Electric Railway Journal

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THE "ORDER THEM NOW" MOVEMENT

In a brief symposium on the prospects for 1916 deliveries of materials required in the manufacture of cars, printed in last week's issue, an axiomatic but timely truth was stated by a leading car manufacturer. This was in substance that the date of delivery of a car depends upon that of the last important component of that car. If the axles are late the car will be late, no matter how promptly the wheels are received. The manufacturing chain is as strong only as its weakest link. There is no doubt, therefore, that disappointment in regard to car deliveries will be minimized for those prospective purchasers who get their orders in early. The condition of the steel market as outlined editorially two weeks ago was by no means exaggerated, and the electric railway industry must take its place in the waiting line. Steel is being produced at a rate of approximately 40,000,000 tons annually and as long as the reign of the god of war continues it can be consumed at this rate, or at a greater rate if manufacturing facilities are increased under the temporary stimulus. The slogan "Order them now" is therefore an appropriate one.

ENGINEER APPOINTED TO NEW YORK COMMISSION

We are glad to record this week another excellent appointment by Governor Whitman to the New York Public Service Commission, First District, in the person of Henry W. Hodge. The complaint of several politicians on the appointment is added evidence of its suitability, and the new appointee's record as an engineer makes his selection one of the best things that could have happened to restore public confidence in the now discredited regulatory body in New York City. We are glad that Governor Whitman has recognized the demand that there should be representation on the Public Service Commission of the engineering profession because of the large number of engineering questions which naturally come before the commission for consideration. Mr. Hodge has been engineer for some of the largest bridges in the country and is a director of the American Society of Civil Engineers and a member of the council of the American Institute of Consulting Engineers. But it is not only because of Mr. Hodge's reputation as an engineer that we commend the appointment. His standing in the community and his success in other fields where careful judgment and executive ability are required are additional evidences of his fitness for the place. If, as has been said, he is a strong personal friend of the Governor, we can only repeat the wish expressed by Lincoln when told that Grant favored a particular brand of whiskey, and hope that he has many more friends of this character.

AUTOMOBILE COMPETITION NOT DISCOURAGING

Elsewhere in this issue we are fortunate in being able to publish a discussion by Ernest Gonzenbach upon the future influence of the automobile, which, it may be said, was written some months ago, not for publication, but for private circulation among the investors in the properties with which the author is associated. It was intended originally to bring about debate upon the problem which appears so portentous of ill fortune to many electric railway operators to-day, and it provides a most excellent basis for consideration of the wider aspects of the present situation. In brief, Mr. Gonzenbach's belief is that, though there may be new and untapped sources of revenue, especially for the interurban railways, the real opportunity for the industry in meeting automobile competition lies in the financing of operating-cost reductions whose possibilities have only become apparent since the present period of readjustment and refinement began. That there are many such chances for improving conditions cannot be doubted. Some will involve capital expenditures, as exemplified by the lightweight interurban cars, the one-man city cars and the automatic substations cited by the author, but on the other hand, such improvements as increased schedule speed and accident prevention may actually cost nothing for their introduction. For the industry as a whole, all of these and similar more or less definitely understood betterments are of the future. They are developments whose eventual commercialization cannot fail to relieve the situation at least in part, and if for no other reason than that the industry has something to look forward to, the outlook for the future cannot fail to be encouraging.

COMPETITION AS A STIMULANT

In the light of past experience one must admit that the automobile is certain to be gradually improved, even though the chances are greatly against the sudden arrival of any revolutionary change in its favor such as gasoline at 3 cents or 4 cents per gallon—a circumstance, by the way, which alone would not make the jitney really profitable. Since even gradual changes eventually become revolutionary in extent, it is quite conceivable that, if the electric railway stands still long enough, it might be driven out of business by some form of super-jitney, or seriously injured by some vast and at present incomprehensible increase in the use of private automobiles. Clearly enough, the electric railway industry cannot afford to stand still at all. It is now meeting competition, and whether this competition is going to centralize about the jitney or the private motor car is really immaterial in the final result. The obvious move

is to take advantage of those opportunities for reducing the cost of transportation that are presenting themselves, and there is no doubt that those electric railways which do so will, as Mr. Gonzenbach has so aptly put it in his article on another page, emerge soonest from the black clouds of to-day, from which they will have "grabbed the silver lining."

CAN THE JITNEY BE REVIVIFIED?

It is the practicability and definiteness of improvements for the immediate future of the electric railway industry that provides an answer to the somewhat alarming queries propounded by H. S. Cooper in his article of last week regarding the prospect of a revivified jitney.

It is obviously true, as this author points out, that the recently deceased jitney movement had everything against it; that its latent possibilities were submerged by improperly designed equipment as well as by a general insufficiency of knowledge and experience, and that, given the advantage of certain "favorable changes," the present receding wave might flow back with an added impetus that could even sweep away the very foundations of the electric railway industry. Granting this possibility, however, does not alter the fact that in the competition between the two forms of transportation the electric railway has already "sunk its putt," and the jitney, in whatever form it comes in future, has still to make its shot. Whether its chances for "holing out" are good or bad depends upon the individual viewpoint, but no one can say that it is certain eventually to make good. There is at least a chance for it to miss at its next trial, as it did in the past disastrous twelvemonth of operation.

On the other hand, we know definitely that the electric railway can be successful, and we know definitely that improvements can be made. For it to survive, miracles are by no means necessary. Of course, Mr. Cooper's list of "favorable changes" for the jitney bus are perfectly reasonable possibilities, including even a low-priced fuel, and the establishment of all of them as accomplished facts would, no doubt, wreck the electric railways. But for that matter, so would the commercial development of individual flying machines that permitted every one to fly instead of walk. This, as a matter of fact, is no more than equivalent to the threat of revolutionary change which the future holds over every form of activity, and yet the number of industries that actually have been thus wiped out is utterly insignificant, reciprocating steam engine construction and carriage building being the only recent ones that come off-hand to mind.

That the jitney or its equivalent will return some day in new form and with renewed vigor is, therefore, exceedingly unlikely. As a nation-wide movement the jitney is dead. Rattling its bones may bring some valuable lessons to the electric railways but can hardly be terrifying, and in this regard we cannot agree with Mr. Cooper even though we can heartily applaud his belief that the electric railway industry should keep its ear close to the ground.

THE RHODE ISLAND ARBITRATION AWARD

Probably the most striking point in the Rhode Island arbitration award, abstracted in last week's issue, is the limitation of the wage increase to blue uniformed men who have been in the company's service more than one year, and the grant of a 0.5 cent increase for second-year service and a 1.5 cent increase for third-year service, thus placing a premium on the continuance of service for three years. The arbitration board thus does well in regarding the first-year and second-year men as apprentices, and gives the more experienced men the higher wages. Naturally this finding has led to expressions of dissatisfaction among the younger men, but the newer employees have been decidedly helped by the fixing of a daily guarantee of six hours' work, with fourteen hours' outside time for extra men.

The granting of the increase on the basis of comparison with neighboring schedules is worthy of note, since the board stated emphatically that little light was thrown upon the wage question by the consideration of compensation in other occupations. In arbitration proceedings in Massachusetts it has long been a favorite method of the union representatives to present extended evidence in regard to the earnings of carpenters, bricklayers, masons and other craftsmen per hour or per day in order to prove that the earnings of platform men are low. Even city employees have been dragged into such proceedings. The present arbitration board, however, rightly considers such evidence of little value, and prefers to fix the scale by direct comparison. This is obviously a more just method. Just how far a board can properly go in assuming that operating conditions on one railway resemble those on another is, of course, a question open to debate, but on the whole it seems that the prevailing scales on neighboring systems having similar service problems may justly be considered in wage awards. It is interesting to observe that the present arbitration board, when judging the similarity of conditions on different properties, refused to countenance the technical objection that state lines intervened between such properties. In other words, the board felt that a likeness of conditions was a matter for proof based on other factors than mere geographical boundaries, and on the basis of the data submitted it considered that Massachusetts and Connecticut companies were near enough in the same general section and under sufficiently analogous conditions to permit fair and just comparisons to be drawn.

The difficulty of occupational comparison, or at least the lack of satisfactory comparative evidence presented by the employees in the present case, appears in part responsible for the decision to leave the wages of shop, power-plant and other miscellaneous employees unchanged. The deeper the board went into the evidence, the more difficult it became to compare the work of such men on the Rhode Island system with that of miscellaneous employees elsewhere. Owing to local conditions, and probably also to gradual development, the classifications of these employees differ materially in different companies, which is only another way of saying that their duties and capabilities vary widely. At

all events, the board found no reason to recommend an increase for any men in this class, from which it would seem that they must be reasonably well paid.

The broader question of the company's ability to withstand the increases granted is closely related to the onerous conditions imposed upon it in the way of taxation and assessment for city improvements and maintenance. Heavy burdens have been assumed by the road as a condition of the right to do business in Providence, and the case is simply another one where public co-operation is needed to put the company on the plane where it belongs as a successful business institution. If citizens and employees will do their part, the Rhode Island Company and others which are laboring under enormous handicaps will come out of the woods and be able to pay an attractive wage, and also render the service that skilled management and loyal support are glad to give in return for a reasonable reward to the investor.

PHYSICAL LIMITATIONS IMPEDE INTERURBAN GROWTH

Progress in interurban railway extensions and construction has not only practically ceased but existing roads are finding the problem of earning a fair return on their investment increasingly difficult. Gross receipts are not only not increasing with the development of the country, but in many individual cases they are actually decreasing. Greater economy in operation is hardly possible except at the expense of maintenance, and this would be merely "robbing Peter to pay Paul." What has brought about this condition? Competition? Yes, to some extent. Regulation? Only to a small degree. Mismanagement? No. Then what is the cause? We are strongly of the opinion that the present trouble is due principally to the erroneous idea on the part of the original builders of the roads as to their revenue-producing possibilities.

Most of the interurban roads were built, primarily, to handle passenger traffic. The frequency and reliability of the service established soon gleaned the territory of any prospect of adding greatly to the gross revenue from improvements in this direction. As passenger traffic stimulators, picnics and amusement parks have been tried, but most companies have found them to be unprofitable. To cap the climax, the automobile, in the past few years, has made irretrievable inroads into the possibilities for future development of passenger traffic. The question now is, where shall the interurban railways turn to obtain the additional revenue which they require?

As we view the situation, the interurban roads are in a rut and heroic measures are necessary to bring about an enduring remedy. While it is true that some regulatory measures have tended to impede natural growth, the question with most companies has been whether they dared to increase their passenger and freight rates to the maximum permitted by law. Many have done this, but renewals, automobile competition and laws requiring block signal protection and grade separations have more than offset the increased earnings thus obtained. Fields other than the passenger business now must be sought to recover this loss, and it appears that the best opportunity for rapid development is afforded by going into the general freight-handling business. To do this, franchise limitations must be overcome, physical restrictions must be removed and liberal freight-handling facilities and terminals will be required to obtain sufficient freight traffic to make it profitable.

Why the electric interurban lines have not considered themselves as undeveloped until they were fitted physically to meet the competitive freight service offered by steam roads is a question difficult to answer. Some may say that the experience with freight service on a small scale has shown that it is unprofitable. We are of the opinion that this is a mistaken conclusion.

The passenger traffic, on most interurban roads, has been sufficiently dense to show a small profit, but it should be evident, at least by this time, that it alone will not make the interurban electric railways prosper. Many isolated properties could be cited that have gone into the wholesale freight-handling business on a scale equal to that practised by steam roads and have found it profitable. If this policy is successful on roads without track connections to other electric interurban lines, how much more so would it be with networks of electric lines such as exist in certain parts of the country.

Interurban railway managers, as a rule, are close to the public they serve, and there does not appear to be the slightest doubt that they could obtain most of the intrastate freight, and where they have electric or steam road connections, considerable interstate freight as well, both in car loads and in less than carload shipments.

A network of interurban lines, through their associations, should work together as one system in the handling of through freight to insure the reliability and dispatch of the service. Belt lines around many cities will be necessary, tracks to industries will be required, and extensions to passing sidings must be made to care for freight traffic. The expense of these changes unquestionably will be considerable, but all of these things need not be done at once. The principal matter is to decide upon the direction of future improvement. The situation may seem clearer if we consider that the interurban road, as it stands to-day, is largely an undeveloped enterprise, and that for it to lie idle during the night hours when the passenger service is practically off the line is an economic waste.

Interurban electric railways, like every other successful business, should be prepared to sell every product that they can supply. There is not the slightest doubt that if the electric lines will prepare to handle freight of all kinds the business will be forthcoming and at rates which will make it profitable. But it cannot be obtained in considerable quantities without a sufficient degree of preparedness in the form of trackage especially installed to handle every class of freight that can be carried profitably and the elimination of physical errors which impede the operation of freight trains.

Safety First in Seattle

The Author Describes the Early Interest of the Seattle Company in Accident Prevention, the Organization of Safety Committees, the System of "Barn Bogies" and other Methods Which Have Materially Reduced the Accidents on the Railway

By GEORGE CARSON
President American Electric Railway Claims Association

WHILE the country has been progressing in various directions for many years, advance in accident prevention in an organized and systematic manner is comparatively new. So far as I know, the first work of this kind was undertaken by Stone & Webster in 1908, when the firm began a campaign of publicity in the daily press in all the cities where their properties were located, publishing cuts illustrating various types of accidents to pedestrians, vehicle drivers, etc. Soon after that time we held occasional meetings in Seattle of the officials of the company and trainmen at the various carhouses, but these meetings were few, and it was not until June 21, 1910, that we became active in organized preventive work.

On the evening of that date we held a safety meeting at Fremont carhouse of the trainmen, transportation officials and members of the claim department. There was an attendance of about 150 trainmen. The meeting lasted for more than two hours, the heads of the transportation, employment and claim departments making addresses, and the keynote in every instance was co-operation. Co-operation is still the watchword. Without such no part of the business in which we are engaged can be a complete success. Mr. Kempster, at that time superintendent of transportation, presided and opened the meeting with the following address, which was so pertinent to the work about to be undertaken and afterward followed, that I quote it in full:

"The subject of prevention of accidents is the one for which we have met to-night. We have met to talk about ways and means in preventing accidents. The money that this company pays out in settling accident claims and in taking care of the expense incident to every accident that occurs is something enormous, way beyond what a majority of you have any idea of. Not only is that true of this company, but it is equally true of every public utility corporation engaged in transporting passengers throughout the country.

"Money paid in that way is practically a dead loss. It is gone. No good can come from it. There is no possible means of getting it back. The question in this business is how much profit you can get out of that 5 cents that is paid by the passenger, and we are in this business for the profit that there is in it.

"No single individual can furnish the money necessary to equip and operate a company of the size of the transportation company here in Seattle. The company that can make the best record in accident claims or in the prevention of accidents is the company that has the best standing, as a rule, in the financial world.

"A side of the question that touches all of us more closely than the investment side is the question of safety, the question of being carried on these cars without injury, without danger of losing life or limb, and free from injuries of that character. That is what the public wants. That is what it demands. There is always a double loss. We lose the confidence that the public has a right to expect. If the people of the community feel that the cars upon which they are riding are not properly handled, that they are apt to be hurt, and if men feel that when their wives and children are being carried from one part of the city to another they are likely to suffer injury, they will have a very poor opinion of the company, of its methods, and incidentally of the men who handle the cars.

"We have had an experience in the past few years that has been anything but creditable. We want from now on to get closer together—each one of us—in the matter of prevention of accidents, and with that end in view the claim department, right from the chief of the department, Mr. Carson, all the way down, is going to take part with the transportation department in an effort to study out this question, and enlist the aid and support of you men in eliminating a great many of these dangerous and costly accidents. There is only one way in which that can be done, and that is through securing the hearty co-operation and support of every man in the department. It means just as much to you as to any one else connected with the company. You—all of you—would, I am sure, take pride in working for a concern whose record in that particular is good. There are many features in this city which make accidents more liable to occur than they do in other communities. It calls for just a little more care than it would if conditions were easier in the matter of operation.

"I want you to know this: that it is not the purpose of these meetings from now on to lecture or to find fault, or anything of that kind, but the whole purpose of these meetings is to educate, to train and to render such help as we can, singly or unitedly, to pull this thing up to a higher plane and to cut down and to cut out a great many of the accidents from which we now have to suffer."

J. M. Wilmot, who was at that time chief clerk in the claim department, submitted figures which were amazing, emphasizing the fact that 10 per cent of the gross railway receipts were being spent for accidents, so much money being absolutely thrown away. The accident situation and expense at that time was alarming. For the preceding month (May, 1910) the following was the condition:

There were 450 reported accidents.
Ten collisions between cars.
Seventy-one collisions with vehicles.
Eighteen collisions with pedestrians.
Ten collisions with animals.
Thirty-eight derailments.
Twelve accidents due to defective car or track.
Twenty-nine accidents due to persons boarding moving cars.
Sixty-nine accidents due to persons leaving moving cars.
Eighty-three accidents to persons while on cars (including where they fell in aisles, etc.).
Two persons fell from moving cars.
Sixteen persons fell near cars.
Ninety-two miscellaneous.

During that month there were eighty-five accident reports on which no witnesses were returned, or 18.8 per cent of the whole amount. The average witnesses per accident was but four, an exceedingly bad showing as compared with other companies. Great improvement has been brought about in this regard since that time.

Of the ten collisions between cars, six were with injuries and four without, the total cost of the ten accidents being $3,417.

Puget Sound Traction, Light & Power Company

SEATTLE DIVISION

SAFETY COMMITTEE ORGANIZATION

TO ALL EMPLOYES:

For two years the Company has had organized Safety Committees. The object being to bring about an organized effort to discover and remove causes of accidents. This is not a substitute for but an aid to those charged directly with such duties. The result has proved the wisdom of the plan and Safety Committees have become a fixture.

The organization of these Safety Committees consists of a Central and Division Safety Committees. The Division Safety Committees reporting to the Central.

The following diagram illustrates the organization

(DIVISION SAFETY COMMITTEES)

The Central Safety Committee is composed of the following officers of the Company:

CLAIM AGENT (Chairman)
ASSISTANT TO THE MANAGER
SUPERINTENDENT RAILWAY
SUPERINTENDENT LIGHT & POWER
CHIEF ENGINEER
LAW DEPARTMENT TRIAL ATTORNEYS
SUPERINTENDENT TRANSPORTATION
SUPERINTENDENT ROLLING STOCK AND SHOPS
OPERATING SUPERINTENDENT, LIGHT & POWER
SUPERINTENDENT WATER POWER
ROADMASTER
SUPERINTENDENT DIVISION NO. 1
SUPERINTENDENT DIVISION NO. 2

In order that the influence of the organization may be extended as far as possible and bring it to renewed and vigilant support, the personnel of the Division Safety Committees are changed each six months.

The plan of the organization consists not only in each and every member of the Central Safety Committee being on the lookout for anything that might cause accidents, but in impressing upon the Division Safety Committee, and through them upon every employee, the duty to be vigilant and faithful in observing and noticing those conditions by and through which accidents may be caused. When any employee observes any condition whereby an accident might be caused, he is urged to report the matter at once to the Division Safety Committee Chairman, whose duty it will be, thereafter, to notify immediately the chairman of the Central Safety Committee, who in turn will at once report the matter to the proper department. That every employee may know the result of a report, it is the policy of the Central Safety Committee to advise the employee who made the original report of the action taken.

It is the purpose of the Company to make this year the safest in its history, and this it can only do by the aid and vigilance of each and every employee of the Company in reporting any condition likely to produce an accident. The best and most satisfactory results can only be had by united action—by "team work."

Every employee is a member of the "Safety League."

Because a condition that is likely to produce an accident has not been produced by you or is not directly connected with your work is no reason why you should fail or hesitate to immediately advise the Division Safety Committee Chairman of it.

There are several thousand employees of the Company going over the various lines of railway and scattered throughout the various stations and properties of the Company, and if every one of these employees will keep in mind that it is the policy of the Company to have safety first and that it is the policy and intention of the Company to remove and change those conditions whereby accidents are liable to be caused, and if such employees will report at once, as herein suggested, those conditions, they will not only be serving the Company but they will be serving the public and providing themselves with safer places to work.

If the employees of the Company will also take the time and trouble to look into the history of the men now controlling the operation and management of the Company they will be surprised to learn how many have risen from the ranks. What has been accomplished in the past will also occur again in the future. Men will rise from the ranks to positions of importance. This can only come from making the Company's business your business, and when any employee observes and reports those conditions whereby accidents may be produced, to that extent he is showing an interest in his employer's interest and to that extent he is bringing himself in line for worthy promotion.

Let us make this year the safest year in the history of the Company.

PUGET SOUND TRACTION, LIGHT & POWER COMPANY,
SEATTLE DIVISION.

SAFETY IN SEATTLE—BULLETIN ANNOUNCING APPOINTMENT OF SAFETY COMMITTEE

The seventy-one collisions with vehicles cost $4,370.

Collisions with pedestrians cost more than $2,000.

Derailments during the month cost $1,157; accidents to persons leaving moving cars came to more than $5,000. The eighty-three accidents to persons while on cars, due to bad operation, cost the enormous total of $4,012.

Miscellaneous accidents cost $1,229.

The operating expenses of the claim department brought the total expense for the month to the enormous sum of $26,620, fully double our present average expense.

The Fremont meeting was a complete success. The men listened with the closest attention. Other similar meetings followed close thereafter, and this, coupled with publicity in the *Live Wire*, brought about almost an immediate reduction in the number and severity of accidents and in the accident expense. We have continued the carhouse meetings regularly ever since.

In August, 1912, a sub-committee of the central safety committee was appointed to take up the matter of carhouse meetings and subjects, in this way making the work most systematic and efficient. This committee is still serving.

CLAIM EXPENSES AND COMPARISON OF ACCIDENTS IN SEATTLE SINCE SAFETY COMMITTEE ORGANIZATION WAS EFFECTED IN JANUARY, 1912

Claim expense, 1911, $216,999.84..Per cent of gross earnings, 6.16
Claim expense, 1912, 226,668.20..Per cent of gross earnings, 6.50
Claim expense, 1913, 188,805.46..Per cent of gross earnings, 5.15
Claim expense, 1914, 177,955.59..Per cent of gross earnings, 4.86

Comparison of Accidents

	1911	1912	1913	1914
Derailments	25	9	8	6
Collision between cars	22	15	15	21
Collision with vehicles	363	424	539	515
Collision with pedestrians	176	149	136	116
Boarding moving cars	114	32	55	39
Leaving moving cars	209	125	110	106
Boarding and leaving still cars	172	150	172	184
Accidents to persons on cars	356	351	384	427
Defective car or track	79	21	55	28
Totals	1,516	1,276	1,474	1,442

LECTURES TO SCHOOL CHILDREN AND THEIR RESULTS

In the fall of 1910 we started safety lectures in the public and private schools, women's and other clubs, universities, business colleges, etc., employing for that purpose F. S. Hughes, who had lectured to the school children of Portland some months previous with splendid success. In connection with the school lectures we distributed 100,000 safety lapel buttons to the children of the schools, and followed that by placing nicely framed cards of "Street Car Don'ts" in all the schools throughout the city, both public and private, with warnings against accidents printed thereon.

There were in the city of Seattle at that time some 900 school rooms, more than 30,000 pupils and approximately 1000 teachers. This has reference only to the public schools. There were a number of private schools, in which there were employed approximately fifty teachers, with 1500 pupils. Two talks were given to all the pupils, both public and private, between Sept. 10, 1910, and April 15, 1911, reaching approximately 45,000 children, and undoubtedly, through the discussions and

THE SEATTLE ELECTRIC CO.

SEATTLE, WASH., January 2nd, 1912.

TO ALL EMPLOYEES

Accidents cost the Company money, and the public loss and pain and suffering. Our duty both to the public and to the Company is to be vigilant in discovering and removing causes of accidents. While the present shows gratifying improvement over the past in the discovery and removal of causes of accidents and the lessening of the expense on account thereof, still by increased vigilance much further improvement can be made along the line of preventing accidents, and for that reason it has been decided by our Company to organize what are to be known as Safety Committees, the organization to consist of two kinds of committees; one which has already been organized is known as the Central Safety Committee.

The Central Safety Committee is composed of the following:

MR. GEORGE CARSON, General Claim Agent, Chairman
MR. A. L. KEMPSTER, Superintendent of Railways.
MR. O. A. RICHARDSON, Superintendent of Transportation.
MR. A. D. CAMPBELL, Superintendent of Rolling Stock and Shops.
MR. W. S. SALLEE, Superintendent of Ways and Structures.
MR. G. E. QUINAN, Operating Superintendent, Light and Power Department.
MR. G. B. HARRINGTON, Superintendent of Mines.
MR. D. W. HENDERSON, Superintendent of Division No. 1.
MR. J. D. NICE, Superintendent of Division No. 2.

The other committees it is proposed to organize are to be known as Division Safety Committees, it being intended to organize a Division Safety Committee at all six Barns, the organization to be started at first at the North Seattle Barn. It has been decided that this Division Safety Committee shall be composed as follows:

Station Master as Chairman.
1 man from the Sub-Station.
1 man from the Trolley Line Department, and
1 man from the Mechanical Department.
8 Trainmen, making

A Total of 12 men.

The personnel of this Division Safety Committee will be announced at once and notice sent to the members, the selection having already been made.

