between Norristown and Lebanon at approximately $4,600,000. The company's experts are said to have placed the value of its property at $6,500,000.

Personal Mention

General Manager Named for Toronto Commission

H. H. Couzens, general manager of the Civic Hydro-Electric Commission, of Toronto, Ont., was on Sept. 28 appointed general manager of the Toronto Transportation Commission, which is to take over and manage the system of the Toronto Railway at the expiration of the latter's franchise in September, 1921.

The commission also appointed R. C. Harris, Commissioner of Works for the city; E. L. Cousins, general manager of the Harbor Commission, and F. A. Gaby, chief engineer of the Hydro-Electric Power Commission, as a committee to serve in a consulting capacity with a view to co-ordinating the interests represented by them and obtaining the benefit of their advice on the problems arising in connection with the taking over of the railway lines.

One of these problems involves the altering of the gage of the Toronto Railway and the Toronto Civic Railway lines now operating in St. Clair, Danforth and Gerrard Avenues, which were constructed in 1912 and 1914. The gage on both the privately owned and the civic lines is 4 ft. 11 in., in comparison with the standard of 4 ft. 8½ in. The importance of this question will be understood when considered in connection with the Ontario hydro-radial project. If the gage is not changed to conform to the standard gage, the Toronto system will be unable to take advantage of the night haul of radial express and freight cars into the city, and much revenue will be lost.

E. C. Brister has resigned as general manager of the Alexandria (La.) Municipal Street Railway. Mr. Brister has accepted a position as manager of the Alexandria municipal power station.

Dean McLaughlin, superintendent of the Michigan Railroad, Kalamazoo, Mich., has resigned to join the organization of the Ohio Brass Company, Mansfield, Ohio. Mr. McLaughlin has been connected with the Michigan Railroad and with its predecessor, the Michigan United Traction Company, for the past eight years. Prior to that time he served with the Toledo Railways & Light Company, Toledo, Ohio.

Robert J. Dunham has resigned as vice-president of Armour & Company, Chicago, Ill., and will sever all connection with the Armour interests. Mr. Dunham was receiver of the Kansas City (Mo.) Railways on the occasion of its former receivership, ended in 1914. Subsequently he served as chairman of the board of the Kansas City Railways until his resignation in June of this year. He is now president of the Sioux City Service Company, Sioux City, Iowa, a property controlled by the Armours, but will resign this position in the near future.

Steam Operator Chosen

Ernest Stenger, New President of the Denver Tramway, Long with Union Pacific System

Steam railroading has lost an able executive to the electric railway field in the person of Ernest Stenger, the newly elected president of the Denver (Col.) Tramway. Mr. Stenger has already achieved a reputation for "getting things done" as superintendent of the Southern Division of the Union Pacific Railroad. The experience which he has thus gained will stand him in good stead in taking up for the first time the management of a traction property.

ERNEST STENGER

Mr. Stenger, as announced in last week's issue, has already entered upon his new duties. The office of president has been vacant since 1913, the direction of the affairs of the company having been largely in the hands of Charles Boettcher, chairman of the board of directors. In addition to serving as president, Mr. Stenger will perform the functions of general manager, Vice-President F. W. Hild having submitted his resignation to take effect as soon as the operating force has been reorganized. Mr. Stenger has announced that he will adhere to the present policies of the tramway, and that he contemplates no changes in the executive personnel.

Like most steam railroad executives, Mr. Stenger gained much of his experience in the school of hard knocks. A civil engineer by training, he has a broad understanding of the fundamentals of the transportation industry, which has not only made possible the rise to a position of responsibility with the Union Pacific, but which will enable him to visualize the problems of the Denver system. He is well acquainted with the West, his entire railroad career having been passed west of the Mississippi River.

Mr. Stenger was born in 1865 at Colmar, Alsace. Coming at an early age to the United States he was graduated from the University of Michigan in 1886. In the same year he entered the railway service as a rodman with the Burlington & Missouri River Railroad in Nebraska. After two years of this work he was appointed a draftsman with the Atchison, Topeka & Sante Fè Railway, resigning in 1890 to become assistant engineer with the Missouri Pacific Railway.