The duties of the members of the Division Safety Committee shall be as follows: To keep a continual lookout for anything that might cause or tend to cause accidents, and, having discovered same, to report it promptly on blanks that will be furnished, to the Chairman of the Division Safety Committee, whose duty it will be to forward such reports promptly to the Chairman of the Central Safety Committee, by whom they shall be at once forwarded to the head of the department concerned, for action. When the matter reported has been acted upon, notice of action taken will be sent to the Chairman of the Division Safety Committee, who shall advise the member who made the original report of the action taken.

The idea, as most of our men no doubt know, of men in the ranks reporting defects and causes of accidents is not a new one. It has been done in the past continually and great benefit has been derived therefrom. The organization of these committees is for the purpose of providing a channel through which not only members of the committees but all other employes can present, in a proper and orderly manner, suggestions and recommendations for greater safety and improvement in conditions and methods. The Management has always not only invited suggestions, but has solicited them, and is thereby afforded the benefit of ideas and observations of the men who actually do the work in the ranks.

This, it is felt, will bring the officers of the Company and the men closer together, something always very desirable.

The following are suggestions of matters to be reported by members of the Division Safety Committee: Defective cars, defective track, defective tools or machinery, defective platforms and landings, defective bridges and trestles, defective buildings, overhead defects, obstructions near the track where a passenger is liable to be hit, and all other matters that might tend to cause accidents. Of course, emergency matters, and defects requiring immediate attention, will continue to be reported as heretofore.

One of the most important duties that members of the Committee will be called upon to do is to watch the work of new men entering the service, or comparatively new men, and when such men are disposed to be negligent in operation, due to excessive speed or failure to slow down as required by rules when passing cars, or rough handling of cars either in stopping or starting, or other matters of similar nature, either through ignorance of the rules or other cause, it will be the duty of men on the Committee to go to them in a friendly way and tell them about matters in connection with operation in which they are not proficient and matters about which they might be careless. Of course, if the man spoken to did not respond to the advice given him, it would become necessary to report the matter to the proper authority, and if a man should continue to be careless after sufficient warning had been given, it would become necessary to remove him from the service, as none of the men can afford to have a careless man among them.

It has been decided that the time of service on Division Committees shall be six months, thus giving opportunity to a large number of the men to serve within a year or two.

It is the belief of the Company that the men appointed on these committees will, in he future, largely recruit the vacancies occurring in higher positions, and also that service on these committees will tend to develop men to fill higher positions.

It is intended that the Division Committees shall meet at least once each month, the Company paying them for the time consumed in attendance at the meetings, and also that meetings shall be held between the Division Committees and the Central Committee at times to be decided upon, for the purpose of discussing matters of interest in the prevention of accidents.

It is also believed that this organization, in the bringing together of the officers and employees of the Company, in this intimate way, will result in more friendly and closer relations between them; that conditions will improve and accidents will be greatly reduced, and that we shall secure what everybody desires, viz., greater safety and less accident expense.

THE SEATTLE ELECTRIC COMPANY.

SAFETY IN SEATTLE—BULLETIN DESCRIBING WORK ACCOMPLISHED BY SAFETY COMMITTEE AFTER TWO YEARS OF SERVICE

communications that of necessity would occur in their homes following the talks and lectures, almost every person in the city. With a view of determining accurately the probable effect of these talks along the line of safety, I made a comparison of the records in my office from Sept. 1, 1910, to May 1, 1911, with the year preceding July 1, 1910. In another communication bearing upon this same subject, and covering the accidents to boys and girls where the boys and girls were not without fault, between July 1, 1909, and July 1, 1910, I compiled the following summary:

Between July 1, 1909, and July 1, 1910, the confidential reports of my office showed 157 accidents in which boys and girls were involved and in which the girls and boys were not without fault. In these, thirty-six girls were involved and 121 boys. This indicates a greater carelessness and indifference to danger on the part of the boys. A further classification of these accidents showed that forty-nine children were injured by being struck by a car, twenty-three were hurt in jumping on or off moving cars, thirteen occurred in getting off standing cars, seven on account of collisions with little wagons or bicycles, twelve by being hit by teams or some other vehicle while alighting from a car, two falling down while running beside a car, fifty-one miscellaneous. As will be seen, there were 157 accidents in twelve months, approximately thirteen a month.

The confidential reports of my office also showed from Sept. 1, 1910, to May 1, 1911, a period of eight months, thirty-three accidents in which boys and girls were not without fault, being accidents of similar character to those occurring in the summary of the year prior to July 1, 1910. In other words, the accidents of that character averaged, beginning with the school year of 1910, when the lectures were begun, to the spring of 1911, approximately four a month, or nine less per month than had occurred during the previous period. While probably the lectures in the public schools cannot claim the credit for all of this reduction, as improvements had been made in other and various lines, I cannot but feel that they constituted a controlling factor in reducing the number of accidents. They are a type of accidents generally in which the defense of contributory negligence cannot be ordinarily sustained, and where there is any negligence on the part of the company a liability exists.

We are still giving the school lectures with continued gratifying results.

In addition to school lectures the safety inspector, J. F. Cooper, takes up with the police department, automobile association and owners of vehicles the matter of carelessness on the part of drivers. He also calls on parents of children found reckless in the streets.

THE SEATTLE ELECTRIC COMPANY
LAW DEPARTMENT—CLAIMS DEPARTMENT
SEATTLE

Gentlemen:

The purpose of sending you this letter is to ask your earnest co-operation in the avoidance of collisions between your vehicles and the street cars. I am sure neither desires such accidents, which at times result not only in serious injury to the animals and vehicles, but result in painful and fatal injuries to the drivers and to the employees and passengers in the cars. There should be no enmity between your employees and our employees; both should earnestly endeavor to avoid injury to the other.

In the past year especially, my investigators and myself have regularly and frequently conducted meetings in the various street car barns, whereby those in charge of the cars have been cautioned and instructed in the avoidance of collisions, and I assure you that this instruction and caution will be continued. A word of caution from you to your employees may save a serious accident. Will you not give it?

Street cars weigh many tons and are operated upon fixed tracks. It is impossible for them to turn out or to make an immediate stop. In crossing street car tracks or in turning on to the tracks, will you not urge your employees to look and listen and not attempt to drive on or across the track near an approaching car?

Might you not suggest, also, to your employees that after night, especially where it is dark and the vehicle not readily seen and where there is no reasonable necessity for driving on the street car tracks, that they drive to the side of the tracks and avoid the possibility of a collision? At a very small expense many of the collisions after night between the street cars and the wagons could be avoided if the wagon would display red lights, similar to those on autos, and thus enable the operator of the car to discover in time the presence of the vehicle.

Mutual co-operation between us to avoid collisions, I am sure, will be beneficial to both. Let us co-operate.

I am illustrating common types of collisions between street cars and vehicles by posters, which I trust may help to enforce the ideas herein expressed.

Accidents are expensive to both, and I assure you on behalf of the company I represent that every effort to avoid them will continue to be made.

Very truly,
GEORGE CARSON,
General Claim Agent.

SAFETY IN SEATTLE—CIRCULAR LETTER TO VEHICLE OWNERS

Puget Sound Traction, Light & Power Company
SEATTLE DIVISION

HEADQUARTERS OF CENTRAL SAFETY COMMITTEE
ROOM 203, ELECTRIC BUILDING

SAFETY BULLETIN No. 2

SEATTLE, WASH., January 2nd, 1913

One year ago we issued our first Safety Bulletin announcing safety committee organization. IT MARKED A NEW DEVELOPMENT IN ACCIDENT PREVENTION.

The organization of safety committees is based on the idea that our FIRST duty is to reduce accidents to the SMALLEST POSSIBLE MINIMUM. The plan systematizes the efforts of ALL EMPLOYEES. We have been more then gratified by the work of the past year and we desire to express our appreciation for the splendid work of the division committees. We believe we will obtain GREATER RESULTS during the coming year.

The present Central Safety Committee is composed of the following:

Geo. Carson, Claim Agent, Chairman.
A. L. Kempster, General Superintendent.
G. B. Harrington, Assistant General Superintendent.
G. A. Richardson, Superintendent of Railway.
G. P. James, Chief Engineer.
O. W. Henderson, Superintendent of Transportation.
A. D. Campbell, Superintendent of Rolling Stock & Shops.
G. E. Quinan, Operating Superintendent, Light & Power Departments.
W. S. Sallee, Superintendent of Ways & Structures.
W. A. Burrell, Superintendent of Division No. 1.
J. D. Nice, Superintendent of Division No. 2.

Every Employee is a Member of the "Safety League"

TAKE NOTICE!

Keep a lookout for defective cars.
Keep a lookout for defective tracks.
Keep a lookout for defective tools or machinery.
Keep a lookout for defective landings.
Keep a lookout for ANYTHING THAT MIGHT CAUSE ACCIDENTS
Report promptly to the Chairman of the Central Safety Committee.
REMEMBER ETERNAL VIGILANCE IS THE PRICE OF SAFETY

Watch the work of new men. Speak kindly to them about matters in which they appear negligent. If they do not respond to kindly advice, report the matter. You will be advised of whatever action is taken upon any matter reported by you.

IT IS THE POLICY OF THE COMPANY TO PROMOTE ONLY MEN WHO SHOW INTEREST AND EFFICIENCY

GEO. CARSON, Chairman.

SAFETY IN SEATTLE—SAFETY BULLETIN NO. 2

Efforts with Vehicle Drivers Successful

In the spring of 1911 we sent a circular letter to all vehicle owners throughout the city, asking their co-operation in the prevention of accidents. A copy of this circular letter is given herewith.

We also placed in the barns and garages throughout the city cards illustrating various types of vehicular accidents with words of warning against accidents printed thereon. These cards were patterned from the cuts which were used by Stone & Webster in newspapers in 1908.

About the same time we distributed in offices and stores thoughout the city 100,000 desk blotters with words of warning against accidents printed thereon and also mailed a large number with bills to the company's customers, and we placed large safety pennants in the trainmen's quarters, company's shops, carhouses and other buildings.

Organization of Safety Committee

In January, 1912, we organized safety committees. The safety committee idea originated with Ralph

Puget Sound Traction, Light and Power Company
SEATTLE DIVISION

HEADQUARTERS OF CENTRAL SAFETY COMMITTEE
ROOM 203 ELECTRIC BUILDING

Seattle, January 2, 1914
Annual Safety Bulletin No. 3

SAFETY FIRST

1914—BANNER YEAR—1914

The Puget Sound Traction, Light & Power Company proposes to make 1914 the safest year in its history. This can be done only with your aid and watchfulness.

Watch! Watch! Watch!

Whenever you see *anything that might cause an accident,* report at once to chairman of your division Safety Committee

DON'T DELAY

Make the Company's business *your* business. Interest shown brings promotion.

Remember: Eternal Vigilance is the Price of Safety

The present Safety Committee of this Division is composed of the following:

SAFETY IN SEATTLE—SAFETY BULLETIN NO. 3

R. Richards, general claim agent of the Chicago & Northwestern Railroad. We in Seattle are the originators of safety committee organization as applied to electric roads. Our plan of organization was taken up by a small number of electric roads immediately after our organization, on lines similar to ours, and gradually other companies have been organizing them. I believe that nine-tenths of all the large electric companies now have safety committee organizations, which, in my opinion, are the most effective accident preventive agency known at this time. The benefit that comes from safety committee organization is due to the fact that it creates an official channel by which not only members of the committees but all other employees can present in a proper and orderly manner suggestions and recommendations for improvement in conditions and methods. This plan affords the management the benefit of ideas and observations of the men who actually do the work in the ranks. The organization arouses interest and enthusiasm in accident prevention that cannot be brought about, in my opinion, by ordinary methods. In addition, the organization brings the officials and employees of the company closer together—something which, for the mutual good feeling that it creates, is always very desirable.

"BARN BOGIE" SYSTEM

Following close on the safety committees, we adopted the "barn bogie" system. These bogies, I am satisfied, result very beneficially as they create a friendly rivalry which brings about increased exertion to avoid accidents. (An account of this system was published in the issue of the ELECTRIC RAILWAY JOURNAL for Feb. 1, 1913.)

Briefly the plan consists of a friendly, competitive scheme among the trainmen of the several carhouses of the company, wherein each carhouse not only attempts to make the best showing as to the number of accidents for a given time but, in addition, endeavors to beat its own previous record. The electric carhouses compete with each other distinctly from the cable houses. The bogie allowance is made monthly and is a certain number of accidents allowed each carhouse based upon the past showing of the carhouse, number of cars operating therefrom, car mileage, topographical conditions, etc. This allowance is displayed upon the bogie chart, divided by the month on a daily scale which is posted in each carhouse.

The progress as to the number of accidents is posted daily in each carhouse from figures made up from the claim department so that the trainmen can at once see the number of accidents in which their carhouse has been involved to date and also the number of accidents the other carhouses have had and their relative standing. At the end of each month the percentages are computed, and the score is then published in the journal issued by the company, with such comments as may be deemed pertinent.

Cumulative bogies are figures made up upon the same theory for succeeding months. At the end of the first six months the scores of the several carhouses for such time are published and again at the end of the year, and the carhouse which has made the best showing for the year is, of course, proclaimed champion for that time. But the fact that such carhouse has made the best showing among the carhouses is of itself not the only goal, for it must be remembered that in addition to having made the best showing among the carhouses, the carhouse, in order to have accomplished the purpose of the bogie, must have improved its own record for the previous year.

The "barn bogie" system has proved to be very successful from every viewpoint. The company has found the trainmen to be very much interested in it. In addition, the scheme has stimulated them to better effort on their part in endeavoring to reduce the number of accidents by more careful operation, etc. As in any competitive game, the scores are watched by the trainmen with much interest, and it has engendered a friendly rivalry among them as to which carhouse will carry off

Puget Sound Traction, Light and Power Company
SEATTLE DIVISION
HEADQUARTERS OF CENTRAL SAFETY COMMITTEE
ROOM 203 ELECTRIC BUILDING

SEATTLE, JANUARY 1, 1915
Annual Safety Bulletin No. 4

What Safety Rests On

SAFETY
Central Safety Committee
Division Safety Committees
THE MAN ON THE JOB

Safety
Always
First.
Eternal Vigilance
The Price—
Yesterday, Today and Tomorrow.

First, because it is Humane, and—
Indispensible to the protection of your own and the Company's interests; and it
Rests with "The Man On the Job" to make it a
Success.
Take a hand as a "Committee of One" and

When you—"The Man On the Job"—see anything that might cause an accident, report it AT ONCE to the chairman of your Division Safety Committee.
While you have made 1914 THE BANNER YEAR so far, with continued co-operation, YOU CAN MAKE 1915 SHOW A BETTER RECORD.
The present Safety Committee of this Division is composed of the following:

SAFETY IN SEATTLE—SAFETY BULLETIN NO. 4

final honors, all to the common and commendable end of materially reducing accidents.

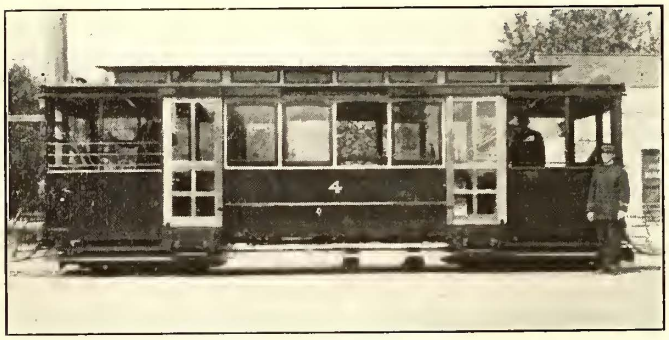
OTHER SAFETY METHODS

In the summer of 1912 the transportation department adopted the near-side stop. It is generally believed by all companies that this stop prevents a number of collisions.

In the summer of 1909 the mechanical department began the equipping of cars on the prepayment system with gates, completing this work on all cars on the system (except cable cars) in the fall of 1912. Folding or sliding gates on both ends of cars undoubtedly decrease step accidents, more particularly after trainmen have become accustomed to their use. Apart from defective steps and landings, gates should eliminate all liability step accidents and will do so if the gates are handled by trainmen according to rules.

A short time ago our management decided to convert the cable cars to the prepayment system with gates. Some of the cable cars are now so equipped, and I feel quite certain that this change will bring about a large reduction in step accidents on cable cars, a cause of accident from which we have suffered very much in the past, many times through no fault of trainmen in handling the cars.

In the spring of 1913 we sent a "follow-up" circular letter to vehicle owners, urging their co-operation in the avoidance of accidents, and at the same time we posted other more elaborate posters illustrating vehicular accidents in the carhouses and garages throughout the city.



SAFETY IN SEATTLE—CABLE CAR REBUILT FOR PREPAYMENT SERVICE

In September, 1913, we organized our safety committee, adding thereto three divisions of the light and power department and added to the central safety committee our two trial attorneys.

In the winter of 1913, we introduced stereopticon views in connection with carhouse meetings, the views being displayed by Mr. Upton, safety lecturer.

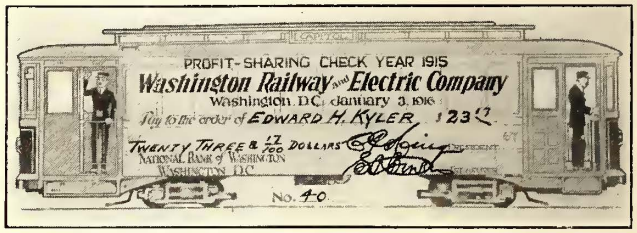
In May, 1914, we printed and distributed among the school children 50,000 safety guide pamphlets for children, with appropriate words of warning against accidents. In accident prevention, two factors are concerned—the employee and the public. I believe that the education of employees constitutes the backbone of all safety work.

The topography of Seattle is unfavorable to safe operation. Its many hills call for the most rigid inspection to detect defects so that the remedy may be applied before the accident occurs. A defect in equipment on level track might not occasion any damage whatever, while the same defect on a steep grade might cause the most disastrous kind of an accident. In this regard our safety committees are continually rendering valuable aid in reporting promptly defects and dangerous conditions wherever found.

Washington Employees Receive Bonus

Distribution of $15,527 Under Profit-Sharing Plan Inaugurated by the Washington Railway & Electric Company Four Years Ago

FOLLOWING the fifteenth annual Christmas entertainment given at the company's expense for the children of employees, the management of the Washington Railway & Electric Company, Washington, D. C., announced that 790 employees of the transportation department will receive specially designed checks with face value aggregating $15,527, representing the sum to be disbursed under the profit-sharing plan inaugurated by President Clarence P. King four years ago. The



SPECIALLY-DESIGNED PROFIT-SHARING CHECK

profit-sharing plan was conceived with a desire that the employees, classified as platform men should share in whatever improvement could be made in the year's results over the preceding year. During the past four years the amount divided has been based on the year 1911, when 26 per cent of the earnings (after deduction of 4 per cent District of Columbia tax) was expended for accidents and trainmen's wages. This year a slight modification in the plan was made so that men not receiving demerits during the year will receive a larger amount than those who have received demerits for infraction of rules. The transportation men eligible to participate in the fund are those who have been in the service a longer period than thirty days. The amount of the check for 1915 to all men in the service of the company for a period of one year or longer term, and who have not received demerits, is $23.17; to those in service eleven months $20.15, and a proportionate amount to all others according to the length of time employed.

Japanese Railway Projects

According to *Eastern Engineering*, the final plans for the construction of a government railway line from Tokyo to Koté, cutting off the haul over the Hakone Mountains by boring a tunnel through the mountains, were adopted during 1914. It is intended to use electric power for hauling through the tunnel. The year 1914 witnessed the completion of the long expected electric line between Yokohama and Tokyo. Unfortunately, the engineer having the work in charge decided to alter the plans submitted by the foreign experts called into consultation, hoping to effect a saving in the cost of the line. The overhead contact wire for carrying the current was in the original plan to have been welded to the supporting carriers. The plans adopted provided for the support of the wire by means of a hook which was not closed. As a result, when the line was opened, the passage of a train would elevate the wires so that they slipped off the hooks. The consequent confusion tied up the line for more than four months. The line is now in operation and is proving very successful.

The Electric Railway and the Automobile

The Author Considers Competition from the Private Automobile a Serious Problem of the Future —He Recommends Greater Attention to the Freight Business, Systematic Traffic Development, Rearrangement of Schedules and Possible Auxiliary Bus Service as Remedies

By ERNEST GONZENBACH
General Manager Empire United Railways, Syracuse, N. Y.

THE electric railway situation at this time is so extraordinary that an analysis is worthy of deepest thought, and a way out of existing conditions must be sought and found. Indeed, it has even been charged that the industry is in danger of being crowded aside by the very circumstances which caused it to spring into existence, although the facts here presented do not justify that view.

The electric railway is really an expression of the good roads movement which began long before that movement had assumed definite shape, but which was, nevertheless, a distinct development of that thought. When it was desired to haul in a horse-drawn coach more people than could be hauled by two horses on the roads then prevailing, someone laid a pair of rails in the street. The object was to provide a smooth highway. Horse cars prospered because the investment was small and the operating expenses were within reason. Then came the era of electrification, when enormous sums of money were spent in providing heavy track and larger rolling stock, and the railways were extended out into the country. In the meantime, charges due to the enormous investment multiplied, the wages of men operating the cars increased enormously and, with the increase in weight of cars, the maintenance of the roadway and the power required to move cars kept on growing. The unit of compensation, however, remained persistently the same, and electric railways eventually reached the crisis which now confronts the entire industry. This is a crisis which is based almost entirely on the fact that the return to the railways has not kept pace with the increasing expenses, and that the railways have never at any time in their history had enough net earnings to be able to write off any portion of their capital charges, although, in fact, such capital has been continuously subject to diminution by wear and tear as well as by obsolescence.

To-day the conduct and management of the industry has largely been taken out of the hands of the owners. Legislative bodies of all descriptions prescribe how the road shall be operated, and they prescribe operations which are admittedly unprofitable. City councils impose regulations and, from horse car days, the industry has inherited the burden of street paving. Public service commissions demand service and requirements beyond the power of the investments to bear. The labor unions have taken their toll, and at the present time it is quite impossible to manage an electric railway on an efficient basis such as would be approved in the management of any other form of business.

In addition to these burdens there has now been developed, in the shape of the automobile, a form of competitive transportation for which a roadway is being furnished free of charge by the taxpayers and by which is provided for the individual a means of conveyance far more serviceable than that provided by any other form of vehicle. The automobile owner makes his own schedule speed and his own schedule. It is admitted that the operation of automobiles costs more per car-mile and more per passenger than the operation of an electric car, but the extra cost of such operation seems to be willingly assumed, and it would seem that the owner is justified in the assumption of the cost because of the greater convenience to himself and the greater efficiency in time and service. Attempts to carry passengers by means of automobiles for 5 cents are bound to be failures, and the so-called "jitney menace" is only a temporary danger. No automobile at present prices and operating costs can compete with electric railways in carrying passengers in public service.

The real competition is the privately owned automobile, and we must assume that the privately owned automobile will continue to increase in numbers. More and better brick, concrete and asphalt roads are being constructed, and the price of automobiles continues to decrease—factors which inevitably spell "more automobiles." Neither can it be assumed that the cost of maintaining an automobile will discourage the man of moderate means from purchasing another one when his first machine has worn out. Almost invariably a purchaser who has purchased a cheap machine for his first attempt will purchase a more expensive one after the first one has worn out. There may be a very few exceptions to the case, but the rule has been amply proved.

Although the jitney owner has been living on his property, or, in street parlance, has been "eating his car," he has not been a greater sinner than the electric railway industry itself, for in very few cases have the railways made provision for renewals and replacements of depreciation and obsolescence. The electric railways have been living on their property and have been "eating" their cars quite as much as have the jitney owners, and that they have not come to grief earlier is because more capital is tied up in the railway industry and, therefore, there have been more "eats." Money which should have been available to keep intact the capital account has been spent in giving unprofitable service, street paving and similar expenses, such funds rarely being used for dividend purposes. In fact, the industry has arrived at the beginning of a distinct epoch of its existence, and plans for the future will need to be carefully weighed.

Possibilities of the Future

In the future the industry must concern itself principally with meeting competition by privately owned cars which, it must be assumed, will continue to increase. It is quite inconceivable that the electric railway industry will entirely succumb and be crowded out. The investment in immovable objects and intangible assets is the greatest portion of an electric railway's capital, and in some way or other the owners of the property will have to continue to live with it, no matter what competition or conditions may face them.

But it is quite possible that in the future electric railway schedules may have to be handled in exactly the reverse condition from that now obtaining, i.e., schedules in the winter time may have to be increased and they may have to be decreased for the summer season. This is because the privately owned auto is most active

as well as most attractive in the summer time, and because most private owners are more than willing to put up their cars during the cold weather period. That, however, will not solve the problem of existence of electric railways.

The matter of utilizing the rails of electric roads for the handling of freight is a possibility, but it is one which is full of pitfalls. The successful handling of freight involves interchange of equipment with steam roads and the making of joint tariffs. It has been almost impossible to meet this situation so far, and even if steam railroads are willing to make joint tariffs and to interchange equipment, the handling of freight on electric lines will require a very large additional investment for side tracks, yards, etc. Very few electric roads to-day have side-track facilities, and practically none have yards for adequate freight handling on a considerable scale. There is admittedly some revenue to be obtained from the freight business, but at the present moment such revenue is that which can be obtained mostly from package freight, and no very large revenues can be made available for electric railways unless additional investments are made for the purpose of providing freight facilities.