After serving with the Missouri Pacific for ten years, Mr. Stenger resigned to join the Union Pacific System. His first position with that road was that of division engineer. He later served as assistant superintendent and as division superintendent. In 1907 he was made general superintendent of the Rio Grande Western Railway, continuing in that capacity until March, 1911. He then became general manager of the St. Joseph & Grand Island Railway, with headquarters at St. Joseph, Mo. He subsequently returned to the Union Pacific as superintendent of the Southern Division, making his headquarters at Kansas City.

During the war Mr. Stenger served with the American Expeditionary Forces in France as lieutenant-colonel of the 31st Engineers, directing the transportation of supplies to the battle front.

W. W. Nielsen, assistant secretary of the Springfield (Mo.) Traction Company, has resigned. Mr. Nielsen has accepted a position with the International Coal & Products Company, a Virginia corporation. He has been connected with the Springfield Traction Company since May, 1919.

Robert W. Hewins, who recently submitted his resignation as superintendent of the Norton, Taunton & Attleboro Street Railway, Norton, Mass., has reconsidered his action at the request of the board of directors and has announced that he will continue with the road indefinitely.

Frederick W. Heffernan has been appointed superintendent of transportation of the Augusta Division of the Androscoggin & Kennebec Railway, Lewiston, Maine. Mr. Heffernan succeeds George W. Bowie, resigned. He has been connected with the company for a number of years.

Louis A. Pease, division superintendent of the Buffalo & Lake Erie Traction Company, Buffalo, N. Y., with headquarters at Erie, Pa., has resigned. Mr. Pease was appointed superintendent of the western division of the railway four years ago. He was formerly a conductor with the same system.

Manufactures and the Markets

DISCUSSIONS OF MARKET AND TRADE CONDITIONS FOR THE MANUFACTURER, SALESMAN AND PURCHASING AGENT

ROLLING STOCK PURCHASES BUSINESS ANNOUNCEMENTS

Large Turbo-Generators in Strong Demand

Westinghouse Orders Amount to More Than 500,000 Hp. in the Last Three Months

The Westinghouse Electric & Manufacturing Company announces that it has received within the past three months orders from electric light and power companies for more than 500,000 hp. of turbo-generators. Among these are:

Cheswick Power Company, Pittsburgh, Pa., one compound unit of 60,000 kw., which will be one of the largest engines ever built.

Narragansett Electric Lighting Company, Providence, R. I, one compound unit of 45,000 kw.

United Electric Light & Power Company, New York, two compound units of 35,000 kw. each.

Brooklyn (N. Y.) Edison Company, two single units of 25,000 kw. each.

United Electric Company, Springfield, Mass., a single unit of 25,000 kw.

Commonwealth Edison Company, Chicago, one compound unit of 35,000 kw.

Havana (Cuba) Electric Railway Company, two single units of 25,000 kw. each.

Commenting on the sale of these large steam turbines, E. H. Sniffin, manager of the power department, Westinghouse Electric & Manufacturing Company, pointed out that the business in large turbine units was about equally divided, as to number, between units of over 30,000 kw. and units of under 30,000 kw. rating. Owing to the reliability of the multicylinder type, he stated, it is believed that it eliminates many problems of design which would occur, owing to the physical dimensions, with the single cylinder in these very large sizes. From the present knowledge of design it appears, according to Mr. Sniffin, that this will continue to be the case for some time to come, but, of course, definite prediction cannot be made on account of the rapid development in the industry.

British Purchase American Rails

The question of ordering American rails again came before the Town Council of Glasgow on Sept. 1. It may be recalled that a recommendation by the tramways committee to give an order to the United States Steel Products Company for 10,000 tons of steel rails and fishplates had been referred back to the committee. The latter reconsidered the subject and renewed its recommendation, which was again brought forward. In the interval, owing to the necessity of getting rails as soon as possible, the general manager, with the concurrence of the chairman of the tramways committee, accepted the contract and gave the order. The labor members of the council again made the allegation that the steel workers in America had to work excessive hours and that in this way the American prices for rails were lower than the British. This was met by the statement that the president of the American rail manufacturing company gave a personal guarantee that the rails were being produced under fair conditions. The proposal of the committee was carried by forty-two votes against eighteen. The American price is £23, 10s. per ton, while the only British tender received was £28 per ton.

Special Coal Permits for Emergency Needs

General Privilege of Assigned Cars to Utilities Rescinded—Committee of Three Hears Cases

While service order 21, issued October 8 by the Interstate Commerce Commission, takes away the privilege of assigned cars to public utilities generally, the new order makes the securing of emergency coal more certain. It provides a sort of super-rating for cars needed to supply utilities in distress. Because the old order had been abused to an important extent the commission decided that the need for emergency coal would have to be established in each individual case. It therefore has appointed a committee which is to pass on all applications for emergency coal. The committee is constituted as follows: W. L. Barnes, American Railroad Association; D. B. Wentz, president of the National Coal Association, and G. W. Elliott of the National Committee on Gas and Electric Service.

With the operators and the railroads represented on this committee it is believed that most applications can be taken care of without resort to the commission's order. The operators see that utilities are kept in coal.

All applications by utilities for relief in the matter of coal supply should be addressed to the National Committee on Gas and Electric Service, Munsey Building, Washington, D. C. As a result of the better understanding which has followed the conferences which preceded the issuance of the new orders it is believed that the crisis in the coal situation has passed. With the issuance of Order 21 the commission also curtailed all outstanding permits for the use of open-top equipment for other than coal-carrying purposes.

Railway Motor Manufacturers Optimistic

Demand Light at Present, but Manufacturing Conditions Are Improved, with Heavier Sales Expected

Demand for railway motors at present is light, according to leading manufacturers. Electric traction companies are said to be buying new rolling stock only when absolutely necessary. The trend of demand has been more and more toward safety cars, so that now the number of motors bought for heavy car service is small compared with the safety car types. One result of this tendency has been an improvement in delivery conditions, since in the safety car motor certain material such as gears can be more or less standardized. One of the largest motor manufacturers in the country is optimistic regarding future business on the ground that the attitude of the public toward electric railways is improving in respect to higher fares and increased transportation facilities. Virtually all of the lines are badly in need of additional equipment, this company states. Heretofore, more cars at old rates of fare in many cases meant greater loss in operation, however, and the money with which to make extensions has been lacking. Demand, as a result, has not been as great as it would have been if the railway companies could finance new equipment. This condition is said to be gradually improving.

Manufacturing conditions are fairly favorable at present. Raw material is causing little trouble. The shortage of gears and of insulating material that prevailed during the summer has been relieved. Furthermore, producers are anticipating their needs well in advance, keeping a good running stock of material on hand at the factory. A reserve supply of motors is also maintained with each of the car builders, it is stated. Reasonable shipments can be made. One manufacturer quotes deliveries of from forty-five to sixty days. No cancellations have been reported.

Small hope of any immediate reduction in prices is held out by one of the leading interests, until there is a reduction in wages paid the men who build the equipments. This view holds that the high level attained by railway motor prices since prior to the war has been very largely caused by the tremendous demands of labor all along the line, from the ore in the ground to the finished product. Another producer, however, thinks that if any change comes about it will be in the direction of lower prices, provided the cost of raw material lessens.

Cement Market Greatly Undersupplied

Stocks Are Low and Deliveries Long In the Face of Heavy Demand—Prices Steady

Demand for cement holds up so strongly that manufacturers are still far from catching up with the volume of orders. In spite of the curtailment of the building industry in many sections of the country, the market for cement remains greatly undersupplied. Electric railways have not been heavy buyers, however, but according to one of the leading interests the outlook is bright for good business to develop from that quarter as well as from steam roads next year. According to an article recently appearing in the New York *Times*, there are orders hanging over the market for 15,000,000 barrels of cement at present that the industry cannot hope to catch up with for the next three or four months. The same source of information states that today there is no more than a national ten days' supply of this commodity in the country. The probable entire production for 1920 is placed at 95,000,000 barrels, provided the present approximate output of 70 per cent of capacity is maintained. Of this total, railroad needs are expected to account for 6.63 per cent of the supply.

Producers are so heavily booked ahead with orders that new business is not accepted for shipment earlier than about Dec. 1 in several representative cases. Mill stocks of cement are generally depleted. According to the *Times* report, there were about 5,000,000 barrels on hand on Oct. 1, compared with 10,000,000 barrels last year at that time. The raw material supply is reported favorable except in respect to coal.