It is possible to handle the auto competition which threatens the industry in such a way that it will become an aid to both passenger and freight service, but it is a new field which has not yet been exploited and which is full of dangers. For instance, it would be possible to provide covered platforms at terminal and way stations, where passengers could be transferred from electric cars to an auto-bus, and the local distribution of the passengers would be handled by auto-bus for the price of an additional fare. Collection of passengers would similarly be made and transferred to the electric cars. Package freight collections and deliveries might be similarly handled. In a large measure this might prove an aid to the electric railway, but the aid would necessarily have to be self-supporting, if not actually profitable.

More important than this, however, is the fact that the electric railway industry has never made a systematic effort to sell its merchandise in the same way that electric light companies, gas companies and merchandising establishments generally have been selling their wares. Efforts heretofore have been directed towards procuring excursion business. Summer parks have principally been provided at an enormous expense to the company which have not been self-supporting and which have proved a detriment. Good salesmanship of the electric railways' stock in trade does not permit existence of such artificial stimulants and "traffic cocktails," but should look rather toward the securing of permanent business, as this is the kind of patronage that uses the cars every day of the year. It is possible, for instance, for the electric railway to take an interest in the present "back to the land" agitation by facilitating as much as possible the settlement of city workers in the country along the lines of electric railways where frequent service to and from the city may be had. The facilitating of such a movement does not have to be an expense to the railways, but can be carried on as an independent transaction which should not only be self-supporting but should actually be profitable. The work, however, involves a promoting ability of extraordinary degree, and it requires provision of ample electric railway service as well as a dependable supply of electric power service for twenty-four hours per day. In addition, there must be suitable sites for acreage plots and small homes, and there must be a systematic and sustained effort to stimulate interest in country life. Such development has been automatic along many lines of old established suburban and interurban railways, and it is to be noticed that such lines are least affected by the present revenue depression.

It is always possible to seek help from our old friend "cutting operating expenses"—poor, overworked old friend! Many of us old-timers have been "cutting operating expenses" for a quarter of a century and we are still doing it. Some day some old white-haired electric railway veteran will write a book entitled "Operating Expenses I Have Cut," and beyond the shadow of a doubt it will be worth reading. What heartaches, what intrigues, what profanity have grown out of the three words! Yet they cannot be dodged, and operating expenses must be reduced and are being reduced to the lowest level that has ever been reached in the history of our industry.

Reference to the matter is warranted not so much by the fact as by the method of accomplishing the object. Probably there does not exist a well-managed property which could not be turned over to some fiend on operating expenses with resulting great glee to the said fiend, temporary glory to himself and a fleeting happy hour to the stockholders. Cutting operating expenses is one of the easiest and simplest things we have to do, but cutting them wisely is quite another matter. And, just at this time, with incomes reduced in all directions, the temptations to overdo are almost irresistible. But cheese-paring of petty expenditures is not management, nor is the sudden cessation of all disbursements warranted even in the present hour of trial. Substantial reductions in operating costs usually carry with them capital expenditures, and just now that is the Senegambian in the wood pile. Light-weight interurban cars, one-man city cars, automatic substation operation, all these will be large factors in the rehabilitation of our balance sheets, but all call for new capital. We can sum up the situation by stating as an axiom the fact that the electric railways which can and will finance the severe reductions in operating costs will soonest emerge from out of the black clouds—they will have grabbed the silver lining.

In the end, the electric railway industry is not to be crowded aside, it is not on the decline, it is not going to be permanently superseded by any other form of transportation. But it is going through a period of trial, readjustment and refinement, and, to the man with foresight and backbone, the present is a time of opportunity.

New Method for Producing Pure Iron

It has been recently announced by the University of Illinois that a new method of producing pure iron, whereby a great saving can be effected in the electrical industries of the country, has been discovered by Trygve Yensen of the experimental bureau of the university. The new method consists in melting electrolytically-refined iron in a vacuum, and this reduces the impurities to a point far below that which has been reached by previous investigators. The magnetic properties of this vacuum-fused iron have proved to be as remarkable as its purity, its maximum permeability being reported to be about 20,000, or about seven times that of the sheet metal commonly used for transformer cores. The practical result of this investigation is obviously that the amount of iron required for the magnetic path in electrical machinery of all kinds can be reduced very materially and the magnetic losses may be largely decreased. It is said that the University of Illinois has declined to permit a patent to be taken out on the process, as it is believed that the benefits from it should accrue to industry as a whole.

Fare Collection Revolutionized at Boston

On the Elevated and Subway Lines Tickets Have Been Abolished in Favor of Straight Cash; on the Surface Lines, Fare Box and Register Work Automatically in Unison— Motor-Driven Coin Registers Are Used in Both Services to Effect the Improvements Described

IN an address made at the San Francisco convention of the American Electric Railway Association in October, 1915, M. C. Brush, vice-president of the Boston Elevated Railway, set forth the advantages that would follow the displacement of ticket delivery and deposit at elevated and subway stations by a straight cash, fare-box system. The chief advantages foreseen by Mr. Brush may be summarized as follows:

Traffic at the stations would be accelerated because passengers would not have to stop to buy tickets. They would proceed directly to the car platforms, only a small fraction being obliged to stop for change.

Since passengers would be much more likely to have the proper fare, a given number of ticket sellers could be replaced by a smaller number of change makers.

Short-change disputes with passengers would be greatly reduced because they would go to the change-maker only for an exact exchange; not for a transaction involving subtraction and the counting of tickets.

Accounting disputes with the station cashiers also would be reduced because the change-maker simply would have to turn in exactly as much money as she received on beginning work. On the other hand, with the use of tickets, errors may arise from the duplication or skipping of serial numbers on the ticket reels. In this event, an honest ticket seller would get into trouble for turning in "overs."

Aside from these differences, the abolition of tickets would prevent collusion between the ticket sellers and the ticket choppers and would make it impossible for the ticket sellers to substitute transfers for cash fares.

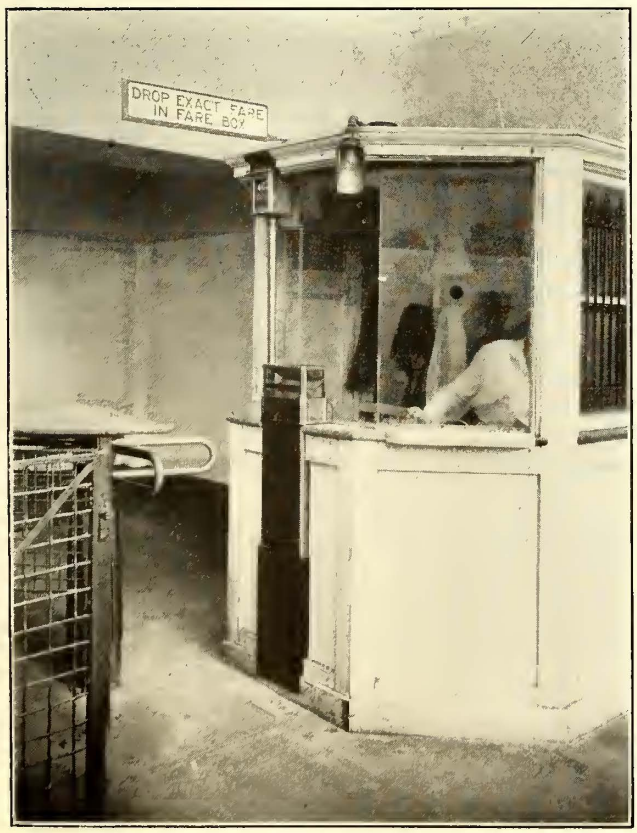
The palming of tickets by dishonest passengers would be eliminated. Losses from the palming of money would be trifling, since a wrong coin would be detected more easily than a crumpled counterfeit ticket.

There would also be a material increase in revenue in addition to the saving which would be effected from the elimination of tickets and the reduction of station forces.

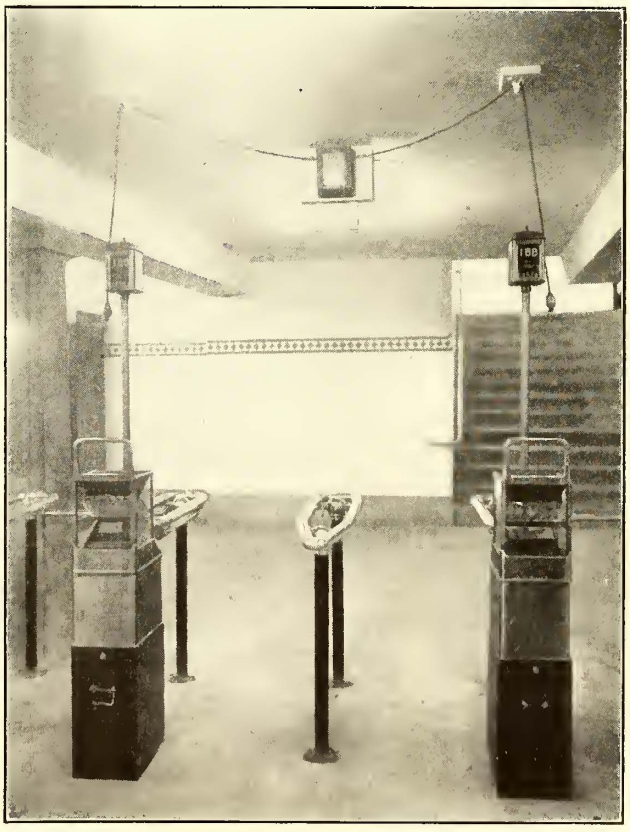
Development of Station Apparatus

After a number of consultations with the International Register Company, Chicago, Ill., the Boston company decided that the success of an all-coin system would depend upon the proper design of a motor-driven coin register with tilting inspection table, the box to be in charge of a coin inspector. It was clear that passengers would not move past the box at maximum speed if it was to be operated like the old-fashioned ticket chopper.

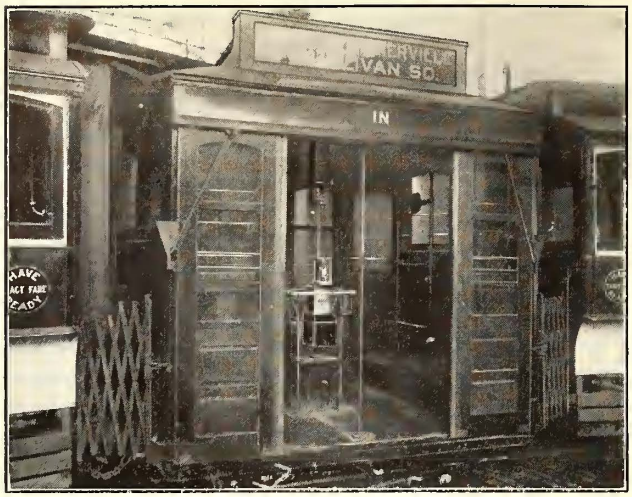
Late in 1913 a trial fare box was installed at the Scollay Square station to ascertain the features that would be necessary to insure success on a large scale. The motor and money-counting mechanisms gave little trouble, but it was found desirable to develop a motor which



BOSTON FARE COLLECTION—ONE-PERSON REGISTER AND TURNSTILE OUTFIT AT PARK STREET STATION, NORTH



BOSTON FARE COLLECTION—MOTOR-DRIVEN COIN REGISTERS AT A BUSY STATION, HAND-OPERATED REGISTER FOR OCCASIONAL TRANSFERS SHOWN ON WALL BEHIND



BOSTON FARE COLLECTION—POSITION OF MOTOR-OPERATED COIN REGISTER AND STANCHIONS IN CENTER OF ARTICULATED UNIT

would operate directly on railway voltage instead of using lighting voltage or resistance.

In the spring of 1914, after several months' trial at Scollay Square, the company ordered fifteen additional station equipments and these were put in service in October. An order for twenty more followed in December. Because of the excellent results secured additional equipments for the subway-elevated lines were purchased, until at this time seventy-eight motor-driven outfits are in use for station service, all delivered through the Charles N. Wood Company, Boston, representative of the International Register Company.

Operation of Non-Ticket System

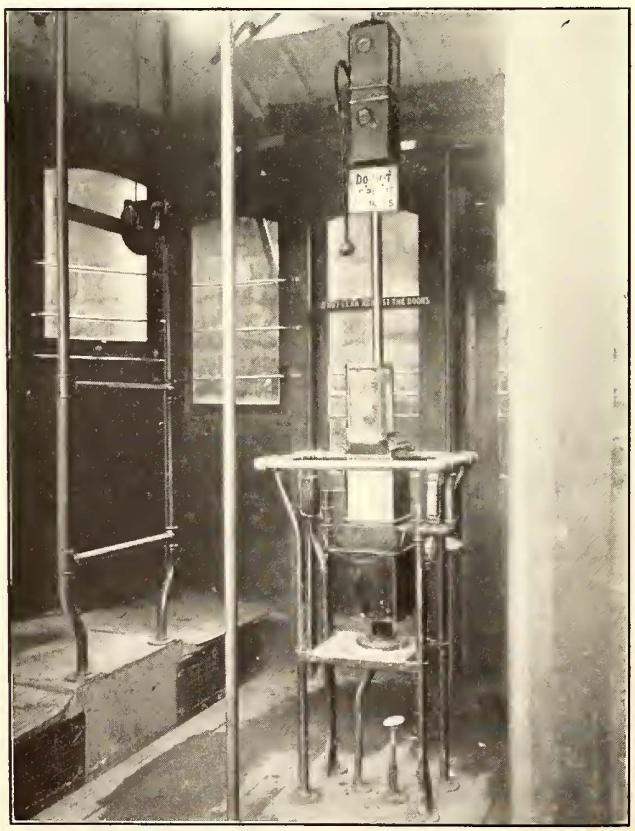
The actual operation of the non-ticket system has met the most optimistic expectations of the company. The acceleration of traffic may be appreciated from the fact that 80 per cent to 90 per cent of the passengers now have their fares ready in order to avoid stopping for change and possibly losing a car. The incentive to have the exact fare in advance is particularly strong among passengers who pass through a prepayment area in going to those surface cars which are run into part of the subway system.

At the Park Street station it was originally necessary to supply the change-makers with $1,000 in change, while to-day $500 each morning is enough. Another indication that passengers are more likely to have exact fare when coin boxes are used is that the rush-hour travel at this station is now handled by two change-makers instead of six ticket sellers.

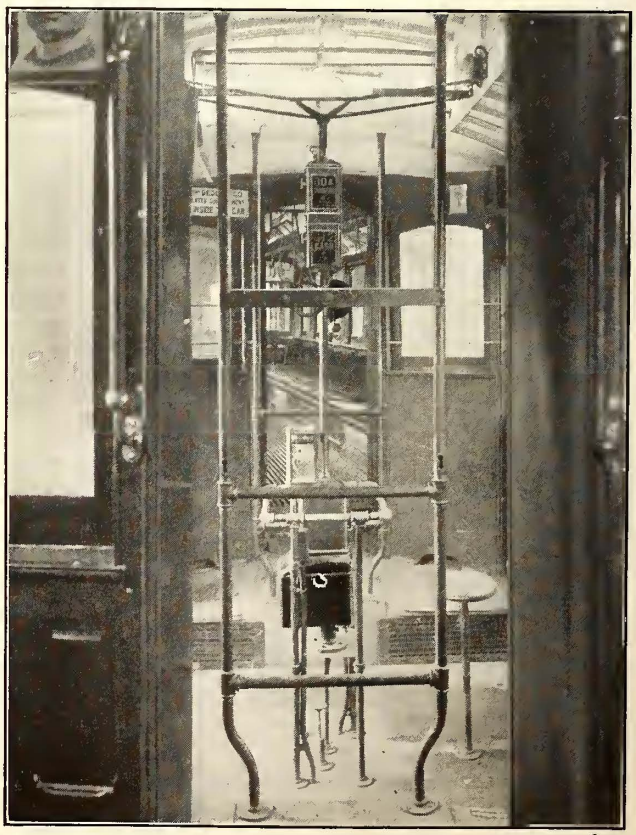
The change-making booths are so placed that they do not interfere with the direct movement of those passengers who have their fare ready. The fare box registers pennies, nickels and dimes. Every coin falls through the hopper onto a revolving drum which carries it into a locked receptacle. If the fare inspector sees a suspicious coin he causes the drum to stop until he has satisfied himself that the coin is either good or bad. It is found that the number of non-current coins is astonishingly small. Thus of $340,000 taken in these boxes during November, 1915, only the equivalent of $11 was non-current. Even of this insignificant sum more than half was redeemable. Foreign keepsake coins are found oftener than slugs.

The remarkable acceleration of traffic produced by the aid of the motor-driven coin registers is shown by the fact that at Park Street fully 8000 people have been handled in one hour with one box. During the summer a baseball crowd of 9000 has been handled at Kenmore Street station, Fenway Park, in twelve minutes with four fare boxes.

One instance of the flexibility of the all-cash system is found at the Devonshire Street station of the East Boston Tunnel. Here, in accordance with municipal requirements, a toll of 1 cent is charged for passengers



BOSTON FARE COLLECTION—COIN REGISTER FOR CENTER-ENTRANCE CAR AS SEEN FROM THE EXTERIOR



BOSTON FARE COLLECTION—COIN REGISTER WITH NUMERALS DISPLAYED AS SEEN FROM THE CAR INTERIOR

going to or returning from East Boston. To take care of this condition, one box is provided for the 5-cent fare and a second box for the 1-cent toll.

ONE-PERSON TURNSTILE STATIONS

With but one exception, stationary motor-driven outfits have been installed only at those stations where at least one person is employed to make change and another to inspect the coins deposited. The exception is a trial box and turnstile at the Park Street station, North. Here the coin register is built directly into the change-maker's booth and behind it is a five-arm Langlow turnstile with a table on which passengers can rest packages while paying fare. The window of the change-maker is so placed that those who have the exact fare can proceed to the cash hopper and turnstile without standing in line. The passenger cannot go through the turnstile until the cashier releases it, following her inspection of the coin deposited. As the turnstile counts every passenger, it can be used as a check on the coin register.

Eventually all light traffic stations may be equipped with a similar combination of coin register and turnstile. A five-arm passimeter instead of a four-arm stile will be used to prevent the registration of but one fare when two passengers go through within one pair of arms, or when one fare is tendered for two passengers who try to get through in this manner.

MOTOR-DRIVEN COIN REGISTERS ON SURFACE CARS

Owing to the satisfaction given by the motor-driven coin register in stationary service, the suggestion was made that it be developed for surface cars.

As early as 1912 the International Register Company had furnished 100 hand-operated coin registers, known as Type C-15. It delivered 275 additional machines during 1913. This machine was an improvement over a money-counting fare box and separate fare register, as the fare register was located on a column over the fare box through which the money counter operated the fare register automatically when the crank was turned.

Nevertheless, it was apparent that even this combination was not the best possible solution for heavy service. When a conductor is handling a rush-hour crowd, he is so busy making change and issuing transfers that he cannot possibly ring up the fares as fast as they are deposited. In practice he must wait until passengers have boarded, whereupon he turns the handle of the cash box and then rings up on the register the number of fares released. Since this registration is made some minutes after the passengers have paid fare, it is impossible to check the fare collection properly.

To overcome the general difficulties existing with a hand-operated box the manufacturer developed a motor-driven coin register of which 173 Type C-25 are now in use and 100 Type C-25 and 170 Type C-26 are on order. These will replace hand-operated money-counting fare boxes. On double-end cars, only the fare box itself is transferred from end to end, while on center-entrance cars the entire equipment remains in place at all times.

When a passenger offers fare on a car equipped with a motor-driven box he is not allowed to deposit pennies or tickets. If a letter carrier or other government employee tenders a ticket of value, the conductor must give him a nickel in exchange therefor, whereupon the passenger deposits the same. If the passenger tenders a 4-cent exchange ticket from the Bay State Street Railway or a transfer, the conductor registers it by hand on the transfer register.

When the passenger drops his nickel in the box it falls on the tilting table, which is hand-operated under the control of the conductor. The money is registered automatically by the motor, which is started by tilting the table, and the fare drops into the bottom of the box where it is immediately available for change.

Therefore, the motor-driven box accomplishes three important things, namely: The conductor does not have to "coffee mill" the fare box or operate a register by cord except to register transfers, 8-cent checks and employees' tickets, and he cannot possibly show an honest difference between the money collected and the indication on the register. Also, on a heavy traffic line, it is no small convenience to the conductor to have change immediately instead of being obliged to interrupt his work by turning the handle of the fare box to grind out the desired change.

The old trick of securing a fractional registration with a penny or clipped nickel is useless, because the register will not record anything below a full fare; furthermore, it is dangerous to the conductor who tries it because such coins drop into a locked receptacle not accessible to the conductor. Naturally a conductor whose box contains several such coins lays himself open to suspicion.

The motor-operated coin register is very popular with the great majority of the conductors because it relieves them of much work and worry. It is probable that the hand-operated coin registers will gradually be transferred to cars which are operated in less congested districts.

PREPAYMENT AREAS AND BODILY TRANSFER

About 60 per cent of all fares on the Boston Elevated Railway system are now collected on the prepayment plan. The proportion will be increased to about 70 per cent when the extension of the Cambridge-Dorchester subway permits various surface lines to be run into the subway.

Aside from the abolition of paper tickets in the operation of subway and elevated lines, the company is trying to reduce the issue of paper transfers to a minimum by installing areas for bodily transfer wherever possible. The company holds the saving of time, unnecessary labor, accounting and paper, as well as the convenience of interchange of passengers, to be so important that it has purchased several pieces of property for prepayment areas in which bodily transfers can be made rapidly.

Record of Operation Over Switches

An interesting record in the way cars of the Louisville (Ky.) Railway have taken the temporary cross-overs which have been in extensive use for several months past on account of construction work is presented by Charles L. Christopher, superintendent of construction for the company. He says: "A remarkable record has been established during the summer of 1915 with the use of temporary cross-over switches, as cars have passed over them in different parts of the city more than 1,700,000 times with but sixteen derailments to date. Cars on the Market Street and Fontaine Ferry line alone have crossed the switches more than 500,000 times, and this record reflects commendable credit upon the motormen and trackmen—only one derailment out of 500,000 cross-overs on this line. The company also has 474 tongue switches which are used many times every day and from Jan. 1 to Dec. 1 last, the cars used receiving or leading switches about 20,000,000 times with only 107 derailments due to split switches."

Estimating Cost of Track Constuction on a Unit-Time Basis

The Author Outlines a Logical Plan for Estimating Costs, the Method Herein Described Being Particularly Adapted to Labor Costs, and Illustrates This with an Example for Which Approximate Data Are Given

By CARL H. FULLER
Associate Member American Society of Civil Engineers

IN the estimates of cost of constructing a specific piece of track work, the quantity of material to be used may be readily determined and usually is listed quite accurately, especially the heavier materials such as steel and ties which seldom vary appreciably from actual requirements. The estimator will price this material, frequently from specific quotations that are virtually contracts to supply the materials at the prices named, so that material estimates frequently check within a fractional per cent.

But when it comes to the item of labor, an entirely different procedure is usually followed, a lump sum for the job or a price per unit of length being added, no reference being made to the quantity of labor required, or, if the quantity is mentioned or required it is figured backward from the unit prices instead of from unit-time data. It is not unusual for the labor item to be the veriest guesswork, hence variations of 25 per cent and 50 per cent over the estimates are of common occurrence and variations of 100 per cent are all too frequent. Should the estimator be asked how much time a certain operation will require, his ideas on the subject will be found to be more or less hazy depending on how intimately he is connected with the labor problem. Many large organizations endeavor to maintain accurate detail cost records of the various jobs handled, and these are frequently supplemented by the more personal records of the engineering and construction departments, but such data lose much of their value because they are recorded in terms of money. This frequently becomes a most elastic term of measurement because of the varying wages, whereas if such records were based on units of time they would prove of wider and more accurate value, being less affected by variations in locality or date of construction.

While there are many constructors who maintain or have access to reasonably efficient cost records, there is a large majority, particularly on the smaller and medium-sized roads, who have very little reliable data to guide them in the preparation of their estimates. They have to depend to a very large extent on unrecorded observations, previous experience and some other fellow's records, guess work or well intentioned but wholly inadequate stop-watch observations.

That stop-watch observations and records may prove nearly as misleading as guesswork, may be illustrated by an incident. A stop watch was held on a bonding crew of three men. The operation consisted in removing the pair of plates from the joint, drilling two holes, installing a compressed terminal bond and replacing the plates. With men feeling fresh, knowing they were being timed and ambitious to make a record, tools in good order and bits well sharpened, the installation of the first bond may reasonably be called 100 per cent efficient. The time of installing the second bond showed a distinct loss, the third more loss, and by the time eight or ten bonds had been installed the ratio of efficiency of the men had fallen below their monthly average. It is natural that the stop-watch observer should select the most favorable time for his observations, which cover but limited periods of time. They consequently fail to take account of the fatigue of the men, lost time, moving of equipment and the numerous other things that make for delay, hence such results should be used with extreme caution in the estimating of future work.

It is the purpose of this article to show (1) how dependable detail costs of a job, in time units, can be secured, with a small expenditure of effort; (2) some of the results obtained in this manner; (3) how these results can be used in preparing future estimates.

Recording Cost Data

The collection of such data differs in no essential from the approved methods of collecting detailed costs in terms of money, except that such records are made in terms of time. To be reliable, such records must be consistently kept throughout the entire course of a job.

The most practical method is to require each foreman, who is best fitted for this part of the work because of his intimate knowledge of his day's operations, to make a detailed daily report on a suitable printed form. These reports may be designed to suit the individual fancy of the construction manager and the requirements of the job, but as the average foreman is seldom qualified to perform any elaborate clerical operations, they should be planned along the most simple lines possible.

The form should show each operation performed, the number of men engaged in the operation, the quantity of work done, and the total hours required in its performance. On track work, the subdivisions of time into less than hour units only complicates the work and makes no appreciable difference in the results obtained. Two additional columns can be provided, if desired, one for the rate of pay and the other for the extension of time in money, while another column in which the construction manager or his clerk may indicate the standard account numbers can be added, thereby making the report of value to the auditing department in preparing the distribution of the payrolls to such accounts. Of course the totals on the daily report check the hours recorded in the time book.

Spaces should also be provided for the date, foreman's name or signature and the location of the job, while provision for a list of material received from stores is of value. Such a report, if not too complicated, will supply all the information desired from the foreman, stimulate his interest in his work, tend to make him concentrate on the various operations, promote rivalry between gangs, and place the construction manager, who has many jobs to look after, in a closer personal touch with his lieutenants.

The form presented herewith, while not submitted as an ideal one, embodies the essential features and gives results both in hours and money cost.

In the office, a clerk can tabulate the daily subdivisions under proper headings on sheets ruled for that purpose, a separate sheet being provided for each job. On this is a column for the dates, and one for each operation in which the day's totals are recorded. When the job is complete the summary of the tabulated time, or the tabulated time and money cost, can be divided by the previously estimated quantity units of the various operations to give such unit costs. From these results a tabulated statement of the various operations can be prepared much after the manner of the preliminary detailed estimate developed further along. These cost sheets and preliminary estimates when typed and bound in a loose-leaf cover, as described in an article on "Indexing Technical Information," appearing on page 1100 of the issue of the ELECTRIC RAILWAY JOURNAL for Nov. 14, 1914, soon become a veritable mine of valuable estimating material.

SEGREGATION OF COST DATA

From these job-hour cost sheets further segregation under the several detailed operations can be prepared. The following average minute-per-foot of track (m.p.f.) costs are derived from a series of such job-cost data and are given to demonstrate the advantage of keeping such m.p.f. costs rather than to furnish any authoritative cost data on track construction. In making the following selections, only typical average jobs have been used and these averages may be applied elsewhere under similar conditions by multiplying these m.p.f. costs by the wage scale prevailing in the desired locality. Owing to the impossibility of describing, within the limits of this article, all of the modifying conditions to which these jobs are subject, these figures should be used with due caution. To derive the greatest benefit from this kind of data each man should preserve his own cost records.

In the following, examples are taken from three to six jobs and averaged by dividing the total lineal feet of track under consideration into the sum total of the time involved. The results are the average costs, in minutes per foot, of the several jobs.

A.—Removing the old paving from the space occupied by the tracks for the purpose of entirely rebuilding track:

3,250 lineal feet in brick paving	at	36.3 m.p.f.
1,500 lineal feet in brick paving	at	35.9 m.p.f.
4,759 lineal feet in asphalt paving	at	42.0 m.p.f.
Average of three jobs		39.0 m.p.f.

B.—Tearing out the old track and separating the material preparatory to hauling away:

649 lineal feet track in dirt road	at	16.0 m.p.f.
3,250 lineal feet track in dirt road	at	15.5 m.p.f.
1,560 lineal feet track in paving	at	17.4 m.p.f.
2,780 lineal feet track in paving	at	14.0 m.p.f.
1,860 lineal feet track in paving	at	18.3 m.p.f.
4,290 lineal feet track in paving	at	13.8 m.p.f.
Average of six jobs		15.3 m.p.f.

C.—Hauling away old track material with the ordinary utility equipment. No cranes used. Includes motorman's time:

MACON RAILWAY & LIGHT COMPANY
DAILY WORK CAR AND TRACK FOREMAN'S REPORT

Foreman ..... Date 191

FORCE					MATERIAL USED					
No. of Men		Hours	Rate	Amount	No. Pcs.	Material*	Where Used	Cost	Charge to	W'k Order
	Conductor									
	Motorman									
	Foreman									
	Teams									
	Laborers									
	Total									

DISTRIBUTION OF TIME

No. of Men	From	To	Hours	Rate	Amount	Charge to	W'k Order	Nature and Location of Work†

REMARKS

*In this column appear the following entries: Special work; rail A.S.C.E. 60-lb.; rail 6-in. 72-in.; splices (pairs); track bolts; spikes; inseal bonds; long bonds; ties; guard rail; G. R. lugs.

†In this column appear the following entries: Removing paving; excavation; laying track; surfacing and lining; bonding; ballasting track; removing paving; repaving; hauling steel; hauling ties; hauling ballast; placing special work.

TRACK COSTS ON A TIME-UNIT BASIS—FORM FOR USE IN ESTIMATING TRACK COST IN TIME AND MONEY

649 lineal feet (5-mile round trip)	at	12.0 m.p.f.
3,250 lineal feet (2-mile round trip)	at	10.0 m.p.f.
1,560 lineal feet (3-mile round trip)	at	11.0 m.p.f.
4,290 lineal feet (4-mile round trip)	at	9.0 m.p.f.
Average of four jobs		9.9 m.p.f.

D.—Excavating in dirt road for track. Practically all pick and shovel work:

450 lineal feet of track	at	51.3 m.p.f.
1,500 lineal feet of track	at	48.0 m.p.f.
16,843 lineal feet of track	at	50.8 m.p.f.
Average of three jobs		49.6 m.p.f.

E.—Excavating in street to lay track after paving has been removed but retaining the old track in operating condition until the new rail and ties can be placed. All pick and shovel work. Cars seven and one-half to fifteen-minute intervals.

3,250 lineal feet of track	at	70.5 m.p.f.
4,750 lineal feet of track	at	37.8 m p.f.
1,560 lineal feet of track	at	54.0 m.p.f.
1,860 lineal feet of track	at	83.7 m.p.f.
4,290 lineal feet of track	at	60.0 m.p.f.
Average of five jobs		58.5 m.p.f.

Note the greater average length of time required for operation E over D due to having track to maintain. The wide range between the five jobs listed is due to variations in car travel, location of the job and condition of the old tracks, etc., all of which variously affect the cost of excavation more than the material itself.

F.—Removal of excavated material from the trench to the various dumping grounds by means of teams and slat-bottomed wagons. All dumps within a half mile from the job:

1,560 lineal feet of track	at	28.9 m p.f.
2,780 lineal feet of track	at	26.4 m.p.f.
4,290 lineal feet of track	at	30.0 m p.f.
Average of three jobs		28.6 m.p.f.

G.—Removal of excavated material from the trench to the dump using the ordinary utility equipment of flat and dump cars and hauling from 2 miles to 6 miles for the round trip:

450 lineal feet (2-mile round trip)	at	48.0 m p.f.
1,500 lineal feet (1-mile round trip)	at	54.6 m p.f.
1,860 lineal feet (3-mile round trip)	at	65.8 m p.f.
4,290 lineal feet (4-mile round trip)	at	70.0 m.p.f.
Average of four jobs		64.7 m.p.f.

H.—Hauling steel from stock yard to the job on flats:

649 lineal feet track, 60-lb. 30-ft. steel (6 miles)	at	12.3 m p f.
4,290 lineal feet track, 60-lb. 30-ft. steel (4 miles)	at	12.2 m p.f.
1,560 lineal feet track, 72-lb. 60-ft. steel (1 mile)	at	7.3 m p.f.
2,780 lineal feet track, 72-lb. 60-ft. steel (2 miles)	at	14.0 m p.f.
1,860 lineal feet track, 72-lb. 60-ft. steel (3 miles)	at	19.4 m p.f.
Average of five jobs		13.6 m.p.f.

K.—Hauling ties from the stock yard to the job on flats. Average spacing of ties in track 24 in. on centers:

649 lineal feet track (6-mile round trip)	at	8.1 m.p.f.
3,250 lineal feet track (1-mile round trip)	at	7.8 m p f.
1,500 lineal feet track (1-mile round trip)	at	8.7 m p.f.
2,780 lineal feet track (2-mile round trip)	at	5.5 m p.f.
4,290 lineal feet track (4-mile round trip)	at	9.2 m.p.f.
Average of five jobs		7.9 m.p.f.

Traffic conditions over the routes on which the hauling is done and the opportunity to unload without switching apparently affect the time costs under K and H more than the distance hauled.

L.—Miscellaneous hauling, such as special work, moving tools, equipment and fittings, cleaning up, etc.:

450 lineal feet track	at	10.0 m p.f.
3,250 lineal feet track	at	13.8 m p.f.
4,750 lineal feet track	at	4.3 m.p.f.
16,843 lineal feet track	at	3.9 m.p.f.
Average of four jobs		5.2 m.p.f.

Usually this cost decreases with the length of the job.

M.—Hauling crushed rock ballast from freight yard to the job, including loading and unloading:

450 lineal feet track (2-mile round trip)	at	28.2 m.p.f.
3,250 lineal feet track (1-mile round trip)	at	26.4 m.p.f.
4,750 lineal feet track (3-mile round trip)	at	16.3 m p.f.
1,860 lineal feet track (3-mile round trip)	at	29.0 m.p.f.
Average of four jobs		22.2 m.p.f.

N.—Fine grading of trench where track is laid on the natural soil:

1,500 lineal feet of track	at	7.1 m.p.f.
1,560 lineal feet of track	at	12.2 m.p.f.
2,780 lineal feet of track	at	8.9 m.p.f.
4,290 lineal feet of track	at	9.2 m.p.f.
Average of four jobs		9.3 m.p.f.

O.—Placing ties and rails, and spiking and bolting joints:

16,843 lineal feet track, 60-lb. 30-ft. steel	at	15.3 m.p.f.
4,290 lineal feet track, 60-lb. 30-ft. steel	at	16.1 m.p.f.
1,860 lineal feet track, 72-lb. 60-ft. steel	at	19.5 m.p.f.
1,560 lineal feet track, 72-lb. 60-ft. steel	at	26.0 m.p.f.
2,780 lineal feet track, 72-lb. 60-ft. steel	at	18.6 m.p.f.
Average of five jobs		16.7 m.p.f.

P.—Tamping lining and surfacing track on dirt ballast for paving operations:

1,500 lineal feet track	at	35.5 m.p.f.
1,560 lineal feet track	at	42.2 m.p.f.
2,780 lineal feet track	at	39.4 m.p.f.
4,290 lineal feet track	at	43.8 m.p.f.
Average of four jobs		41.6 m.p.f.

Q.—Tamping, lining and surfacing track on rock ballast for paving operations:

649 lineal feet track	at	38.0 m.p.f.
3,250 lineal feet track	at	53.3 m.p.f.
4,750 lineal feet track	at	46.0 m.p.f.
1,860 lineal feet track	at	48.3 m.p.f.
Average of four jobs		48.6 m.p.f.

R.—Bonding with compressed-terminal, concealed bonds applied under the splice plates. Average for eleven jobs or 2347 bonds at 21.5 cents each (see article on "Cost of Bonding" in Electric Railway Journal, July 25, 1914), which gives 90.6 minutes average per bond, or for

30-ft. rails, two joints	at	6.4 m.p.f.
60-ft. rails, two joints	at	3.2 m.p.f.

S.—Replacing paving, using concrete base, sand cushion, vitrified paving brick, all material new:

Lineal Feet of Track	Hauling Concrete Materials	Mixing and Placing Concrete	Hauling Paving Brick	Paving
450	36.3	40.8	45.4	34.4 m.p.f.
1,500	38.4	33.2	45.7	35.6 m.p.f.
1,860	36.5	33.8	40.6	30.9 m.p.f.
Average	37.1	35.7	41.1	33.1 m.p.f.

T.—Where paving was replaced with solid concrete having no top dressing and finished smooth. All material new:

Lineal Feet of Track	Hauling Materials	Mixing Concrete	Placing Concrete	Finishing Concrete	Miscellaneous Labor
1,560	45.3	17.9	15.9	8.5	12.4 m.p.f.
2,780	44.0	18.1	16.2	9.6	13.9 m.p.f.
4,290	46.0	17.7	15.5	9.0	13.6 m.p.f.
Average	45.3	17.8	18.7	9.1	13.5 m.p.f.

Using the preceding hour costs for a basis to determine the quantity and value of labor required we will consider the preparation of an estimate. Assuming that we are to reconstruct 500 lineal feet of double track laid in brick paving which is to be replaced with concrete paving after the new track is laid and new material used throughout. This is equivalent to 1000 ft. of single track, and for the purpose of the estimate we shall consider it such.

Removal of old paving	at 39.0 m.p.f.	equals	650	hours
Tearing up old track	at 15.3 m.p.f.	equals	255	hours
Excavation	at 58.5 m.p.f.	equals	1,078	hours
Requiring a total of			1,983	hours
Placing ties, rail and joints	at 13.6 m.p.f.	equals	279	hours
Bonding joints	at 3.2 m.p.f.	equals	53	hours
To tamp line and surface	at 48.6 m.p.f.	equals	810	hours
Requiring a total of			1,142	hours
Hauling away old track material	at 9.9 m.p.f.	equals	165	hours
Removing excavation	at 64.7 m.p.f.	equals	1,078	hours
Hauling ties, rails, etc	at 26.7 m.p.f.	equals	473	hours
Hauling paving material	at 45.3 m.p.f.	equals	766	hours
Hauling ballast	at 22.2 m.p.f.	equals	370	hours
Requiring a total of			2,852	hours

Mixing concrete	at 17.8	m.p.f.	equals	297 hours
Placing concrete	at 18.7	m.p.f.	equals	320 hours
Surfacing and finishing	at 9.1	m.p.f.	equals	150 hours
Miscellaneous labor	at 13.5	m.p.f.	equals	225 hours
Requiring a total of				912 hours

If any extra labor is required for the placing of special work, bonding rail on curves or placing guard rails, etc., it should be added, as these figures only provide for the operations indicated. We have now determined that it will require 6889 hours to perform this piece of work, and applying our local wage scale could add the whole to our material estimates, but before we do this we can consider the make-up of our crew of men to secure proper balance, something which is practically impossible under the usual dollar and cents method of figuring and which may affect the final results to some extent.

The 500 ft. of double track, or practically two blocks, is to be completed within thirty days, say twenty-six working days, and traffic is to be maintained on either one or the other of the tracks during that period. As the paving is of concrete and the engineer requires that we allow it to set for seven days before permitting traffic over it we lose six more working days, reducing our actual working time to twenty days.

With our equipment, paving operations will require five men loading mixer, two men operating mixer, six men handling material from the mixer, two men finishing concrete, and one foreman, making a total of sixteen men working 160 hours per day. With this crew our 912 hours' labor reduces to 5.7 days' time.

Owing to the size of the job and the time we have at our disposal we expect to increase our regular crew by the addition of a number of green men, but, as it is not an economical proposition to organize a paving gang for less than six days' work and as such jobs come up at irregular intervals, we will assume that our regular track gang, which is about this size, has had paving experience. We shall assume further that it contains two or three utility men capable of operating the concrete mixer and finishing concrete, and we shall assign this work to them and pass to a consideration of the track work.

Track laying requires 1142 hours of labor. As the two bonding men are specialists, from the nature of their job, and have other duties elsewhere, we shall eliminate their fifty-three hours for the present, reducing the time to 1089 hours. Dividing this by the 160 hours per day which the gang makes, we have 6.8 days for laying track.

The removal of the old paving and old track requires 1983 hours of labor. As our track gang still has 7.5 days out of the allotted twenty to account for, and as it is desirable to keep these men on the job as continuously as possible, they can do a part of this work to an advantage, and we are thus able to reduce the green labor to 784 hours. Allowing each extra man twenty days, or 200 hours' time, four additional men will be reqired.

The hauling is a considerable item, requiring 2852 hours. As the utility equipment is limited, we can assign only one crew to this job. Ordinarily the motorman-foreman and six men with the facilities at their disposal can handle the 60-ft. rails, but it is obvious that this crew cannot handle the quantity of work assigned to them, so we shall add two men. Any greater number would result in a loss of efficiency. This gives a ninety-hour day on the work car, or a total of 1800 hours, which will provide for all of the hauling but that of excavated material. This material may readily be handled by teams, as there are various alleys and back lots within a reasonable distance where such material can be disposed of. Referring again to the original data we noted that the handling of this material by teams involves a much different labor ratio per man than when it is handled on the cars, and we derive the following:

Car service	at 64.7	m.p.f.	gives 1,078 hours at 20 cents	or $215.60
Team service	at 28.6	m.p.f.	gives 477 hours at 45 cents	or 214.65

As the team work will only occupy about fourteen days to advantage we shall employ four teams for a total of 477 hours.

Tabulating these results we have:

One foreman	20	days at	$3.00	$60.00
Three track men	60	days at	2.50	150.00
Twelve track men	240	days at	2.00	480.00
Four extra men	40	days at	1.75	140.00
Two bond men	6	days at	3.00 and 2.25	15.75
One motorman-foreman	20	days at	3.00	60.00
Six work car men	120	days at	2.00	240.00
Two extra men	40	days at	1.75	70.00
Four teams	48	days at	4.50	216.00
Thirty-five men	614	days		$1,431.75

This gives us an average cost per foot of track of 6.14 hours, or $1.43175, to be added to our material estimate.

In addition we know in advance how many extra men will be required and where they should be placed. The weak link in our organization is in the utility service, and that can be provided for by using teams. We can also determine just what tools will have to be provided and just what will have to be done in order to finish up on the date set. We are also in position to forecast each day's work or to check it with our estimates. Lost time and lost motion have been provided for, as these items are cared for in our original data.

Determining Profit on a Job

If we care to investigate further, we can determine within quite definite limits the possibilities of profit or loss on the estimate just prepared, provided, of course, that our basic data are sufficiently comprehensive. It is safe to assume the impossibility of performing each individual item of this work for less than the individual minimums from which our data are derived, while on the other hand it is equally logical to assume that it will not cost more than the individual maximums involved in the data. We shall proceed, therefore, to tabulate the minimum, average and maximum for the several jobs in order to determine the average possible minimum and maximum.

	Minimum	Average	Maximum
Removing old paving	35.9	39.0	42.0
Tearing out old track	13.8	15.3	18.3
Excavation	37.8	58.5	83.7
Placing rail, ties and joints	15.3	16.7	26.0
Tamping, lining and surfacing	38.0	48.6	53.3
Bonding	1.4	3.2	5.6
Hauling old track material	9.0	9.9	12.0
Removing excavation	26.4	28.6	30.0
Hauling ties, rail, etc.	16.7	26.7	42.4
Hauling paving material	44.0	45.3	46.0
Hauling ballast	16.3	22.2	29.0
Mixing concrete	17.7	17.8	18.1
Placing concrete	15.5	18.7	15.9
Finishing pavement	8.5	9.1	9.6
Miscellaneous paving labor	12.4	13.5	13.9
Total average time per foot	308.7	383.1	445.8
Percentages	81	100	117

The above percentages indicate the possibility of a 19 per cent saving over the estimate, but to do this each individual operation would have to be performed for the minimum of any job included in the basic figures. This would require exceptional management, while on the other hand the expenditure of 17 per cent more than the estimate would indicate gross mismanagement. If we have any respect at all for the mathematical laws of chance and averages we are bound to recognize the attainment of the extreme minimum or maximum as a very remote possibility, although it is resonable to expect some variation. Therefore, unless the work is affected by influences either favorable or unfavorable not provided for in our basic figures, we have no reason

to expect any marked variation from our estimate. By scanning the table thus prepared we are able to determine at a glance the items that will require greatest attention on account of possible variation.

Had the basic data from which this sample estimate was prepared been recorded in terms of money with no relation to the time value indicated, the difference in the two wage scales would have placed a 48 per cent handicap on the estimate. This the above percentages would indicate as impossible to overcome, consequently we should lose money. Yet such or even a greater percentage or error is always possible, especially when using published cost data recorded in terms of money. Failure to recognize the fact that the average foot-pounds of work delivered by the average laborer is practically constant under similar conditions, and is a value that can be determined within very practical limits, destroys the value of the most carefully prepared cost records and accounts for much of the variation or undervaluation of labor in making estimates.

There is no desire to cast any reflection upon efficient cost-keeping systems where results are recorded in terms of money, but it is desired to impress the need of giving more attention to the performance time and to the keeping of records of such time. A little investigation along these lines, with its supplementary records, even though not as elaborate as outlined, will produce most beneficial results in the preparation of any class of estimates where labor is involved.

Regenerative Braking Tests on the St. Paul

Motor-Generators Handle Large Reversed Loads—Air and Electric Brakes Operated Together

In recent tests of the regenerative braking system that has been installed on the locomotives for the electrified engine division on the Chicago, Milwaukee & St. Paul Railway, it has been found that the motor-generator sets in the substations have been able to take very large reverse loads. Each of these machines is made up of a synchronous motor driving two 1500-volt direct-current generators connected permanently in series for 3000 volts. In the substation supplying the section of line where the tests were carried out, the generators for each set are rated at 1500 kw., being provided with interpole, commutating and series field windings. Regenerated loads amounting to more than 2500 kw. have been returned through two of these sets without disturbing the equal division of the load between them when the two sets were running in parallel, and the return of power to the line is accomplished without noticeable sparking at the commutator. Owing to the fact that the series field windings act as differential windings when the motor-generator set is reversed, the substation potential is slightly lowered and this tends to equalize the booster potential required in the trolley at the point where the locomotive is operated during regeneration. Consequently, an abnormal rise in trolley potential due to the resistance of the line between the locomotive and the substation is prevented.

On one test a train was made up of seventy-four freight cars to equal a trailing tonnage of 3000, and the experiment was tried of using combined regenerative and air braking, one of the two locomotives on the train being cut out when the train was on a 2 per cent down grade. Because a considerable range of speed is available during regenerative electric braking, this being under the control of the operator, there is sufficient margin to allow for the joint operation with the air brakes. During the test the entire train of seventy-four cars was bunched against the locomotive at the head end and was carried around 10-deg. curves with no mishaps whatsoever. The fact that the train was held only by one locomotive made the load considerably in excess of the rating of the single engine in operation. However, with the assistance of the air brakes the train was handled with perfect ease.

Reducing a Gasoline Fire Hazard

Gasoline Poured Through a Chamois-Skin Strainer Generated Static Electricity, Which Resulted in Fires in Boston—Suggestions Are Made for Eliminating This Danger

The large number of gasoline automobiles employed by electric railway officials makes the fire hazard of such machines important. Recent fires accompanying the handling of gasoline in electric railway and other services lend special interest to an investigation concluded not long ago at Boston, Mass., by Walter L. Wedger, chemist, of the Massachusetts District Police. The apparently mysterious origin of some of these fires was found to be a comparatively simple case of static electricity generated while pouring gasoline through a chamois-skin strainer and also through a rubber-lined hose. Recent tests prove that as high as 500 volts may be generated by forcing gasoline over non-conducting surfaces in clear, dry atmospheric conditions.

To avoid fire from these causes it is necessary to maintain good metallic contact between can nozzles, hose nozzles, funnels and the frame of the vehicle. Thus, in drawing gasoline from a pump into a can, the can and pump should always be in metallic contact, so that all electricity generated can pass off through the pump to the ground. Wooden handles or other insulating substances on the bails of cans should be removed at once. In filling the tank of a motor-vehicle with gasoline from a can through a metal funnel containing a chamois-skin strainer, care should be taken that the metal of the funnel is in contact with the metal of the tank and also that the can is in metallic contact with tank or funnel.

The use of blocks of wood or other insulating substances around the filling hole of the tank, to make the funnel stand upright during filling, is undesirable, as it insulates the funnel from the tank and creates a pocket for the accumulation of electric charges in the metal of the funnel, which would otherwise pass off to the metal of the vehicle in harmless intensity as fast as formed. If it is inconvenient to rest the mouth of the can upon the funnel edge while pouring, a piece of clean copper chain should be soldered to the mouth of the can and the end of the chain allowed to rest in contact with the funnel or the tank. Neglect to take these precautions resulted in five fires.

Similarly, in filling motor-vehicle tanks with gasoline run through a hose with a metal nozzle, fires have been known to occur from frictional electricity generated by the passage of gasoline through the rubber hose, and the concentration of charges in the nozzle, with resulting discharge when brought near any substance. Contact between the nozzle and the tank or funnel is most important, and a hose with a metallic lining is very desirable. A bare copper wire passed through the inside of the hose and soldered to the metal of the nozzle at one end and to the pump connection at the other, prevents the accumulation of electricity in the gasoline inside the hose by conducting it off to the pump and ground as fast as formed. Attention to these inexpensive and simple means of safeguarding the handling of gasoline is an important matter in the present rapid development of motor vehicles as accessories in electric railway administration.