Representative manufacturers express the view that the downward trend of prices in other lines will not affect the cement market. Some producers are covered by contracts for quite a while yet, and this circumstance, together with the present scarcity of the finished product and the prevailing high prices of coal and labor, is expected to operate against any immediate lowering of prices. Optimism is the keynote of the view which cement manufacturers take of the trade. In spite of excellent sales this year, 1921 should show even better results it is said. Many construction products which have long been postponed pending more favorable conditions, are expected to get under way, not only in the railway field, but in constructing highways, buildings, etc.

Street Car Plant Undamaged at St. Louis Car Fire

Fire which was discovered at midnight of Oct. 11 in the steel erection plant of the St. Louis Car Company at St. Louis, Mo., partially destroyed the plant and caused a loss which is estimated by fire department officials to exceed $500,000. The electric railway car assembly plant was not damaged, however. This was largely due to its being separated from the fire by a 100-ft. areaway. The phonograph assembling plant and the former aircraft building were also saved.

An explosion in an acetylene tank is said to have started the fire, which gained rapid headway because of the wind and the inflammable nature of the material stored at the plant. The buildings destroyed included the pneumatic tool, steel car, wheel and axle and truck departments, as well as the machine shop, power house, planing mill, pattern and storage warehouses and steel forgings plant. Most of these were new buildings. About 1,200 people are employed at the plant and it is expected that many of these will be thrown out of work. Besides street cars the company manufactures freight cars and passenger coaches, automobiles and cabinet phonographs.

At the date of going to press encouraging word has been received. Edwin B. Meissner, vice-president and general manager of the company, is quoted as saying that normal operation should be resumed by Nov. 10. The entire West Works and the main car-building section of the plant, as well as the lumber stock and dry kilns, remain intact, Mr. Meissner states. The destroyed wood mill and machine shop of the East Works can be taken care of by their counterpart in the West Works, it is stated.

Rolling Stock

The Northern Ohio Traction & Light Company, Akron, Ohio, noted in the Aug. 14 issue as having received authority to purchase twenty interurban cars in addition to the fifty-six city cars mentioned last week, has specified the following equipment on the interurban cars:

Number of cars ordered	20
Builder	The G. C. Kuhlman Car Company
Type	Interurban—Single End
Seating capacity	58
Weight, total	71,980 lb.
Bolster centers, length	32 ft. 6 in.
Length over all	55 ft. 11 in.
Truck wheelbase	0 ft. 84 in.
Width over all	8 ft. 6 in.
Height	12 ft. 9½ in.
Body	Steel
Interior trim	Mahogany
Headlining	Agasote—Buff
Roof	Arch
Air brakes	Westinghouse AMM
Axles	Penna. R.R. Standard
Bumpers	Hedley Anti-Climbers
Signal system	Westinghouse 8-T Signal System; Ohio Brass Company Marker Lamps and Signal System.
Control	G. E. MK
Couplers	Ohio Brass
Curtain fixtures	Curtain Supply Company
Curtain material	Pantasote
Designation signs	Hunter
Fenders or wheelguards	N. O. T. & L. Co. Std. Pilot
Hand brakes	American Brake Company
Heaters	Peter Smith Heater Company, Hot Water
Headlights	Crouse-Hinds LHH Luminous
Lightning arresters	G. E.
Motors	G.E.-240-B-4
Registers	Ohmer Fare Register Company
Sanders	Nichols-Lintern Company
Seats	Brill
Seating material	Fabrikoid
Trolley catchers or retrievers	Trolley Supply Company
Trolley wheels	More-Jones Brass & Metal Company
Trucks	Brill 27 MCB-2
Ventilators	Nichols-Lintern Company
Wheels	Forged Steel Wheel Company, 36 in.

Track and Roadway

Carolina Power & Light Company, Raleigh, N. C.—This company has been authorized by the Raleigh City Commission to double-track its line in Hillsboro Street from Park Road to Groveland Avenue.

Virginia Railway & Power Company, Richmond, Va.—The Church Street Improvement League will petition the City Manager and the Council against the removal of tracks from Church Street between Eighteenth and Twenty-sixth Streets, and to the re-routing of cars through Granby Street between these points, as turning business into Granby from Church Street. This property belongs to the Virginia Railway & Power Company operating in Norfolk.