MIDYEAR MEETING
CHICAGO
FEBRUARY 4, 1916

ASSOCIATION NEWS

MIDYEAR MEETING
CHICAGO
FEBRUARY 4, 1916

Additional Details of the Program for the Mid-Year Meeting—Biographical Sketches of the Newly-Elected Denver Tramway Section Officers—Meeting of Manila Company Section—Proposed Amendments of the Constitution and By-Laws—Committee Activities

Mid-Year Meeting Program

Further details of the program of the mid-year meeting of the American Electric Railway Association, to be held in Chicago on Feb. 4, have been announced. The principal address on the subject of "Valuation" will be given by N. T. Guernsey, general counsel American Telephone & Telegraph Company. The discussion on this subject will be led by P. J. Kealy, member board of control Kansas City Railways, and by George Weston, engineer for the Board of Supervising Engineers, Chicago Traction. There will also be a topical discussion on the subject of "Rate of Return." This discussion will be led by James D. Mortimer, president Milwaukee Electric Railway & Light Company, and will be participated in by leading executives.

At the dinner, which will be held in the evening in the Congress Hotel, Senator Oscar W. Underwood, who will speak on "Government Regulation and Our Transportation Systems," will be introduced by Judge Jacob M. Dickinson, formerly secretary of war. There will also be addresses by the presidents of the American Electric Railway Association and of the Manufacturers' Association.

Mid-Winter Meeting Transportation

Arrangements have been completed between the transportation committee and the New York Central Lines for special equipment on the "Twentieth Century Limited" on Feb. 3. Passenger Agent E. C. Cook will accompany the train. Special equipment will also be added to the same train on Feb. 2, and to the "Lake Shore Limited" and "Wolverine" on both Feb. 2 and 3. Full announcements regarding this service will be mailed to the members of the association shortly.

The Pennsylvania Railroad has also made arrangements for special train service, and announces that on Feb. 2 and 3 special equipment will be added to the "Broadway Limited," the "Manhattan Limited" and the "Pennsylvania Limited," leaving New York at 2.45 p. m., 5.04 p. m., and 11.04 a. m. respectively.

Capital Traction Company Section

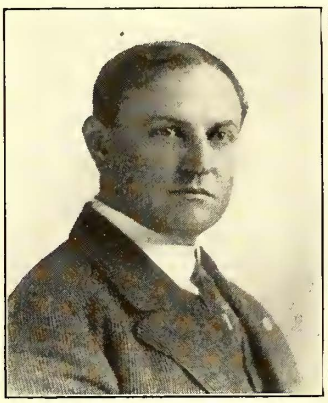
As was recently announced in the ELECTRIC RAILWAY JOURNAL, a company section will be formed by the Capital Traction Company in Washington, D. C., on Jan. 13. The meeting will be held in the company's shop on M Street. A committee has been appointed, and is now drawing up a constitution for consideration by the meeting. No set program will be followed but, after the constitution has been adopted and the officers elected, remarks will be made by Martin Schreiber, Public Service Railway, Newark, N. J.; E. B. Burritt, New York, N. Y.; Harlow C. Clark, New York, N. Y.; Charles C. Peirce, Boston, Mass.; H. G. McConnaughy, New York, N. Y., and H. H. Norris, ELECTRIC RAILWAY JOURNAL. President George E. Hamilton, Vice-President D. S. Carll and Chief Engineer J. H. Hanna will speak for the company. Mr. Carll will preside until after the election.

There are already sixty-seven members of the association in the company and it is expected that the number will be considerably increased before the meeting.

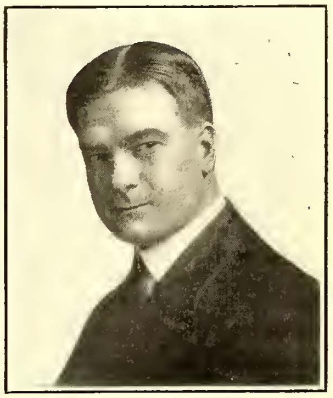
Denver Tramway Section

William G. Matthews, the newly-elected president of the Denver Tramway Section, has been superintendent of this company's overhead line and light department for more than ten years. Since 1881 he has been associated with electrical industries, obtaining his first experience in the service of the Colorado Telephone Company as operator. He was later employed by the Rocky Mountain Bell Telephone Company as its local agent in Idaho, with headquarters at Hailey, and was later transferred to Salt Lake City, Utah, as chief operator. When the Colorado Telephone Company extended its lines into New Mexico he was made local agent at Albuquerque.

Mr. Matthews' decision to enter the electric railway field was formed after a visit to Topeka, Kan., where a trolley line was being pushed to completion. He was impressed by the new method of transportation, and



W. G. MATTHEWS
President,
Denver Company Section



H. G. MUNDHENK
Secretary,
Denver Company Section

secured employment with the builders, the Thomson-Houston Electric Company. This company had closed a contract to construct the first overhead electric line installed in Denver, the Lawrence Street line, together with the necessary generating plant. Construction work on this job was begun in March, 1890, and Mr. Matthews' first association with the Tramway Company began then. He took part in the erection and installation work of the power house, and in the car and power house wiring, the track bonding and the erection of trolley lines and feeders. During the construction period which followed he remained with the contracting company, but later was retained by the Tramway Company. His headquarters were in the cable power house, which stood on the present site of Denver Civic Center at the corner of Broadway and Colfax Avenue. At first he had charge of the electrical apparatus, the general wiring and the signal system used on the cable lines, finally taking charge of the lighting department, which was merged with the overhead construction department when he assumed control.

Mr. Matthews is well known and effective outside of his immediate technical work. In 1908 he was president of the Colorado Electric Light, Power & Railway Association, and in 1912 of the Colorado Electric Club. For many years he has been an enthusiastic member of the American Electric Railway Association, and has been

active in the company's section movement since its inception.

H. G. Mundhenk, who was re-elected secretary of the Denver Tramway Section, is now in his fourth year of service in that capacity. A biographical sketch of him was given on the Association News page in the issue for Dec. 26, 1914.

Manila Company Section

The regular meeting of joint company section No. 5 was held in Manila on Nov. 2. The section received the official announcement of the award to J. M. Bury of the association medal for the best paper presented before a company section. His paper, which was on the subject "Courtesy," was read on April 6, 1915. It was abstracted in the issue of the Electric Railway Journal for May 29, page 1033. L. S. Cairns, assistant general manager of the company, presented a paper on "The Public Utility Right to Protection," and it produced a lively discussion.

Mr. Cairns' argument was substantially as follows: Public utilities have a right to protection which is gradually being recognized. They are like pioneers who push forward into new, undeveloped fields, endure hardships and ofttimes suffer financial reverses. Their aims are no more selfish than those of other pioneers, and their achievements benefit others at least as much as themselves. Some utilities have been subjected to deserved criticism, but others have received undeserved criticism which has hampered their development.

Investors are entitled to a fair rate of return which is generally insured with fair regulation. Fair regulation and protection will insure the credit necessary to attract capital for improvements and extensions. Publicity is now the slogan of the utilities, which are informing the public as to the physical and financial conditions of their properties. The operating conditions in these utilities are increasingly difficult, and only the possibility of increasing the gross income and reducing operating expenses will encourage investors to keep up their faith in the ultimate success of these enterprises. Fewer laws, better laws, less politics and more sound principles injected into the laws, a better understanding of the rights of all parties and more confidence in public utilities are the elements necessary for the proper relations of the utilities and the public.

In the discussion of Mr. Cairns' paper H. P. L. Jollye, assistant auditor, pointed out the importance of convincing the public that the utilities want to give the best service possible at a minimum cost. He thought that fairer legislation would be thus secured. W. R. McGeachin, manager railway department, stated that with a complete and comprehensive franchise no necessity for regulation would exist, but such a franchise could not be produced as it would not be practicable to provide for flexibility. Fair regulation removes the necessity for such a franchise. J. C. Rockwell, manager electric department, deplored the tendency to criticise the utilities, and stated that very few people know what constitutes a fair return on investment, and that even if more did know this they could not determine whether or not this return was being received. C. N. Duffy closed the discussion by broadening it to include the government's need of protection from ownership or operation of public utilities. He illustrated the failure of such ownership and operation by means of statistics. He elaborated a definition of a corporation given by Mr. Cairns, showing that an organization of individuals in a corporation for profit is not essentially different from one organized not for profit, such as charitable organizations, etc. Mr. Duffy also explained the purpose and functions of holding companies which are a means of diversifying risks, stating that 80 per cent of the utilities in the United States are organized in such companies.

Proposed Amendments to the Constitution and By-Laws

Secretary E. B. Burritt has sent to company members of the American Association notice of a special meeting to be held in Chicago on Feb. 4, at 10 a. m., for the purpose of considering and acting upon the amendments to the constitution and by-laws as recommended by the special committee to consider recommendations made by the president at the San Francisco convention.

The proposed changes are in Art. III of the constitution and Art. XIV of the by-laws. The new words are indicated by italics in the following paragraphs:

"III. The membership of this association shall consist of *the following* classes:

"*(a)* Company members, consisting of American urban and interurban railway companies, or lessees, or individual owners of urban and interurban railways, or steam railways having electrified sections, *and of companies, firms or individuals engaged in the business of manufacturing or selling apparatus, equipment or supplies used in electric railway operation.* Each member company shall be entitled to one vote, which shall be cast by the properly accredited delegate.

"XIV. *Company* members shall pay an admission fee of ten dollars ($10) and annual dues payable in advance based on gross earnings from electric railway operation, *or from the business of manufacturing or selling apparatus, equipment or supplies used in electric railway operation* during the preceding fiscal year of the respective *members* as follows:

Gross Receipts			Annual Dues
Under	$50,000		$25
Between	50,000 and	$100,000	50
Between	100,000 and	250,000	75
Between	250,000 and	500,000	125
Between	500,000 and	1,000,000	175
Between	1,000,000 and	2,000,000	225
Between	2,000,000 and	3,000,000	275
Between	3,000,000 and	4,000,000	325
Between	4,000,000 and	5,000,000	375
Between	5,000,000 and	6,000,000	425
Between	6,000,000 and	7,000,000	475
Between	7,000,000 and	8,000,000	525
Between	8,000,000 and	9,000,000	575
Between	9,000,000 and	10,000,000	650
Between	10,000,000 and	over	750

Committee Activities

A meeting was held in New York on Jan. 6 of the committee on heavy electric traction, of the Engineering Association. The members met at the office of the chairman, E. R. Hill, of Gibbs & Hill, New York.

As this issue is going to press a meeting is being held in New York at the association headquarters of the representatives of the American Electric Railway Association on the safety code committee and others. W. J. Harvie is presiding.

J. K. Punderford, vice-president and general manager The Connecticut Company, has been appointed chairman of the new committee on street traffic, authorized at the last meeting of the executive committee of the American Association.

The United Railways of St. Louis have fitted their cars with banner boards reading "Rear Platform of Car Stops 50 Ft. from Curb Line." The attention of the public is being called to this fact for its convenience and to reduce the time consumed in stops, thereby making it possible to speed up schedules. These boards have been found particularly valuable as a means of educating the occasional rider in the territory outside the business district.

COMMUNICATIONS

Lighting of Interurban Cars

LEHIGH VALLEY LIGHT & POWER COMPANY
ALLENTOWN, PA., Jan. 5, 1916.

To the Editors:

Referring to the complaint of the ordinary series of lighting of interurban cars in the communication of Mr. Gelder of the Travelers' Protective Association of San Francisco in your Jan. 1 issue, I would suggest that Mr. Gelder make a trip east and travel over the 60 miles of high-speed line of the Lehigh Valley Transit Company between Allentown and Philadelphia. On the cars of this line he will find a lighting equipment entirely independent of the trolley, designed by the writer, consisting of ten Edison cells, in two trays weighing about 100 lb. each, supplying twenty 20-watt, 12-volt, Mazda lamps direct from the battery without regulation, which is not required between full charge and discharge. The original cost of the equipment was approximately $200 per car, and the total maintenance costs during a period of approximately three years have consisted of the expense for one charging of the batteries with the proper solution.

A small, 110-volt motor-generator set in the carhouse is used to charge the batteries in series. They are pulled out of the compartments under the cars during the day time and replaced in time for use during the dark hours. The labor charges for this work are considerably less than those involved in the changing and maintaining of the ordinary arc headlights. Even some of the original lamps were still discovered in service a few days ago. As this battery equipment will maintain the lamps burning continuously for a period of approximately eight hours and there is no connection between the lighting circuit with the overhead system, the scheme is ideal for its purpose.

No patents have been taken out on the idea.

A. H. S. CANTLIN, Vice-President and Manager.

[NOTE.—An article describing the equipment of the Lehigh Valley Transit Company's line and car equipment, including the lighting plan described by Mr. Cantlin, appeared in the issue of the ELECTRIC RAILWAY JOURNAL for Nov. 2, 1912, page 940.—EDS.]

Causes of Rail Corrugation

THIRD AVENUE RAILWAY
NEW YORK, Dec. 31, 1915.

To the Editors:

The article by R. C. Cram on rail corrugation which appeared in the Dec. 25 issue of the ELECTRIC RAILWAY JOURNAL must be of unusual interest to anyone interested in this subject. The writer is of the opinion, based on a very careful study of rail corrugation, that Mr. Cram hit the nail on the head when he said that this trouble is caused by load concentration, due to the reduced area of contact as the result of irregularities or of a difference between the contours of the rail head and the wheel treads. It would, therefore, seem that the suggestion made by him regarding the use of a curved rail head, which will more readily conform to the contour of worn wheels, thereby giving a wider area of contact, would go a long way toward relieving this trouble.

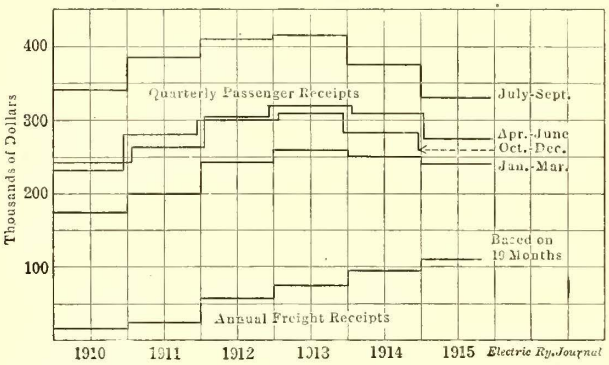
The primary cause of rail corrugation, however, according to the views of the writer, is the result of modern methods used in track construction, where the ties and rails are embedded in a solid mass of concrete and granite which holds the track in a vise-like grip of such rigidity as to eliminate any spring action or give and take. This rigidity prevents the rail from adjusting itself to irregular wheel contours, and also prevents the cushioning effect which would otherwise take care of vibrations which must necessarily result from the rolling of a wheel carrying a heavy load. In the nature of things such a wheel cannot have a perfectly smooth surface, and its rolling over a rail having a similar surface causes a vibratory motion of the wheel. Such a condition does not exist on steam or other roads where the ties and rails are not buried in concrete, thus permitting the rail to take care of these vibrations.

J. S. MCWHIRTER,
Superintendent of Equipment.

Relative Growth of Freight and Passenger Business

Decrease in Passenger Receipts Due to War and Increase in Freight Receipts During the Last Five Years Shown by Large Interurban Railway

THE accompanying graph, which shows the relative growth during the past five years of freight and passenger receipts on a large interurban railway, indicates the importance of the freight business as a growing field for future traffic. From the graph it will be seen that increases in passenger receipts were registered for every year until 1914. The decrease that occurred during the first two quarters of that year were



FREIGHT AND PASSENGER RECEIPTS ON INTERURBAN LINE

small and the really large losses took place only after July, 1914, the influence of the war in Europe being thereby made apparent.

With regard to the receipts from freight, however, an increase was registered for 1914 and for 1915, both years showing a practically normally regular increase. It would appear, therefore, that the extraordinarily heavy losses occurring in passenger receipts for the past two years have not been effective in the case of receipts from freight and express, and although the passenger losses have brought receipts from this source to a point actually below that registered five years ago, the freight receipts have been increased by more than 300 per cent in the same period.

The Public Works Department in Rome, Italy, has approved a new project for the construction of a double-track electric railway from Rome to the sea at Ostia. For the urban section the overhead system will be used at 600 volts, while on the interurban section current will be collected from a third-rail at 1200 volts. Express trains will make the run in twenty-four minutes and local trains in thirty-five minutes. The rolling stock will include eighteen motor and thirty trail cars with two electric locomotives and twenty freight cars for freight traffic. The cost of construction is estimated at about $1,737,000 and of the equipment about $386,000.

EQUIPMENT AND ITS MAINTENANCE

Short Descriptions of Labor, Mechanical and Electrical Practices in Every Department of Electrical Railroading

Contributions from the Men in the Field Are Solicited and Will Be Paid for at Special Rates.

Recent Lightning Arrester Experience

B. L. F. COFFIN

Master Mechanic Beaver Valley Traction Company, New Brighton, Pa.

The protection of electrical apparatus from lightning on the property of the Beaver Valley Traction Company has always been difficult due to the fact that the valleys of the Beaver and Ohio rivers, meeting at Rochester, form a storm center which seems to be the collecting and distributing point for all stray storms. Our records for the season just closed show thirty-one storm periods of lightning discharges ranging from fifteen minutes to two and one-half hours in duration, and during the season of 1914 there were about fifty-five storms. The average over a period of years was about forty-three storms per season.

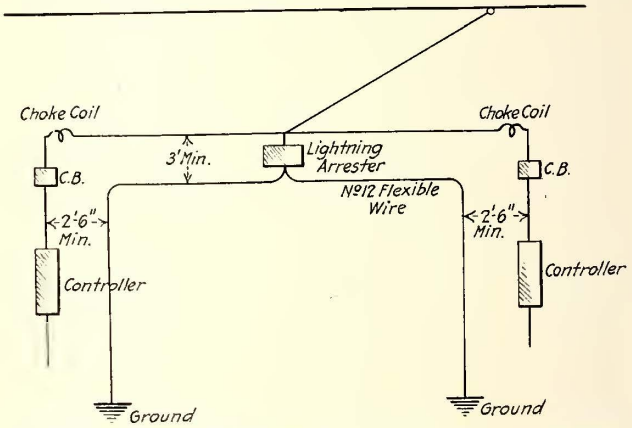
The switchboard in the Junction power house has been equipped for eight or ten years with a home-made arrester, often scouted by visitors as being worthless. Nevertheless our chief engineer, W. H. Braunbeck, has been so enthusiastic over it as to equip our Economy plant with the same type. This arrester consists of wire extensions from the main positive and negative busbars, parallel and about 8 in. apart. These two wires, No. 00 trolley, are bridged by ten No. 24 single cotton covered copper wires, separated by transite boards. The positive and negative wires are also separated by transite board so that no arc can carry across and form a destructive short-circuit. The effective thickness of insulation between positive and negative busbars is 0.007 in. of cotton, which under tests averages a breakdown voltage of 750. In other words, we have an arrester which relieves all line stresses above 750 volts. Our normal line voltage is 550.

With one exception the arresters installed in parallel with this arrester for years have never been known to discharge while the pop of the fuses of No. 24 wire is quite common. The operation of this arrester demonstrates the correctness of the recommendation of the 1915 A. E. R. E. A. committee on lightning protection when it prescribes "That the flash-over point of the arrester be set at a voltage as close to the maximum operating voltage of the system as may be practicable."

The one arrester which has been excepted in the above statement is the aluminum cell arrester, one of which was installed on May 10, 1915. Since that date neither the home-made arrester nor any other than the aluminum cell has ever been known to discharge. In other words, the aluminum cell arrester will relieve line disturbance at less than 750 volts, probably at 625 or 650 volts. This is commonly known, but the above facts should be proof to the unbelieving.

The net result of this protection over a period of years has been that our power houses have been practically free from lightning damage. In June, 1915, however, one generator was grounded by a lightning discharge, but this was due to weakening of the insulation to such an extent that a ground at normal line voltage would probably have occurred soon without any lightning to help it along.

The proper protection of overhead lines and the maintenance of this protection at an effective value is so important to power house and rolling stock protection that its value can scarcely be over-estimated. During the season of 1914 our overhead lines were protected by forty-one arresters, or 1.47 per mile of double track, these arresters being Westinghouse MP and Garton-Daniels, principally the former. During the winter of 1914-1915 plans were laid for an improvement in this protection. A plat was made of our entire system, showing by various symbols the following information: points of damage by lightning in 1914; feeder taps in 1914, and effective arresters in 1914. From this information and from a study of geographic and traffic conditions this plat was further marked with symbols to indicate feeder taps in 1915 and suggested locations for arresters in 1915. The number of arresters proposed was much in excess of the number installed in 1914, the additional arresters to be obtained by removing those



LIGHTNING ARRESTER EXPERIENCE—LIGHTNING ARRESTER WIRING ON CAR

of the magnetic blowout type from cars and applying to overhead lines. The actual improvements made were not quite as extensive as planned, as only certain portions of the overhead lines were equipped with arresters as per notations on the plat. In the installation of line arresters, grounds were made by soldering ground wire to rods driven into the ground, and also in most cases by bonding to the rail. We use no automatic signals.

The protection of car equipment, aside from that afforded by effective overhead line arresters, is the particular phase of lightning protection in which the writer is most interested. Rolling stock in 1914 was protected almost entirely by GE MD and MD-2 magnetic blowout arresters, purchased during the years 1911 to 1913. These arresters were properly installed with choke coils and so wired as to reduce inductive effects to a minimum. It was considered advisable to carry two of these arresters per car, one being hung from the lower side of the hood in each vestibule, thus giving each car double protection. All arresters were inspected and tested at the opening of the season to break down at 1600 volts. After each storm the arresters were inspected and immediately replaced if found defective. The net result of this protection was the loss of thirty-five armatures and of six lighting circuits in cars during the 1914 season, a poor record but the best obtained on our system as far back as our records go.

As a result of the above-described experience it was decided to install GE aluminum cell arresters on all regular cars. All arresters were mounted in the center of the cars on the roof. We noted that this is recommended practice, i.e., "The lightning arrester of whatever type and choke coil should be located as near the trolley base as practicable." The A. E. R. E. A. committee reports a small minority following this practice. Instead of using only one ground wire, two No. 12 ground wires were used in parallel, one running to each end of car, thus giving sufficient current-carrying capacity and at the same time reducing by one-half the inductance of the ground circuit. No lightning arrester wires were run in metallic conduit and all splices were soldered. Inspection of these arresters was made regularly every two weeks during the season.

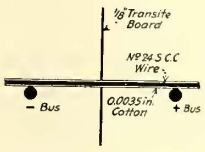
The record for the season of 1915 after the installation of the aluminum cell arresters on May 6 is as follows:

One incandescent lamp burned out on an extra car protected by Garton-Daniels arrester; probably due to lightning.

One K-10 controller blow-out coil grounded on an extra car protected by GE MD-2 arrester.

One K-10 controller blow-out coil grounded on a regular car protected by an aluminum cell arrester, but operating where the overhead line was unprotected.

This is a total lightning damage amounting to $8.10. While lightning discharges during the past season have been comparatively light, our cars on June 13, 1915, passed through the worst electrical storm in the history of Beaver Valley, when for two and one-half hours the sky was continuously illuminated by terrific lightning discharges. Not a cent's worth of damage was done to our rolling stock by lightning in this storm. It has, therefore, been conclusively proved that by the installation of electrolytic arresters on rolling stock, assisted by adequate overhead line protection, an electric railway may be immune from lightning damage.



HOME-MADE LIGHTNING ARRESTER

That the adoption of this type of arrester has not been more general has been due partly to the much feared high cost of maintenance. A few figures for one year of operation may be interesting:

Double-Truck Cars, Twelve Equipped

Cost of aluminum cell arresters at $12.38	$148.98
Renewals	nothing
Cost of inspection	nothing
(This item is readily absorbed in a day's work, not requiring more than five minutes every two weeks.)	
Cost of installation of arresters and wiring at $2.10	$25.20
Cost of removing, cleaning and storing for the winter at $0.12	1.44
Total cost	$175.62
Cost per double-truck car	$14.66

Single-Truck Cars, Ten Equipped

Cost of aluminum cell arresters at $12.38	$123.80
Renewals of cells, electrolyte, etc	42.13
Cost of installation at $2.10	21.00
Cost of removing, etc., at $0.12	1.20
Total cost	$188.13
Cost per car	$18.81

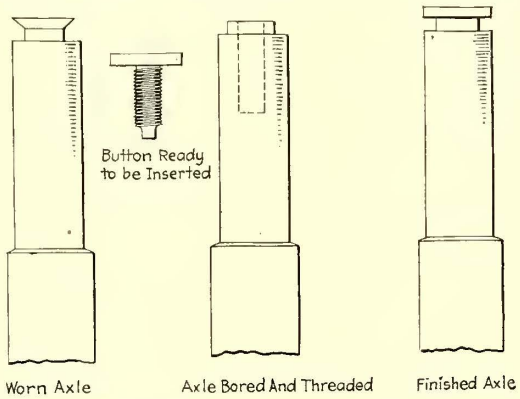
The high cost of renewals on single-truck cars is due to the continual oscillation which gradually bridges over the creepage surface between the positive and negative plates, causing a deposit and finally partially short-circuiting the two plates. This in turn causes the electrolyte to boil away. Though affording practically as good a protection on single-truck cars, this type of arrester will need further development before its maintenance can be reduced to the low level attained on double-truck cars. Allowing a cost of $10 per armature for removal, repairs and replacement of one grounded by lightning, our cost for damage done to armatures by lightning in 1914 was $350. Our total cost of lightning protection in 1915 was $363.75 and total damage resulting in 1915 was $8.10. Our return on the investment of new arresters is therefore 96 per cent the first year.

Reclaiming Worn Button-End Axles

BY J. N. GRAHAM

Master Mechanic Rockford & Interurban Railway, Rockford, Ill.

A practical method of reclaiming worn button-end axles has been developed by the mechanical department of the Rockford & Interurban Railway, Rockford, Ill. A worn axle is first placed in a lathe with the worn end of the axle toward the tailstock. In this position the jaws of the chuck are tightly clamped on the axle to keep it perfectly centered. A steady rest is then placed at the opposite end of the axle, the tailstock center is withdrawn and the old button is turned off. The end



BUTTON-END AXLE, BEFORE AND AFTER RECLAIMING

of the axle is also bored and threaded for a 1½-in. standard thread. If a 1½-in. stub tap is at hand it may be used to save cutting the thread in the lathe. This method of threading, however, is more practical than to use a stub tap because the lathe keeps the threads in perfect alignment with the axle.

New buttons are made from sections of old axles cut in 4-in. lengths. These pieces are centered on both ends, and one end is turned to the diameter and thickness of the button required. The remainder of the piece is turned down and threaded to fit the axle. The best way to do this is to have the finished buttons ready to fit into the axle as the threads are being cut. The axle should be left in the lathe and the button screwed into it. In order to insure results the threads of the button and axle should fit very tightly, requiring a large pipe wrench to tighten the button in position.

When this has been done, the tailstock center may again be inserted, the steady rest removed and, if the axle needs truing which is frequently the case, it may be turned and polished. After the axle is taken out of the lathe, a ½-in. hole is drilled radially through the plug and the axle. This hole is countersunk on both sides of the axle, and a ½-in. countersunk rivet is inserted and riveted. The rivet is afterwards filed or turned off and polished to conform with the axle. The purpose of the rivet is to secure the button in the axle. When the buttons of the reclaimed axles become worn, the rivet may be drilled out and a new button inserted at a very small cost. This method of reclaiming worn axles has proved very satisfactory. It prolongs the life of the axle indefinitely, and by keeping good buttons on the axles the life of the check plates is increased since a worn axle soon cuts through a check plate and renders it useless.

Starting Currents of Interurban Car Motors

BY D. D. EWING
Assistant Professor of Electrical Engineering, Purdue University, LaFayette, Ind.

Within the past couple of years there have been made, under the writer's direction, a number of tests on different types of electric cars. In view of the present interest in railway motor overload ratings it is thought that some of the data secured in these tests may be of general interest.

In Table I is listed some general information regarding the equipments tested. It will be noted that in making the nine test runs listed, five different motor cars were used. These cars were operated during the tests by their regular crews on their regular schedules. In general, ordinary operating conditions prevailed and the results obtained may be considered as typical for the operating conditions which obtain on central and nothern Indiana interurban railways. The tests were all made in the winter, the air temperatures ranging between 0 deg. C. and 10 deg. C.

In Table II the lines of figures beginning "Maximum motor current (series)" give the maximum, minimum and average values of the motor currents which obtained at the instant of starting for the number of starts listed in the line beginning "No."

In general only runs where the controller was notched up steadily, at least to the full series position, were selected. Thus in the entire run of 137.5 miles, in only fourteen starts was the controller notched up steadily to the full series position during the test of car No. 1. Few of what might be called "typical" starts, in which the controller was notched up steadily to the full multiple notch, the car continuing thereafter to accelerate on the motor characteristics until balancing speed was attained, were made. When starting in a town or city the motorman in most cases alternately ran on one of the series notches and coasted until private right-of-way was reached. On this account it was generally possible to secure a larger number of "Motor current at balancing speed" readings than "Motor current at end of three minutes" readings. Irrespective of the manner in which the start was made, however, in no case were the maximum currents at starting greater than those listed in the table.

Although not indicated in the table the first notch in the multiple position ordinarily gave the maximum motor current for the parallel connection of the motors, and this notch was usually reached about thirty seconds after the start, so that the figures in the lines of the table which begin "Maximum motor current (multiple)" approximately represent the motor currents at the end of thirty seconds.

The balancing current of a car is, of course, affected by the profile of the roadway, the current-time curve for a run at balancing speed having undulations corresponding to the undulations of the roadway. The tabulated values were secured by averaging the current-time curve for the corresponding period of balancing speed running.

The data on "Motor current, average thirty seconds," and "Motor current, average one minute," were secured by averaging the current-time curves for the corresponding periods of time.

The average voltages were obtained by averaging the voltage-time curve for each run.

In order to better compare the average motor currents for the various times during the starting period

TABLE I—GENERAL DATA

Test number	1	2	3	4	5	6	7	8	9
Motor car number	1	2	3	3	4	4	4	5	5
Number trailers	....	....	....	....	....	1	2	1	....
Service	passenger Limited	passenger Local	passenger Local	Local passenger	Freight	Freight	Freight	Freight	Freight
Weight, empty, tons	40.5	39.15	41.7	41.7	37.6	37.6	37.6	33.4	33.4
Weight, loaded, tons	43.1	40.5	44.0	44.3	42.0	46.7	47.1	44.6	45.0
Weight, trailers, tons	....	....	....	....	....	17.5	41.0	22.9	....
Weight, total train, tons	43.1	40.5	44.0	44.3	42.0	64.2	88.1	67.5	45.0
Number motors	4	4	4	4	4	4	4	4	4
Make of motors	GE-73	GE-73	West. 303-A	West. 303-A	GE 205-B	GE-205-B	GE-205-B	GE-73	GE-73
Gear ratio	1.78	2.12	2.67	2.67	3.35	3.35	3.35	2.12	2.12
Wheel diameter, inches	35.6	34.1	36.3	36.3	35.6	35.0	35.0	32.4	32.4
Length run, miles	137.5	137.5	114.2	114.2	63.2	25.0	26.0	28.3	109.2

TABLE II—MOTOR CURRENTS DURING STARTING

Test Number		1	2	3	4	5	6	7	8	9
Maximum motor current (series), amperes	Maximum	255	180	180	185	195	140	255	160	170
	Minimum	180	116	105	110	100	105	170	120	120
	Average	206	147	145	150	150	125	200	140	143
	Number	14	26	36	23	6	5	4	3	9
Maximum motor current (multiple), amperes	Maximum	122	116	130	132	132	145	175	105	105
	Minimum	76	60	80	65	102	100	145	87	72
	Average	106	83	97	89	115	120	160	100	86
	Number	8	20	36	22	7	5	4	5	9
Motor current at end of one minute, amperes	Maximum	100	80	82	82	61	70	120	...	80
	Minimum	56	48	50	52	47	50	52	...	48
	Average	78	68	68	67	53	56	77	80	68
	Number	9	18	36	23	7	5	4	1	9
Motor current at end of three minutes, amperes	Maximum	64	56	62	55	40	42	52	...	70
	Minimum	52	44	40	40	35	35	44	...	48
	Average	56	48	45	46	37	40	48	...	53
	Number	6	12	17	11	5	6	3	...	10
Motor current at balancing speed, amperes	Maximum	62	50	50	52	42	40	44	46	66
	Minimum	48	40	37	37	30	37	42	42	30
	Average	56	47	44	46	35	38	43	44	47
	Number	17	14	19	17	7	6	3	3	17
Motor current, average thirty seconds, amperes	Maximum	168	120	150	145	110	100	170	...	140
	Minimum	104	72	90	90	90	70	125	...	88
	Average	130	97	120	118	100	88	150	...	115
	Number	14	26	36	22	6	5	4	...	8
Motor current, average one minute, amperes	Maximum	122	100	112	118	102	93	147	...	105
	Minimum	100	64	82	80	83	86	110	...	80
	Average	105	83	96	95	90	85	125	...	93
	Number	8	18	36	22	6	5	4	...	6
Average voltage for run		630	636	525	522	532	532	532	585	606

TABLE III—MOTOR CURRENTS DURING STARTING IN PER CENT OF BALANCING CURRENT

Test Number	1	2	3	4	5	6	7	8	9	Average
Balancing current, amperes	100	100	100	100	100	100	100	100	100	100
Motor current at end of three minutes, amperes	100	102	104	100	106	105	112	...	113	105
Motor current at end of one minute, amperes	139	145	155	145	152	147	179	181	145	154
Maximum motor current, motors in parallel, amperes	189	176	220	193	328	316	372	227	201	247
Maximum motor current, motors in series, amperes	368	313	330	326	428	329	465	318	304	353

Table III has been prepared. In each case the average balancing-speed current has been used as the basis of comparison, it being expressed as 100 per cent, the other currents being expressed in percentages of balancing-speed current. It will be noted that in general the motor current at the end of three minutes is practically the same as the balancing-speed current, and that at the end of one minute it is only about one and one-half times the balancing-speed current.

The tests were made with the graphic-recording, portable car testing set described in the issue of the ELECTRIC RAILWAY JOURNAL for July 24, 1915.

The writer wishes to express his indebtedness to the Fort Wayne & Northern Indiana Traction Company and the Terre Haute, Indianapolis & Eastern Traction Company, through whose co-operation the tests were possible, and to a number of students of Purdue University, who, in the course of their thesis investigations, collected the major part of the original data.

The Protection of Car Finishes

BY CARL F. WOODS
Secretary Arthur D. Little, Inc.

In our research and testing work for electric railways nothing has proved more enlightening than the analyses of car-washing soaps, paints and varnishes. These products lend themselves easily to deception of the buyer because he cannot readily detect their purity or suitability. The alternatives "purity" and "suitability" are used deliberately, for it is one thing to assert that a manufacturer is dishonest and another to state that he has furnished an unsuitable product.

The buyer and not the seller is at fault if a paint which is not resistant to corrosive influences is purchased for use in a salt-laden atmosphere, or if a short oil varnish intended for interior work is used for the exterior finishing of cars. Too frequently the buyer purchases a product which he knows has given satisfactory service in some other place and perhaps for some entirely different purpose without consideration of the special requirements of his own service. It is essential that the manufacturer should be fully advised of the exact conditions to which his product will be subjected and, then, that the buyer should take the necessary steps to insure delivery of the products required. The specialized knowledge obtained by the reputable paint manufacturer regarding various pigments, vehicles and combinations of these is of great importance to the user, and no buyer is justified in neglecting to obtain all of this information, which is readily at his disposal.

An Experience with Car-Washing Soaps—About a year ago we were requested by one of the largest Eastern electric railways to analyze a number of brands of soap which had been brought to their attention for car-washing purposes, with a view to determining which was the most economical for their purposes. The following table shows the result of this investigation:

Sample	1	2	3	4	5
Price per pound, cents.	3.5	4.13	6	4.5	5.75
Moisture, per cent.....	32.96	79.50	64.74	63.60	3.08
Total fat, per cent.....	53.00	12.90	27.19	29.34	79.74
Comb'd alkali, per cent.	9.14	0.98	4.63	4.63	13.57
Free caustic, per cent..	None	None	None	None	None
Free carbonite, per cent	0.26	5.57	0.11	0.09	0.13
Glycerine, per cent....	4.64	1.05	3.23	2.34	3.48
Effective soap, per cent	62.14	13.88	31.82	33.97	93.31
Price per pound of effective soap, cents..	5.6	29.7	18.9	13.3	6.1

It will be readily seen that while the difference in price per pound as received was not great the price of the actual soap received, due to the varying content of moisture, ran from 5.6 cents to 29.7 cents per pound. Soap No. 4, for instance, although much cheaper than No. 5 as purchased, actually cost twice as much for the soap received. Soap No. 2, on the other hand, was found to contain a large quantity of free alkali and was not comparable with the others as it was a soda soap and inferior to the others for this purpose, all of the rest being potash soaps.

As a result of these tests it was found that the soap which best combined economy, purity and suitability was neither the 6-cent nor the 30-cent soap, but one of the medium priced soaps. As a result, the company is now purchasing its car-washing soaps on a carefully drawn specification, which insures a satisfactory article and permits the benefits of competition.

What general manager or purchasing agent would pass a requisition for an article at a much higher price if he lacked such proof as was gathered in this instance?

Another Soap Experience—Not long ago one of our clients experienced serious trouble in revarnishing cars, due to the crawling of the varnish in spots. Suspicion was naturally directed to the varnish, but this proved to be an eminently suitable varnish for the purpose and an investigation showed that the real trouble lay in the car-washing soap. This soap, although free from the harmful caustic alkali, contained a large percentage of uncombined fat, so that when the car was washed before varnishing thin films of this greasy fat remained on the surface, to which, of course, the varnish would not cling. Here, again, information of decidedly practical value was obtained at the trifling expense of a soap analysis.

Paints and Varnishes—If it is important to find the soap that will best maintain car finish it is even more important that the most suitable paints and varnishes should be applied to the car. Frequently a color is selected for the cars without reference to the pigments which must necessarily be used to obtain the exact shade desired, with the result that either an excessive expense is incurred for the finish or that rapid deterioration takes place due to the use of unsuitable pigments. There is a wide range of car-body colors which are eminently suitable for the purpose, which can be readily obtained from any number of reputable manufacturers and whose composition can be quickly checked by chemical analysis, affording the manager all of the range necessary in selecting a shade for his cars.

The selection of varnish is by no means a simple matter, as it is impossible from chemical analysis alone to obtain all of the necessary information. On the other hand, purchasing the highest-priced varnish is not necessarily a safeguard, as the varnish furnished may be much better than necessary for the purpose. Chemical analysis can, however, readily detect adulteration and the presence of substances like rosin, turpentine substitutes, etc., which either seriously impair the wearing qualities of the varnish or reduce its intrinsic value. A combination of this kind of testing with service tests of those varnishes which are free from objectionable ingredients will rapidly enable the railway company to obtain a satisfactory article at a reasonable price.

The introduction of quick-drying methods has introduced another important phase of the question. The elimination of idle car-hours by cutting down paint-shop time from a week to twenty-four hours offers a tempting prospect to the manager. It is essential, however, in reductions of this kind that intelligent care be used, as not all quick-drying methods produce satisfactory results. The character of the wood, the paint and varnish employed and the facilities for drying demand scientific study to the end that the economies effected may be real.

The increasing use of steel cars particularly neces-

sitates a careful selection of the finishing materials. It is too commonly assumed that steel will withstand practically any service conditions; the fact is overlooked that the ⅛-in. or 3/16-in. side girders, now common in car building, will not maintain their strength very long if not protected against corrosion. Rivets are also particularly vulnerable places in the car armor.

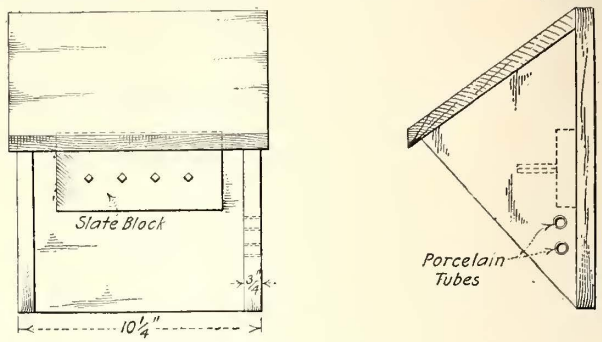
In brief, the diverse conditions under which car-finishing materials are employed should absolutely preclude their purchase on the basis of price, prejudice or past experience in other localities. Only a thorough knowledge of the various materials available, together with a comprehensive system for insuring the receipt of the proper materials, will enable the application of that foresight which is worth so much more than hindsight.

Remodeling a Railway Telephone System

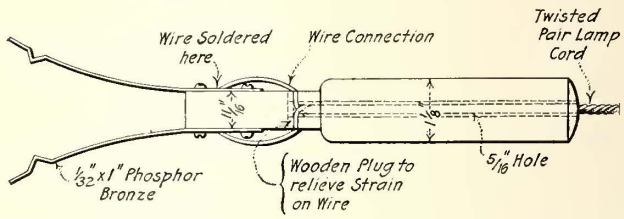
During the past summer the Buffalo, Lockport & Rochester Railway reconstructed its telephone system, doing away with booths located along the tracks and substituting portable telephone sets carried on the cars, the wall sets being reconstructed for this purpose at a nominal cost.

The road was formerly outfitted with twenty-five telephone booths distributed along the 55-mile right-of-way between Rochester and Lockport, N. Y. Stromberg-Carlson wall sets were used in these booths. Along the right-of-way there are duplicate telephone lines of No. 12 bare copper wire, the line designated as No. 1 being used for power dispatching and miscellaneous communication, and that designated as No. 2 being used for train dispatching. The passenger and freight stations are normally on the No. 2 line also. The lines are run at the top of the distribution line poles and are transposed every fifth pole to eliminate induction, as the 60,000-volt transmission line is located on the opposite side of the track from the distribution line. Both telephone lines run through all power substations and passenger stations, and section switches are placed at these points to permit the localization of trouble.

On account of the cost of new portable telephones with the necessary jack boxes, etc., and of the impracticability of disposing of the wall sets to advantage, it was decided to convert the latter into portable sets and to construct suitable jack boxes for use in connection with them. The results are shown in an accompanying illustration.

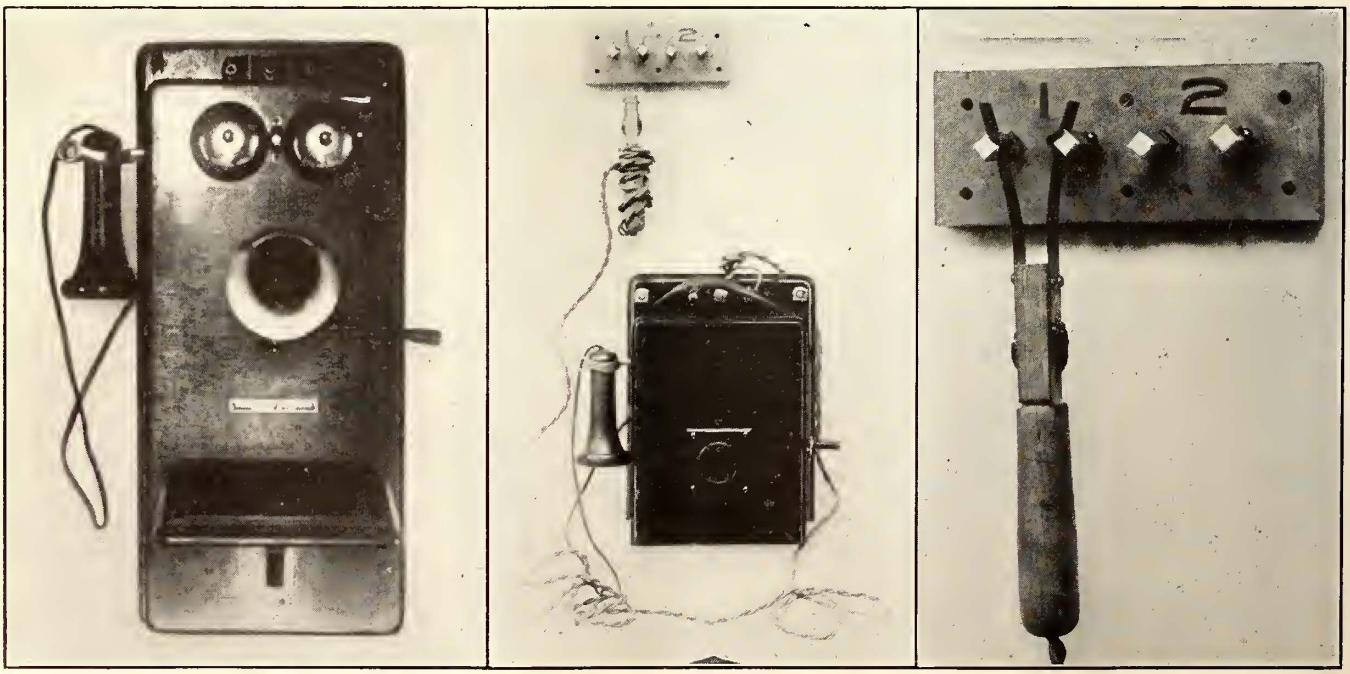


PORTABLE TELEPHONES—WOODEN SHELTER FOR PEG BLOCKS



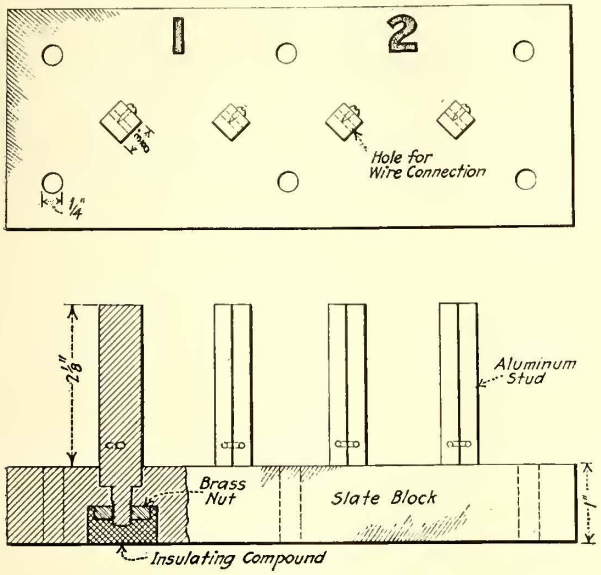
PORTABLE TELEPHONES—MAPLE JACK HANDLE WITH PHOSPHOR BRONZE CONNECTION SPRINGS

In converting the telephone sets the transmitter arms were removed and the transmitters were placed inside the box with the mouth pieces protruding, wooden blocks being fitted around them to eliminate breakage. The boxes were cut off below the magneto supports and bells were removed, small dry cells being fitted inside the boxes at the top behind the former location of the bells. Leather straps were bolted to the box top for convenience in carrying, and on each box a piece of ⅛ in. x 1 in. flat iron bent to form two pockets was attached. These pockets were of suitable size to hook over two hooks, made of ⅛-in. x 1½-in. flat iron which were



PORTABLE TELEPHONES—WALL SET FORMERLY USED, REMODELED SET WITH JACK AND CONNECTING CORD, AND CONNECTING JACK SHOWN ON A LARGER SCALE

fastened to the side of the car to support the sets. Felt strips were secured to the backs of the boxes at the bottom to hold them in line with the side of the car and to prevent vibration. Fifty contact blocks were distributed along the line, each consisting of a slate back with square aluminum pegs set into them.

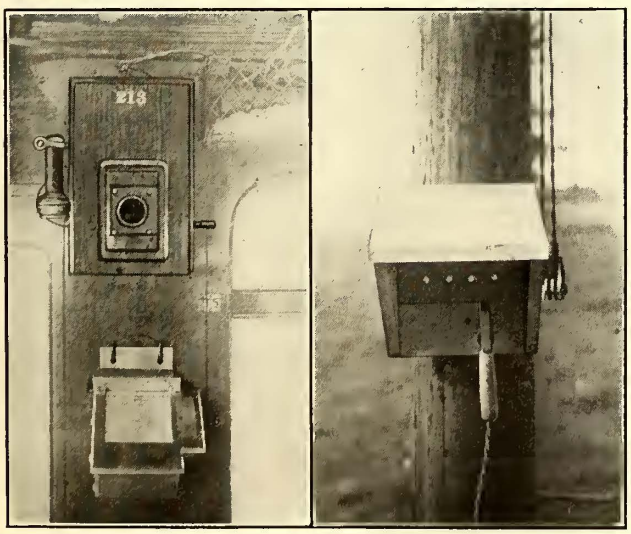


PORTABLE TELEPHONES—SLATE CONNECTING BLOCKS WITH ALUMINUM PEGS

The pegs were secured by nuts at the backs of the blocks, countersunk holes being provided for this purpose. After the pegs were clamped into position electrical compound was run into the holes. Holes were drilled in the square portion of each peg to permit taps from the telephone line to be attached and held firmly in place by means of set screws.

For the connection from telephone to jack box the jack illustrated was made, and a piece of maple 1 in. x 1¼ x 7 in. was used to form a handle and a support for the contact strips. The latter were made of phosphor-bronze strips 1 in. x 1/32 in. x 5½ in. in size, with a "V" formed near the end of each to facilitate the making of good electrical contact with the pegs in the jack box. Connecting wires were brought out through the wooden handle and attached to ordinary twisted pair lamp cords.

Wire baskets which were used on the cars for holding flags were relocated and placed near the telephones so that the jack handles and wire could be easily placed out of the way after use. This convenience appears not to have been appreciated by the train crews, who ordinarily coil the wire around the telephone after use.



PORTABLE TELEPHONES—SETS AND REGISTER IN CAR AND CONTACT BLOCK SHELTER ON POLES

Connections between the overhead telephone line and the jack boxes were made with twisted pairs of telephone wires, the lines being brought down the poles on porcelain knobs. Wooden shelters, as illustrated, were provided to protect the plug bases, and the wires were taken into these shelters through porcelain tubes. The figures 1 and 2 were painted at the top of each plate block to designate the line, but these were really unnecessary as the No. 1 line is always connected to the left-hand pair of plugs and the No. 2 line to the right-hand pair.

The jack boxes were installed at each end of double-end sidings and at each side of the switch at single-end sidings and they were placed at a height convenient for access from the cab door of the car.

In connection with the portable sets it was decided to use Egry registers for taking train orders, and a holder was provided for these registers directly below each telephone set at a height from the floor convenient for writing. Each motorman is furnished with one of these registers and is directly responsible for its care. All telephone sets have the numbers of their designated cars painted at the top, and a few extra sets marked "Spare Telephones" are kept on hand at the car shops in Rochester and at the line foreman's workshop at Albion, N. Y. These are used to replace temporarily car sets which are undergoing repairs.