Ohio Valley Electric Railway, Huntington, W. Va.—The city of Huntington, W. Va., has power by indirection to compel the Ohio Valley Electric Railway to double-track its Third Avenue line. That was the substance of a formal report on the problem filed with the commissioners on Aug. 2 by City Attorney O. J. Deegan. The matter was carried over until a later date in order that the commissioners might confer on the construction of the overhead crossing in front of the American Car & Foundry Company's plant. The two propositions are akin and the commissioners hope to handle both at the same time.

Monongahela Valley Traction Company, Fairmont, W. Va.—The probability of extending the lines of the Monongahela Valley Traction Company from Fairmont to Morgantown within the next twelve months is considered to be very strong by Morgantown business men in touch with the officials of the concern at Fairmont. The company right now has plans for such an extension under consideration and its start is predicted as soon as construction costs swing a little back toward normal. At the present time, the Monongahela Valley company operates cars as far north along the river as Riversville and has a graded right-of-way for some distance below Riversville toward Arnettsville. The distance between this terminal and Morgantown is about 12 miles. A survey which has been made for the proposed route is said to be most favorable for rapid construction, the grade being very light. It is known that several routes are being considered for the line.

Virginia Railway & Power Company, Richmond, Va.—The port terminals' committee of the Chamber of Commerce has framed a resolution calling on the Virginia Railway & Power Company to make an extension of its Pine Beach line to the Army Supply Base. This additional transportation service would materially aid about 1,500 employees of the U. S. Army who have to walk about one mile from the car line to the army base every day. This project before it can be considered must

have the approval of the government.

St. Catharines, Ont.—The Welland Board of Trade will ask the Grand Trunk Railway to electrify the Welland division of the road from Port Dalhousie to Port Colbaine.

Hydro-Electric Power Commission of Ontario, Toronto, Ont. — The double-tracking of West London Street, Windsor, which will begin shortly, has been a long-promised improvement to the border street railway system. The delay has been caused by the difficulty in purchasing the equipment and the condition of the rolling stock taken over from the Detroit United some months ago.

Hydro-Electric Commission, Ontario, Canada.—H. G. Dickinson, superintendent of the Niagara Railway Arch Bridge Company, Niagara Falls, announces that Sir Adam Beck, chairman of the Ontario Hydro-Electric Commission of Canada, is seeking permission to run electric cars over the bridge to connect the Toronto and Rochester interurban lines. Charles E. Foster of New York, consulting engineer of the bridge company, has been called into conference regarding the plans. The proposed Toronto-Rochester interurban line has been under consideration for some time.

Trade Notes

General Railway Signal Company, Rochester, N. Y., has issued an addition to its direct current catalog volume I. The addition is dated September, 1920, and covers section J, Nos. 21-29.

F. M. Richards, formerly chief engineer of the Atlantic Shore Railway, Kennebunk, Me., has joined the forces of the Transit Equipment Company, New York City, in the capacity of chief engineer, it is announced.

The Greenfield Tap & Die Corporation, Greenfield, Mass., is offering $2,255,000 8 per cent cumulative preferred stock through bankers, which is part of a $5,000,000 authorized issue, the par value of which is $100.

Blaw-Knox Company, Pittsburgh, Pa., manufacturer of transmission towers, steel buildings, etc., on Oct. 1 opened a district office in Birmingham, Ala., in charge of Prescott V. Kelly. The company now has eight district offices.

Ohmer Fare Register Company, Dayton, Ohio, has just completed the addition of one story to its main building, making it a five-story structure. The change was necessary to take care of new types of machines and to increase present production.

Edward Casey has joined the Duff Manufacuring Company as the sales representative of the forge department in the East, with offices at 50 Church Street, New York City, it is announced. Mr. Casey was formerly associated with Kraerter & Company and the Bethlehem Steel Company.

Sattley Company, Detroit, Mich., manufacturer of machines for sorting, counting, and wrapping coins, announces that it has moved into its new factory at 812 East Woodbridge Street. The new building comprises 16,000 sq.ft. of floor space and is expected greatly to increase the capacity of the company.

J. L. Galef, 75 Chambers Street, New York City, has taken over the exclusive sales agency of the McGill high-speed changer, manufactured by the McGill Metal Products Company, Chicago. The selling of the utility ticket punches will be continued by the manufacturer as heretofore.