The cost of the change from wall sets to portable sets is given in the following table:

	Labor	Material	Total
Fifty wooden shelters for jack boxes	$12.35	$10.68	$23.03
Fifty slate bases with aluminum contacts	.....	30.00	30.00
Twenty-five jack handles, including wire	5.58	12.06	17.64
Twenty-five portable telephones — cost conversion	18.35	9.00	27.35
Relocating wire baskets and installing telephone support hooks in twenty cars	19.52	2.15	21.67
Insulators, wire, connectors, etc., for connection overhead telephone lines to jack boxes, including installing jack boxes	45.20	71.93	117.13
Total	$101.00	$135.82	$236.82

The change to the portable phones was made about the middle of the summer and since then no trouble worthy of note has been experienced. The extent of the saving in first cost can be appreciated by comparing the costs given in the above table with those of new portable sets and jack boxes. The advantages of this system over that in which wall sets are used in booths have been shown by the experience of this railroad to be as follows:

There is a saving of approximately two minutes on every call of train crews for the dispatcher. The jack box is so simple that there is no difficulty in keeping it up. Telephone maintenance is less, repairs being made in the shop instead of in the booths formerly used.

The system is very flexible because telephone communication can be established from any point by installing a simple jack box.

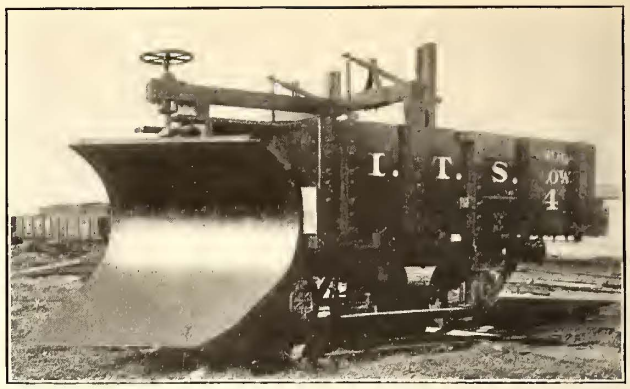
At highway crossings where the view is obstructed and considerable automobile traffic obtains, the Chicago, Lake Shore & South Bend Railway, Michigan City, Ind., has installed warning signs on the highways 300 ft. each way from the crossing. These signs are placed on the right side of the highway and in large letters warn the automobile driver that he is 300 ft. from the track. This is considered ample braking distance for an automobile which is approaching the tracks at a high rate of speed.

An Independently Mounted Snow Plow

Deep snow drifts are removed from the lines of the Illinois Traction System, Peoria, Ill., and the Chicago, Ottawa & Peoria Railway, Ottawa, Ill., by standard snow plows having nose-type shares mounted on independent trucks. One of these plows is shown in the accompanying illustration. Essentially the plow consists of an adjustable nose plowshare supported on a wooden body which in turn is mounted on two pairs of standard car wheels. The plowshare is 4 ft. 8 in. high and 8 ft. wide, and as shown on the line cut, the lower point of the share is 3 ft. 4 in. in advance of the top. This tends to keep the share down when in service. The share is made of ¼-in. steel plate secured to an angle-iron frame with rivets countersunk on the plow face. The plow is so mounted on the projecting end of the truck frame that the share may be raised or lowered by a hand wheel and screw having a maximum range of approximately 6 in. The purpose of this adjustment is to clear the share of obstructions and to lower it practically onto the rail when necessary. After the plow has been raised or lowered to any desired position, the mechanism can be locked. Besides the large plowshare, which is designed to clear the track through heavy drifts, flangers are provided to clean the rails. These flangers can be raised or lowered to any desired position by hand levers operated from the truck body.

The car body proper is built of wood, and it is 8 ft. wide by 11½ ft. long by 2½ ft. deep. It is mounted on two pairs of standard car wheels which are bolted direct to the body underframe. As will be noted in the illustrations, the front pair of wheels is attached to the underframe slightly in advance of the front of the body. This construction provides stability against overturning, by counteracting the tendency to press the share down into the ties when plowing heavy drifts. The other pair of wheels is attached to the underframe 7 ft. 6 in. behind the front wheels. The wheel mounting consists of strap-iron journal box yokes bolted to the underframe, and 4-in. x 4-in., 12.8-lb. angles bolted between the bottoms of the yokes hold the wheels rigidly in position. Other details of the plow are shown in the illustrations.

In service this plow is coupled to the front end of a motor express car. Ballast, usually consisting of boulders and scrap iron, is deposited in the body. The plow complete, together with the ballast, weighs about 17 tons. Experience has demonstrated the advantages of

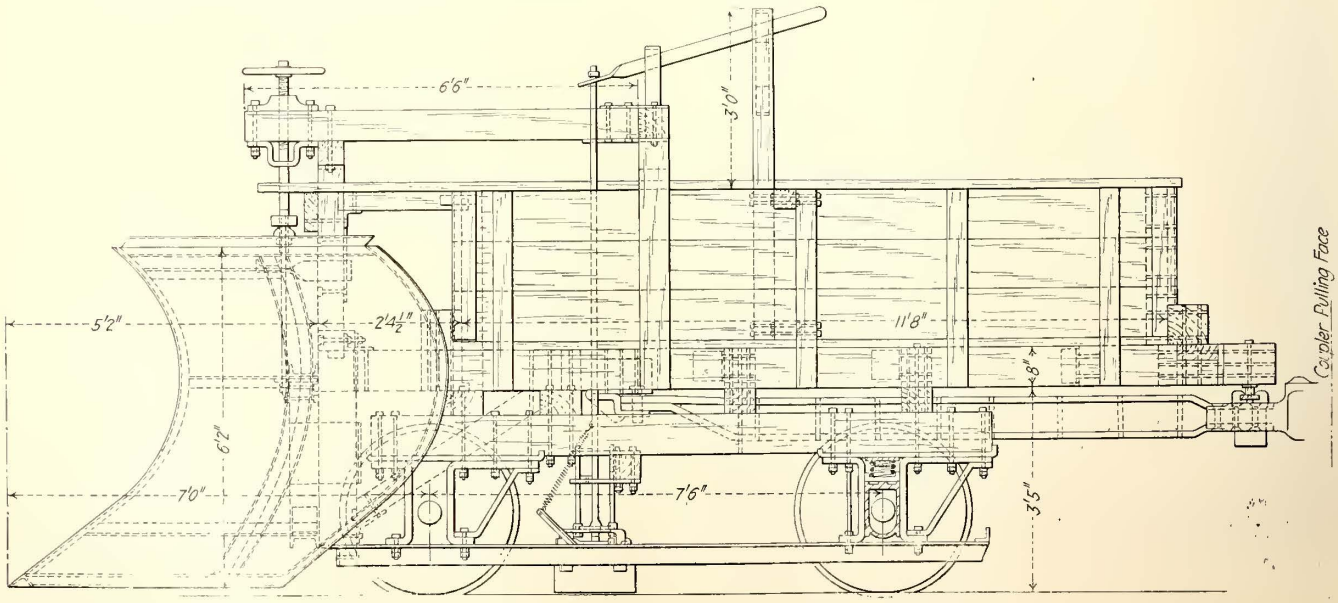


ILLINOIS TRACTION'S STANDARD SNOW PLOW—GENERAL VIEW

independently mounting the plow. It is always ready for service, thus eliminating the delay incident to the use of a plow that must be mounted on a car. The plow is relatively inexpensive in construction, as compared with a self-propelled plow, and the combination of the adjustable, large share and the flangers makes it serviceable for both paved streets and open-track construction. This plow is one of three which have now passed through three winters and have given satisfactory results. J. M. Bosenbury, superintendent of motive power and equipment of the Illinois Traction System, is responsible for their design and construction.

Copper Production by Countries

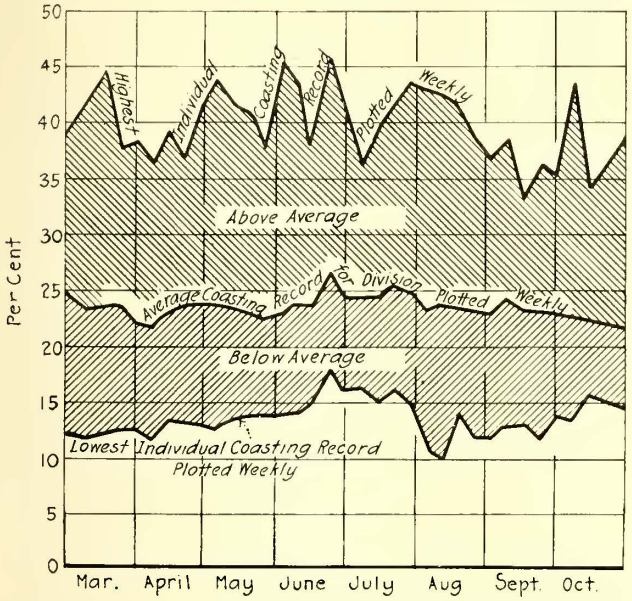
The world's output of copper is normally about 1,000,000 tons per year, this figure having been practically exceeded in 1912. The United States produced 55 per cent of the whole, and the whole of North and South America, 73 per cent. Japan is the next biggest producer with 65,500 tons, and other countries' contributions are as follows: Spain and Portugal, 59,000 tons; Russia, 33,000 tons; Australasia, 47,000 tons; the combined product of Germany, Hungary, Turkey and Bulgaria, when on a peace footing, 35,000 tons; and Great Britain, 300 to 400 tons. The total production of the British Empire is about 100,000 tons, or about one-tenth of the world's output. The four biggest consumers in 1912 were: North America, 365,922 tons; Germany, 243,173 tons; Great Britain, 147,551 tons, and France, 106,753 tons.



ILLINOIS TRACTION'S STANDARD SNOW PLOW—DESIGN DETAILS

Graphic Coasting Record at Boston

Several users of the Rico coasting recorder have originated valuable features for making the records more interesting and forceful than they would be in figures alone. A recent contribution is that of the Boston Elevated Railway, which has devised the graphic record presented in the accompanying illustration to show the relative number of men above or below the average



GRAPHIC COASTING RECORD USED ON BOSTON ELEVATED RAILWAY

coasting record. On the original the "plus" men are represented by an area of solid blues, and the "minus" men by an area of solid red. The record reproduced is that of Division 4, surface lines, Boston Elevated Railway. Similar records are made also for the subway and elevated lines. The Boston Elevated Railway is now using 419 Rico coasting recorders.

Treated Car Roofing

The desirability of using a roof covering that will effectively withstand severe weather conditions and the fading due to strong sunshine led to the introduction some time ago of "Bayonne" car roofing by John Boyle & Company, Inc., New York. This car roofing is a special woven cotton fabric treated with a waterproof preservative preparation. This liquid preservative is applied evenly and smoothly to the fabric as the latter is fed into a machine. The fabric is then run through heavy pressure rollers, which force the liquid into the cloth so that every fiber is thoroughly permeated.

The advantages of this treated car roofing over ordinary canvas roofing are stated to be as follows: It is absolutely waterproof, and does not need to be made so after installation, as is the case with cotton duck. Cotton duck is usually painted to make it waterproof. When the paint comes in contact with the cotton it has a tendency to burn or char the cotton fiber, which necessitates covering or patching the roof in a very short time.

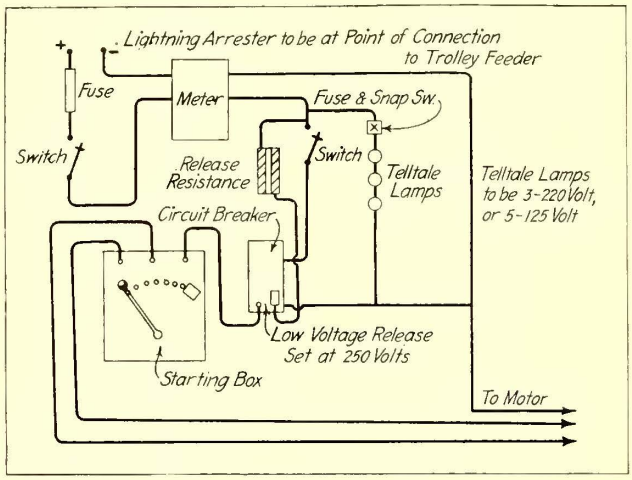
A roof covered with treated roofing is said to be neater in appearance than an ordinary canvas roof, because a man cannot paint a roof as evenly as the machine finishes this fabric. This roofing saves paint enough to more than offset the additional cost of painting an equal weight of untreated cotton duck, and saves the time necessary to apply the paint.

This treated roofing is made in but three weights, any of which will stand considerable wear and tear. On the other hand, cotton duck is made in all weights from a fabric as open as cheesecloth up to weights as heavy as the fabrics used for Bayonne roofing. After cotton duck is painted one cannot tell from its appearance what weight or thickness it is and whether it will last for years or for months.

This roofing is made in yellow and brown and in all widths from 22 in. to 120 in., so that it is possible to cover car roofs of different sizes without waste.

D.C. Motor Insurance Reduced in Indiana

Until recently the electric interurban lines in Indiana have been more or less barred from entering the power field because the national electrical code made no allowance for d.c. motors taking current from grounded railway systems, except when they were housed in an entirely fireproof room. In other words, even when they were installed under ideal conditions the insurance rate remained the same. This made the cost of installation to obtain the minimum rate prohibitive, consequently few d.c. motors have been put in service. All d.c. motor installations not placed in a fireproof room were assessed with a minimum insurance rate of $1 per $100. Recently the Indiana Inspection Bureau, of which E. M.



STANDARD D.C. MOTOR INSTALLATION ON GROUNDED CIRCUIT

Sellers is the head, through its engineer, W. I. Stone, promulgated a standard method for the installation of d.c. motors which is shown in the accompanying diagram. When this method is followed no extra charge is made in the regular insurance rates. However, where the different protective devices shown on this diagram are not included, charges are made for their absence. In connection with this standard method, d.c. motors are required to be of the totally inclosed or inclosed ventilated, compound-wound, commutating-pole type. All other types of motors must be in a standard inclosure, except that inclosed motors having ventilated openings of No. 16 or smaller wire mesh may be installed under certain conditions, provided that motors of this type are not placed in rooms containing combustible materials, vapors, gases or dust. Aside from these exceptions the d.c., electric interurban lines of Indiana are now on the same basis as the a.c. power companies so far as motor installations are concerned.

Owing to an alleged interference with telephone circuits in the neighborhood of the electrified section of the London & Southwestern Railway, the opening of electrical operation to the public of the Kingston "Roundabout" line has been postponed.

NEWS OF ELECTRIC RAILWAYS

NEW FRANCHISES SOUGHT IN PITTSBURGH

Officers of Pittsburgh Railways Outline Need of Grants Desired in Downtown Section to Improve Service

Traffic problems in Pittsburgh, Pa., were discussed at the luncheon of the Chamber of Commerce on Dec. 27 at the Fort Pitt Hotel. The speakers were J. D. Callery, president of the Pittsburgh Railways, who suggested a downtown subway as one means of relieving congestion; Attorney Edwin W. Smith of the company, who reviewed the history of the traction ordinances pending in City Council, and Mayor Armstrong. There was a large assemblage of business men at the luncheon.

The question of increased transit facilities for Pittsburgh has been under agitation for more than ten years. Despite the efforts of the Pittsburgh Railways, however, the company has been able to do only such constructive work as lay entirely within its own province under existing franchises and grants. The whole question has again become a matter of public discussion through the renewed effort of the company at this time to secure the passage in its interest of ordinances authorizing track changes, requests for which were made by it originally in 1906.

In 1909 the Railroad Commission of Pennsylvania appointed Emil Swensson, an engineer of Pittsburgh, to examine and report to it on conditions in the city. He made his report on March 26, 1910. Many of the recommendations made by the commission as a result of Mr. Swensson's report were adopted by the company. He suggested among other things that the company replan, reroute and reloop the terminal district. He also said: "The additional extensions, connections, curves, turnouts, switches, etc., should be authorized by the city, or the improvements in the system and in its efficiency cannot be made." Stone & Webster also reported for the commission in 1909 and Bion J. Arnold for Mayor Magee in 1910. It is said that Mr. Arnold recommended every one of the curves for which the company now seeks authorization from the city.

In addressing the Chamber of Commerce Mr. Callery said in part:

"While we should like to have all of the cars pass all of the great retail stores, it is impossible to do so without causing delay and congestion. The operation of the cars thus through the city would not be such a serious matter if it were not for the blockades caused by automobiles, wagons and other vehicles. We have other problems to meet at the congested hour, at the Westinghouse works, East Pittsburgh, where 18,000 to 20,000 working people are dismissed at one time.

"The great mills at Braddock, Homestead, Duquesne and McKeesport dismiss employees at the same hour. Even if we had the cars, it would be difficult to get a force of men to work for the few hours at the peak load. I was wondering whether, with the lately established branch of your association known as the Retail Merchants' Association, it might not be possible for the merchants to agree to open and close their stores at different hours. This might be done by an agreement with each other to alternate monthly the time of opening and closing. I think that it should be the duty of the employers of labor to look after the welfare of their employees, and one of the most important things to my mind would be to see that they are properly transported from their homes to their work.

"Within the past year we have purchased and installed more than 300 double-truck cars, eliminating a like number of single-truck cars; and we have now under order for delivery beginning in April, 1916, 240 double-truck, low-floor, side-entrance cars, which cars we have adopted as standard. This new purchase involves an outlay of more than $1,250,000.

"If the city were disposed to build a comprehensive subway through the congested portion of the city the railways would be inclined to negotiate for the use of this subway on a reasonable basis. To build a subway to any one of the outlying districts would involve such heavy fixed charges that it would not justify either the city or the railways to construct it. It seems to me that unless the business portion of the downtown district is spread over a larger area the principal streets now in use will have to be double-decked, one street to be used for cars and vehicles and the other for pedestrians."

Mr. Smith said in part:

"There is now pending before Council a series of ordinances granting franchises to the Pittsburgh Railways, or its underlying companies. These ordinances are for the main part grants of curves or short pieces of track and unimportant except as bearing upon the matter of enabling the company to reroute some of its cars. There are also certain ordinances for an agreement between the city and the different railways as to the removal of tracks on certain streets under this act. These ordinances were presented to Council on Dec. 17, 1915, and final action has been postponed largely upon the insistence of the representatives of the Chamber of Commerce.

"In connection with these franchises the paramount duty of the city officials and the managers of the railway is to determine what is the greatest good for the greatest number, and how the most people can be taken where they want to go in the quickest and most comfortable way.

"Each of these ordinances has a definite purpose. My wish is to outline to you, if I may, the attitude of the railway in the matter of service, and what I say must be very general.

"A company operating such a complicated system as that of the Pittsburgh Railways cannot and does not expect every part of its system to pay. It can only ask that its whole operation shall be profitable. The company hopes for no added profit from the grant of these franchises. It reaches no more people thereby, who will travel, but it may increase the riding habit to some extent by a more convenient service. The expense to it in doing the work required under these ordinances will be great. The company is anxious that these franchises be granted by the city as speedily as possible. The ordinances have not been rushed. In November of 1909, there was a meeting of the Railroad Commission in this city upon the complaint of the city of Pittsburgh to investigate the street railway situation. At and before that time the company had appreciated the difficulty of handling its cars in the downtown district, and had been desirous of obtaining the grants of additional facilities. Some of these grants had been asked for as early as 1906.

"The company was and is anxious to have these ordinances passed. Is that not quite natural? There has been an election, and after Jan. 1, 1916, there will be three new members who have not taken part in the discussion, and cannot be expected to give their approval without serious consideration. It is extremely unfortunate that the final action was delayed to so near the close of this Council, but it required time to prepare these ordinances to determine, among other things, to which of the underlying companies it was best to have the grant made. Then after the railway had done its part of the work, the drafts of the ordinances had to be prepared by the legal department of the city, submitted to, and be approved by, the Department of Public Works before they reached the Mayor and the members of Council. They were presented in final form on Dec. 17, 1915.

"More drastic terms the company is not in a position to accept. Owing to conditions over which perhaps nobody now has any control, the street railway business in Pittsburgh has not been profitable, and even if it were, these grants of curves and switches are not such as in fairness ought to carry any compensation to the city. The public is to derive as much, if not more, advantage from them than

is the railway. They are distinctly for the improvement of the service, which improvement cannot be made without the action of the City Council. They have been recommended, at least in part, by experts who have examined the situation. The general necessity of additional facilities have been recognized by the Railroad Commission. We welcome the opportunity which your invitation to Mr. Callery gave us to present to you our views of the importance to the public of these grants. We do not hesitate to ask your approval of all the ordinances which are now pending."

STRIKERS ENJOINED AT WILKES-BARRE

Striking motormen and conductors, their union officials and leaders and anyone acting in their behalf have been enjoined by a preliminary injunction granted by Judge J. B. Woodward from interfering in any way with the business of the Wilkes-Barre (Pa.) Railway, which is operating its cars. The injunction granted by the court is sweeping in its character and enjoins the striking forces as follows:

"From unlawful picketing; assaulting or intimidating by force or show the company's new employees; from congregating in groups about the company's place of business; from gathering about any place where employees lodge or board for the purpose of enticing them to leave the service; from molesting and annoying by threats, intimidations, menaces or otherwise any passenger who while boarding or alighting from company cars is at or near the boarding or alighting points; from assaulting or maltreating any employee of the company; from interfering with, endangering or destroying or in any manner attempting to injure or destroy any company property."

The court ruled that the matter of allowing $200,000 to the company for damages suffered by the strike was not immediately before the court and could not be adjudicated until a hearing is held. The court said that "the company has a right to carry on its business for which it was chartered without hindrance or damage to its property, and that its employees have a right to work without molestation, and that the public has a right to travel without annoyance."

It was reported from Wilkes-Barre on Jan. 5 that the injunction granted the previous day against striking carmen broke up temporarily at least all attempts at picketing along the lines on which cars are now operated. The Grand Jury has refused to return a true bill against Frank Walker, who was arrested by detectives of the company on a charge of attempting to burn a railway bridge, but William Carr, who was arrested during strike riots, has been indicted. It is alleged he threw a stone into a trolley car.

CHICAGO TRACTION FUND RATE OF INCREASE CUT

Based upon an estimate made by the comptroller of the city of Chicago, the public has been informed of the fact that the rate of increase in the traction fund which is now approaching $20,000,000 will be materially reduced by the increase in wages granted the employees. It is estimated that city's 55 per cent of the net earnings of the surface lines for the year 1915 will approximate $2,017,985. This is more than $550,000 less than the city's share of the net earnings received in April, 1915. The amounts paid into this fund by the surface lines since the passage of the traction ordinance in 1907 are as follows: 1908, $1,556,809; 1909, $1,386,877; 1910, $1,276,252; 1911, $1,705,550; 1912, $1,870,908; 1913, $2,529,992; 1914, $3,002,453; 1915, $2,558,383; 1916, $2,017,985.

It has been estimated that the increase in wages to the employees would amount to approximately $1,000,000 a year, 45 per cent of which is borne by the company and 55 per cent by the city. In addition to the increase in wages, the surface lines income has been reduced by reason of the two-day strike, June 14 and 15, 1915. The general business depression has also been reflected in the company's gross earnings. All of these causes have reduced the city's share of the net earnings to the approximate amount shown. It is also of interest to note that this fund has earned in interest since 1908, $854,286. This together with the principal fund is available for local transportation improvements and will probably be employed in subway construction and elevated railroad extensions, or any other improvements recommended by the Chicago Traction Commission, which is in process of formation at the present time.

EDITORIAL TRIBUTE TO MR. GOODRICH

The Minneapolis *Journal* contained in a recent issue the following editorial on the late Calvin G. Goodrich, president of the Twin City Rapid Transit Company:

"In the death of Calvin G. Goodrich Minneapolis loses another of her strong men who have helped to make the city's greatness what it is. While yet a man in his prime, he was one of that sturdy generation that formed the connecting link between the early settlers and the Minneapolis of to-day.

"He was an active figure in Minneapolis up to the time of his death, having devoted thirty-eight years of his life—practically all his business career—to building up the local transportation system of the Twin Cities, as well as that of Duluth and Superior in more recent years.

"His one lifelong ambition was to build up a system unsurpassed by that of any other city. Nor were his activities confined to his own business. No worthy movement was ever undertaken for the community's good that did not secure his ready and generous support. He believed in the Twin Cities, and esteemed it a privilege to serve them in any way.

"But best of all, Mr. Goodrich was a real friend. He had a big, kind heart that was always responsive to distress or to a friend's needs. With his bubbling humor and his perennial youthfulness, he never ceased to be a boy. Tolerant in his views, forgiving in nature and with a broad and deep charity, 'The Colonel, as he was affectionately called by those who knew him best, never went back on a friend, even if that friend had gone back on him. Once a friend, always a friend. He had an unbounded capacity for friendship.

"Simple and modest in his manner, he was one of those natures that instinctively draw men to them and call forth not only respect and admiration, but real, sincere affection. Perhaps his keen sense of fairness, and his large fund of common sense, coupled with his lively sense of humor and quaint philosophy, were the cause.

"His sympathies were large. He had that great gift of being able to put himself in the other man's place. Thousands of men of all classes have come under him in the years of his connection with the company, and they all attest that not only was he always just to them in every dealing, but more than that he was always generous.

"He built a monument for himself in the great transportation system to which he gave his life, but better than that, with his engaging personality he still lives in the hearts of those hundreds of employees and friends who were fortunate enough to know him and to come under his gentle influence."