Dwight P. Robinson & Company, Inc., New York City, with which Westinghouse, Church, Kerr & Company, Inc., is consolidated, devotes the current number of its publication, the *D. P. R. News*, to a railroad issue, emphasizing the importance of improving terminal facilities, roundhouses, shops, etc.

Sam W. Smith, formerly sales manager of the Uehling Instrument Company and at one time equipment engineer of the Southern New England Telephone Company, has joined the Smith Engineering & Supply Company, Boston, Mass., which represents the Uehling Instrument Company and the Adriance-Bate Company in New England.

M. A. Kretchmar, formerly chief lubricating engineer of the Sinclair Refining Company, has become associated with the Horrocks Desk Co., Herkimer, N. Y., it is announced, as supervising engineer and chief of sales. Mr. Kretchmar will devote his attention to promoting the Danight Wick Oiler for lubricating car axles, armature brasses, etc., which the company manufactures.

The Locomotive Superheater Company, New York, through its industrial department, has issued what is called a "Data Book for Engineers." This is a book with flexible covers containing sixty-four pages of data of everyday interest to the steam-plant engineer. Besides an abbreviated steam table, it contains a table of the various coals of the United States arranged by states and giving an approximate analysis.

The Habirshaw Electric Cable Company, 10 East Forty-third Street, New York City, has issued a combined statement of the earnings of the Habirshaw Electric Cable Company, Inc., the Electric Cable Company and the Bare Wire Company, for the five months ended May 31, 1920, as follows: Sales (not including Bare Wire Company), $4,846,807; profit in trading, $412,617, from which $163,767 was deducted for interest, discount and bonuses, leaving a net income of $248,850.

J. J. Edwards, secretary and treasurer of O. M. Edwards Company, Syracuse, N. Y., manufacturer of window fixtures, platform trap-doors, etc., announces that he has given up his duties at Syracuse and will devote his whole attention to the sales field throughout the entire country, with the object of getting into close touch with both steam and electric railways.

American Steam Conveyor Corporation, Chicago, Ill., announces a change in its corporate name to the "Conveyors Corporation of America." The company manufactures steam jet conveyors for handling ashes, etc., trolley conveyors, oil-bearing sheaves, and other conveyor supplies. A completely equipped machine shop, to which foundry facilities will be added, has been acquired at South Bend, Ind. No change either in personnel or business policy will be made, it is stated.

The United Railways Company of St. Louis and a number of street railway supply manufacturers will take part in a railway exposition which is to be given at the Railway Y. M. C. A., St. Louis, for one week starting Oct. 25. The exposition will be given under the auspices of the St. Louis Railway Club. The first and second floors of the Y. M. C. A. building and the grounds surrounding the building will be filled with steam and electric railway equipment, showing the progress that has been made in efficiency and labor-saving devices in the past ten years.

New Advertising Literature

Arc Welding.—The Ohio Brass Company, Mansfield, Ohio, has issued a booklet covering equipment and instructions for electric arc welding.

Automatic Arc Welder — The General Electric Company, Schenectady, N. Y., has issued booklet No. B-3575, covering automatic arc welders.

Used Material.—Transit Equipment Company, New York City, has issued bulletin No. 271, listing its second-hand railway motors, armatures, controllers, trucks, resistances and couplers.

Carbon Electrodes. — The National Carbon Company, 30 East Forty-second Street, New York, has distributed an instructive eighteen-page booklet on carbon electrodes for electric furnaces.

Water Screens.—The Link Belt Company, Chicago, Ill., has recently published a twenty-four page illustrated book covering its traveling water screens. Copies may be had on request.

Equipment. — Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., has issued a fifteen-page special publication, No. 1636, covering its exhibit at the A. E. R. A. convention in Atlantic City.

Price Lists of Car Equipments.—The General Electric Company, Schenectady, N. Y., has issued bulletin No. 44,001-P, to supersede No. 44,001-O, of prices on renewal parts and supplies for car equipments, mine locomotives and railway and mine line material.

Electric Tools.—The Van Dorn Electric Tool Company, Cleveland, Ohio, is circulating a letter with typewritten pages attached, describing the growth and the products of the company. The company employs about 400 people and it has reached its fifteenth anniversary.