ANOTHER NEW YORK COMMISSIONER RESIGNS

Governor Charles S. Whitman of New York has accepted the resignation of Robert Colgate Wood as Public Service Commissioner for the First District. In a letter presented to Governor Whitman by J. P. Archibald, Commissioner Wood's secretary, Commissioner Wood reviewed the circumstances leading up to his action and tendered the Governor his resignation. The Governor wrote an answer, accepting the resignation, to take effect immediately.

The commissioner asserted that the charges made during the Legislative investigation of the commission were nothing but an attempt to besmirch his good name and were without foundation. Nevertheless, Commissioner Wood said, he felt that because of the attack his usefulness as a member of the commission was impaired, and he therefore tendered his resignation.

The resignation of Commissioner Wood is believed to mean an end to the investigation by the Thompson committee. Edward E. McCall, chairman of the commission, was recently removed by Governor Whitman on charges preferred by the committee. Commissioner George V. S. Williams has resigned to take effect on Jan. 31, and the term of office of J. Sergeant Cram expires on Feb. 1, so there is no other member of the old commission left to investigate.

Mr. Wood was appointed by Governor Martin H. Glynn in May, 1914. Mr. Wood is forty-five years old. He was graduated from Harvard University. After leaving Harvard Mr. Wood engaged in the banking and brokerage business with J. Craig Havemeyer.

PASADENA CONSIDERS MONO-RAIL LINE

The general transportation committee of fifty members which is considering the transportation problems of Pasadena, Cal., met on Dec. 17 to receive the report of a sub-committee on the mono-rail plan for improving interurban service between Pasadena and Los Angeles. The sub-committee announced, according to press reports, that the mono-rail line could be built for $150,000 per mile, or $1,500,000 for the entire line, exclusive of right-of-way, and that a twelve-minute running time between Pasadena and Los Angeles could be maintained. Twenty cars with a capacity of sixty-eight passengers each, to cost $5,200 apiece, would be sufficient to afford five-minute service between the terminals. The committee thought that the cost of operation would be so low that a 5-cent fare would be feasible. Owing to the interest in the question the mono-rail sub-committee of five members was increased by the appointment of six additional members, and Jan. 15 was set as the date of the next meeting for considering the question. It is proposed to install the system of the National Suspended Mono-Rail Company.

In addition to the report of the mono-rail committee, reports on improving the present Pacific Electric Railway service and on the possibility of auto-bus service were presented. Paul Shoup, who represented the Pacific Electric Railway, read a paper which explained in detail the possibilities of changes on this system. He spoke of the possibility of elevating that part of the system in Los Angeles between Aliso Street and the Main Street depot, and of grade separation where the lines cross the Southern Pacific Railroad. With these changes completed he thought a twenty-three-minute running time would be possible.

HYDRO-RADIAL RAILWAY APPROVED AT POLLS

The ratepayers of Toronto, Ont., carried the hydro-electric radial by-law on Jan. 1 by a majority of more than 15,000. Sir Adam Beck stated that if the other municipalities endorsed the scheme as had Toronto and London the Hydro-Electric Power Commission of Ontario would go ahead with the preliminary work. The only expenditure necessary for the present will be for completing surveys, preparing plans, drawing up definite estimates, etc. The commencement of construction will depend upon the duration of the war.

One effect of the Toronto vote will be the resumption of negotiations with the Mackenzie interests for the purchase of the Metropolitan division of the Toronto & York Radial Railway. Sir Adam told the people of North Toronto on Dec. 28 that he would consider approval of the by-law a mandate to open the way for the purchase of this railway by the city. The engineers of the Hydro commission and the Metropolitan company will now attempt to reach an agreement as to the actual value of the road. This will form the purchase basis, since Sir William Mackenzie has offered to sell at cost plus 10 per cent.

The vote in London was small, 2763 voting for and 2087 against. A by-law to expend $100,000 on terminal connections for the newly electrified London & Port Stanley Railway was carried. The ratepayers in Berlin gave the suprisingly large majority of 665 in favor of the by-law despite the small vote polled. The vote in Guelph was 932 for and 30[illegible] against. The by-law was carried by a large majority in Mimico. The vote in New Toronto was 175 for and sixteen against the by-law. It was expected that with the results of these places before them the ratepayers in the remaining municipalities betwen Toronto and London would on Jan. 3 endorse the project.

The attempt made by means of injunction proceedings to prevent the submission of the hydro-radial by-law to the people of Toronto on Jan. 1 failed on Dec. 29 when Justice Latchford ruled that irremediable damage would not be done to anybody by the taking of the vote on the by-law. In his summing up, the justice said it was evident the by-law applied to the whole city. He did not think that any elector would be misled. Besides, the petitioner had the right to move to quash the by-law if it carried.

The second injunction application against the by-law, that in which the township of Etobicoke was respondent, was allowed. In this case, because of some confusion in certain by-laws whereby property in North Toronto was described as assessable in Etobicoke, the injunction to restrain the latter township from submitting the by-law to the ratepayers was granted by Justice Latchford. It was practically a printer's error which brought this remarkable situation about, as one schedule of the by-laws of Etobicoke and New Toronto was transposed. The judgment does not preclude the matter being put before the electors of Etobicoke at a future date.

CONSTRUCTION OF CLEVELAND BRIDGE APPROACHES DELAYED

Although it had been decided at committee meetings to put through the City Council of Cleveland, Ohio, at its meeting on Dec. 27 an ordinance authorizing the then present director of public service to enter into an agreement with the Cuyahoga County Commissioners for the construction of subway approaches to the new high-level bridge across the Cuyahoga River, the measure was held up because of fear of protests from the people. Public meetings will now be held at which the subject will be discussed. The first of these meetings was slated for the evening of Dec. 30. The commissioners are ready to proceed with the construction of the approaches. Further consideration of the subject will delay the work. An attempt will be made to have the ordinance ready for a vote at the next meeting. Unless an emergency clause is attached, however, a referendum vote may be called on it.

CLOSE OF PAN-AMERICAN SCIENTIFIC CONGRESS

The second Pan-American Scientific Congress came to an end in Washington, Jan. 8, after sessions which have lasted two weeks and which were participated in by delegates officially sent to Washington by the governments of twenty American republics in addition to those of the United States. The first congress was held in Santiago, Chile, in 1908, and the second one was held in Washington because of the changed conditions brought about by the war in Europe and the desire thus caused for closer co-operation between the American republics which was given its first official impetus at the Pan-American Financial Conference held in Washington last May.

While many of the newspapers of the country in their reports of the proceedings of the second Pan-American Scientific Congress have paid principal attention to the political aspect of the congress, many questions of scientific interest were taken up by the delegates to the congress, in engineering, electrical, metallurgical, chemical and transportation fields.

Conversion of Canadian Line Completed.—Operation by electricity has been begun by the Schomberg & Aurora Railway on its line extending from near Bond Lake, Ont., to Schomberg, 14.4 miles, hitherto operated by steam.

Freight Line Proposed as Adjunct to Cincinnati Rapid Transit Belt.—Charles R. Hebble, industrial manager of the Cincinnati Chamber of Commerce, has suggested that the Rapid Transit Commission consider the construction of a belt line for railroad freight in connection with the passenger entrance for interurban cars.

Mysterious Disappearance.—It was reported in the daily papers early in the week ended Jan. 8 that W. R. W. Griffin, who resided at East Liverpool, Ohio, as receiver of the Tri-State Railway & Electric Company, had mysteriously disappeared from one of the steamers of the New England Steamship Company during the trip to Fall River on the night of Jan. 1. Up to the day of going to press no further light had been thrown on the apparent mystery.

Fort Smith Bridge Contract Signed.—The Fort Smith Light & Traction Company, Fort Smith, Ark., and the Board of Bridge Commissioners have entered into an agreement covering the use of the bridge across the Arkansas River between Fort Smith and Van Buren, by the company's cars. The contract is subject to ratification by the voters at an election to be held on Feb. 8. Cars are being operated across the bridge under an interim agreement.

Discussion of Detroit Extensions on Jan. 18.—The Street Railway Commission of Detroit, Mich., will meet representatives of the Detroit United Railway on Jan. 18 to discuss the matter of extensions and rerouteing of a number of existing lines. Following this meeting the commission will

make recommendations to the Common Council covering the betterments to the traffic situation upon which its members agree. The commission has elected James Wilkie as chairman for the coming year.

Bay State Street Railway Carhouse Burned.—The Bass Avenue carhouse of the Bay State Street Railway, at Gloucester, Mass., was burned on the night of Jan. 4. Three horses, ten single-truck open cars and other equipment are reported as destroyed. The first horse car ever run on Cape Ann was among the cars burned. The carhouse was a wooden structure, and according to C. F. Bancroft, superintendent of motive power and machinery, will not be rebuilt. A rough estimate of the loss is $50,000.

Curtailing the Philadelphia Loan.—According to the Philadelphia *Ledger* of Jan. 6, it was decided in a conference between the Mayor and other officers of the city on Jan. 5 to prepare a new and smaller loan bill to replace the $95,000,000 bill which was killed some time ago. The new loan bill will not appear in Councils until after Feb. 1. It is not believed that it will provide for any but the Broad Street subway and Frankford elevated parts of the Taylor rapid transit plans. Other portions of the plans are to be "considered later." The resignation of A. Merritt Taylor as director of city transit is referred to elsewhere in this issue.

Boston Elevated Vice-Presidents Receive Equal Rank.—By vote of the board of directors of the Boston (Mass.) Elevated Railway, the offices of the vice-president and second vice-president were abolished on Jan. 1, and one or more vice-presidents were authorized. Charles S. Sergeant, who has held the title of vice-president for some years, has been named as vice-president in charge of the bureau of elevated and subway construction, and Matthew C. Brush, formerly second vice-president, has been elected vice-president in charge of the bureau of transportation. In general, the duties of each official remain the same, but by the change both are established on the same executive plane, and the directors' vote makes the executive organization more flexible.

Southwest Missouri Annual Dinner.—The annual dinner of the employees of the Southwest Missouri Railroad, held recently at the club rooms of the employees' organization at Webb City, was addressed by J. R. Harrigan, general manager of the Kansas City, Clay County & St. Joseph Railway, who told of his experiences while handling electric lines in other places, notably Eau Clair, Wis., and Des Moines, Iowa. The men were particularly interested in his methods of overcoming operating obstacles in Wisconsin, and in the outcome of a delicate and serious labor situation in Des Moines. F. J. Munagle, editor of the *Electric Railway Trainman*, Kansas City, spoke on the advantages of social and efficiency organizations among the trainmen. Allen McReynolds, an attorney of Carthage, presided.

Cincinnati Traction Company Settles Claim of City.—On Dec. 30 attorneys for the Cincinnati (Ohio) Traction Company consented in Common Pleas Court to a judgment in favor of the city of Cincinnati for $12,500, which represents 6 per cent of a balance of 2 cents on each fare collected on the Millcreek Valley route between Jan. 1, 1911, and June 1, 1915. The company receives only 3 cents of each 5-cent fare on lines operated over its track which are not the property of the Cincinnati Traction Company. It had claimed that its contract with the city calls for 6 per cent on its gross receipts and not on this balance of 2 cents on each fare which it does not receive. It seems that a suit carried up some time ago indicates that the company must pay on this portion of the fare, however, and the company decided not to carry the litigation further.

Chicago Again Studies Electrification.—At a recent meeting of the railway terminals committee of the City Council of Chicago, Ill., the Railway Terminals Commission, composed of members of the Council and outside experts, was directed to make another report on the electrification of the steam railroads within the corporate limits of the city. In connection with this investigation, the recent report of the smoke abatement and terminal electrification committee of the Chicago Association of Commerce was also referred to the commission for study and report. At this meeting Charles L. Dering, past-president of the Chicago Association of Commerce; Harry A. Wheeler and Harrison B. Riley, members of the smoke abatement committee, urged the cooperation of the city to bring about a gradual abatement of the smoke nuisance.

Clay County Road Increases Wages.—J. R. Harrigan, general manager of the Kansas City, Clay County & St. Joseph Railway, simultaneously with the distribution of the usual Christmas gifts to employees, announced a special gift in the form of an increase of wages to trainmen, effective on Jan. 1. Heretofore the schedule has been 25 cents an hour for the first six months, 26 cents the second six months, and 27 cents thereafter. The new scale is 26 cents the first six months, 26½ cents the second six months, 27 cents the second year, 28 cents the third year, 28½ cents thereafter. Mr. Harrigan announced that the fine and loyal spirit displayed by the trainmen and their response to the suggestions and plans of the company for improving service and preventing delays and accidents were important factors in making the advance possible. The entire personnel of the road received this Christmas, as previously, baskets containing Christmas dinners.

New Michigan Railway Operating Organization.—J. F. Collins, vice-president and general manager of the Michigan Railway, Jackson, Mich., following the consummation of the leases whereby this company took over the operation of some 550 miles of electric road in Michigan, announced its new operating organization. The new appointments became effective on Jan. 1. They include the following: C. E. Morgan, general superintendent; F. W. Brown, traffic manager; G. B. Hunt, general passenger and freight agent; J. H. Weldon, chief of the tariff bureau; H. D. Sanderson, chief engineer; R. C. Taylor, superintendent of equipment; G. B. Ross, purchasing agent; F. W. Haak, electrical superintendent; F. M. Farley, general roadmaster; A. J. Bray, auditor; F. N. Aldrich, auditor of disbursements; J. W. Slater, auditor of receipts; O. H. Degener, auditor of freight accounts and car accountant; H. D. Swayze, general superintendent and traffic manager, Kalamazoo, Lake Shore & Chicago Railway; C. A. Floyd, superintendent Northwestern and Western divisions; C. H. Smith, superintendent Northeastern division; A. E. Green, superintendent Kalamazoo city lines; C. L. McMahan, superintendent Battle Creek city lines; D. McLaughlin, superintendent Jackson city lines; W. E. Maloy, superintendent Lansing city lines, and J. A. Rosenberger, superintendent Owosso and Corunna city lines.

Status of Rapid Transit Contracts in New York.—The Public Service Commission for the First District of New York expects to complete the award of construction contracts on city-owned lines of the dual system during the coming year. At the present time contracts have been awarded for seventy-two out of eighty-nine contract sections into which the work is divided, leaving only seventeen yet to be advertised. The commission also announces that the third tracks on the elevated lines in Manhattan and The Bronx will be opened for traffic early in the new year. It also plans to place in operation during the year the new White Plains Road extension of the Lenox Avenue branch of the existing subway, the new elevated railroads in Queens Borough leading to Astoria and Corona, with connections to Manhattan by the Second Avenue elevated railroad, and the Queensboro Subway (Steinway Tunnel). This winter the new rapid transit work will reach high water mark. On Dec. 1 the commission had completed or under contract construction work on the new lines to be owned by the city of New York aggregating $167,606,989. In addition, the Interborough Rapid Transit Company and the New York Municipal Railway Corporation, the two operating companies which entered into the dual system agreements with the city, had under way or completed construction work on third tracking and extensions of existing elevated railroads aggregating about $26,000,000, making the total contracts to date upwards of $193,000,000.

PROGRAM OF ASSOCIATION MEETING

Western Society of Engineers

The forty-sixth annual meeting and dinner of the Western Society of Engineers will be held at the Hotel Sherman, Chicago, Ill., on Wednesday evening, Jan. 12, at 6.30 o'clock. The principal speaker will be Samuel Insull, president of the Commonwealth Edison Company, Chicago.

Financial and Corporate

FORECAST FOR 1916

Mr. Moody Thinks Country Is Entering Larger Sphere of Activity—Does Not Anticipate Tight Money and Scarcity of Investment Capital After War

According to the well-known financial writer, John Moody, the year 1915 has shown a steady strengthening of the fundamental position of United States business, and, quite regardless of the final outcome of the European conflict, the United States is entering a distinctly new and vastly larger sphere in its relations with the civilized world. How far this tendency will go forward depends to large extent, of course, on the length of the war. A prompt ending of the war would naturally make a change in this prediction, but every indication worth while points to a continuance of the conflict for at least a year to come.

In Mr. Moody's opinion, it is perhaps hazardous to make predictions, except in a broad way, as to what will actually occur after the war is over. Yet, while there is no doubt a great deal of truth in the contention that certain lines of enterprise will suffer, those who anticipate tight money and a scarcity of investment capital in this country after the war will be fooled. Mr. Moody believes, as he did a year ago, that the demand for capital will not increase (in the aggregate) in Europe after the war, but will decline absolutely far more than will the supply. For this reason interest rates will more likely fall to a low level and remain there for a long time than rise or even hold at the relatively high levels existing during the actual hostilities while the governments are floating their big loans.

Barring the special demand for certain types of commodities brought about by the disturbed commercial relations existing during the war, there will be a downward movement in world commodity prices for some time after hostilities are over. The "cost of living," which has been steadily rising the world over for a decade or more, is sure to decline sharply. Falling prices for goods mean increased purchasing power for bond incomes, and therefore bond values will tend to rise. The very decrease in per capita consumption, Mr. Moody asserts, will sharply reduce all demand for new capital and thus cause interest rates to fall. With money cheap it pays better to buy bonds than to loan money, and this buying will tend to maintain and raise bond prices. Furthermore, with a good and sustained market for long-term, low interest-bearing bonds, corporations will cease the issue of high interest-bearing convertibles, debentures or notes. The elimination of these will still further widen the markets for permanent issues, and also open the markets more freely for first-class, dividend-paying stocks.

BOND MARKET WIDE OPEN

The outlook for the bond market at the beginning of 1916 is far more cheering than it was at this time last year. The public is now buying bonds in a fashion that proves confidence to be the watchword. In fact, for the first time in years the bond market has far outdistanced the stock market in activity and breadth, and buyers are found in every quarter and of every character. It is, of course, the period when buying is particularly high on account of the investment of interest and profits now secured, but the improvement has been too sustained and too voluminous for other basic reasons not to be involved. The stimulus of foreign business, the reaction from the reverses of last year, the improved commercial and industrial situation all play their part in the present investment activity. In the face of such conditions, it seems certain that public utilities, offering as they do in most happy combination the various advantages that are sought by investors, are proving and will continue even more so to prove attractive investment propositions. Consequently public utility financing through long-term obligations rather than through short-term securities is quite likely to be in greater evidence from now on.

ANNUAL REPORT

Kentucky Securities Corporation

The combined comparative statement of income, profit and loss of the Kentucky Traction & Terminal Company and the Lexington Utilities Company (the operating companies owned by the Kentucky Securities Corporation), exclusive of inter-company charges, for the years ended June 30, 1914 and 1915, follows:

	1915	1914
Operating revenue	$811,628	$782,271
Operating expenses	432,402	412,509
Operating income	$379,226	$369,762
Miscellaneous income	28,288	32,022
Gross income	$407,514	$401,784
Fixed charges, etc.	237,230	245,184
Surplus for dividends, etc.	$170,284	$156,600

While the railway gross earnings during the last fiscal year reflected the marked slowing down of business in all communities served, the number of passengers carried did not decrease sufficiently to allow the company to reduce the service. The present indications, however, are that the railway department receipts should show gains upon business conditions becoming normal. The appropriations for maintenance on the railway lines were equivalent to 16.7 per cent of the gross earnings, in comparison with 15.6 per cent in 1914. There has been an unusually large amount of repaving in the city of Lexington, and the city main lines have been for the most part entirely rebuilt.

During the year there was no change in the main line mileage of the system, which consists of 24.2 miles of city track and 71.3 miles of interurban track. The companies, however, spent $67,519 on additions and betterments. These expenditures were in accordance with the construction program as planned early in the year, and no new work was either delayed or deferred. The large sums spent in the preceding three years placed the entire property in such physical condition, that in 1915, and in the future, the capital outlays were and can be restricted to merely providing for the normal growth of the business, or any further extensions of service desired.

In its annual report the management calls attention to the fact that since the formation of the company the financial policy has been to raise capital only by means of the sale of stock or of long-term bonds, and, by adhering to this policy, the properties have not been embarassed by early maturities and the difficulties of refunding at a time of unsettled financial conditions. There has been a material increase in the local Kentucky investment in the properties, and the management is much gratified that local capital is looking with increasing favor on their securities.

CURRENT KEY ROUTE REVENUES

President Weeks Shows Relationship of Exposition Business and Jitney Competition to Recent Reduction in Shop Working Time

G. K. Weeks, president San Francisco-Oakland Terminal Railways, Oakland, Cal., in reply to inquiries regarding the recent reduction in working time at the shops of the company, has issued a statement showing that the passenger revenue on the Key division for the eleven months ended Nov. 30, 1915, amounted to $1,374,860, as compared to $1,121,013 for the same period in 1914. This increase of $253,946.69 is attributed almost entirely to Exposition business. The "direct ferry" contributed $169,688, and the dates of increase in the Market Street service indicate that the Exposition was responsible for this gain also.

As compared with this increase of the Key division, the passenger receipts of the traction division for the eleven months of 1915 amounted to $2,606,210, a loss of $256,793 from the returns of the same period in 1914. This appears to be caused entirely by jitney competition. In fact the traction lines which were free from jitney competition showed a substantial gain as compared with 1914, indicating that the loss from the jitneys was really greater than the net loss in traction division revenue shown.

Continuing, Mr. Weeks says:

"What happened this year was that we used the extra

revenue from Exposition travel in maintaining our operations on a normal basis. Every dollar that we received was spent on the property. It does not require an expert to figure that with the Exposition business at an end, if the traction division earnings for 1916 continue at the low ebb shown for 1915, we shall have $245,000 less to spend next year than was spent during 1915. This is what has made necessary a reduction of time in the shops, much to our regret.

"We had prepared complete plans and specifications for a new type of low-step, center-entrance car designed primarily for Key division service on Twelfth Street, as well as for a new type of modern P. A. Y. E. traction division car designed specially for operation in the East Bay cities. It has been the desire of the directors to begin the construction of these cars in our own shops, where we have suffficient facilities to permit the building of three cars at a time, thus materially increasing our force and joining in the movement to encourage home industry. But we have been forced to decrease rather than increase expenditures at our shops until such time as the receipts of our traction division are restored to a normal level.

"On Dec. 12, 1914, we had 211 men in our shop force, which was increased to 255 by Jan. 16. We have now reduced this to 173 men and have been forced to cut 4½ hours a week off the working time. Our track force on Dec. 12, 1914, stood at 319 men, and it was built up to 353 men on Jan. 16, 1915. We have now reduced this force from 299 men on Dec. 12 to 199 men."

COMMISSION APPROVES KANSAS CITY PLAN

Plan of Reorganization for Kansas City Railway & Light Company, as Outlined by Judge Hook, Is Accepted and Commended

The Missouri Public Service Commission on Dec. 29 approved the new franchise ordinance in Kansas City, Mo., and the plans for the reorganization of the Kansas City Railway & Light Company. The commission fixed the valuation of the railway property as of May 31, 1913, at a total amount of $28,000,000. The necessity for the issuance of certificates to cover $3,500,000 for making immediate physical additions to the property and paying off outstanding judgments also was considered by the commission, which intimates that it will consent to a supplementary issue of certificates to meet these requirements.

By the decree the electric light company is effectually separated from the railway company and henceforth they will be separate corporations. The heating company, which has been a part of the street railway and electric light properties, is combined with the lighting company. The fair value and the amount of capitalization for the new heating and lighting corporation will be determined in a supplemental order.

The commission is a unit that the franchise is a public benefit, and one demanded for public convenience. Not a single word or provision is criticised. Instead, the plan of reorganization as outlined by Judge Hook is especially approved and commended. On this point the commission says:

"The franchise ordinance and plan of reorganization evidence great labor and apparently mutual concessions. The numerous documents presented to the commission plainly show that constant publicity and free discussion marked these proceedings step by step. The unification of the entire street railway system, the proposal to reduce the capital stock, the separation of the railway and light properties and the discarding of a holding company, all appeal to the commission as most commendable features of this reorganization."

Referring to the obstructive tactics of certain persons to destroy the franchise, the commission says:

"There is no ground whatever to justify the commission in seeking to give effect to the sentiments or desires of those who now oppose the granting of the certificate."

Frank Hagerman, attorney for the receivers of the street railway, has issued the following statement:

"The opinion of the commission sustains every contention of the receivers and the city. It unconditionally declares that it cannot modify or change the franchise, absolutely approves Judge Hook's plans of reorganization, grants the certificate of necessity, orders the light and street railway properties separated and a new light company formed, and says that the value is ample to warrant the issue now of $28,000,000 in bonds and stock, plus $3,500,000 hereafter.

"Under Judge Hook's plans, this is sufficient to cover all bonds and leave a substantial surplus for stock, which goes to trustees and is entitled to earn all the franchise permits. The amount of this stock is in fact immaterial, because under the plan the stockholders get no stock, but only beneficial certificates without par value, giving them their proportionate part of the earnings. It remains for Judge Hook only to set a date for final hearing and enter a decree selling the property."

American Railways, Philadelphia, Pa.—As a result of the acquisition of control of the American Railways by the United Properties Company, Van Horn Ely, John Gribbel, Henry P. Scott, John J. Henderson, Alexander C. Robinson and Thomas W. Wilson, representing the new control, have been elected to the American Railways board. Other members, who remain on the board, are J. J. Sullivan, E. Clarence Miller and Charles R. Miller. Previous items describing the amalgamation of the National Properties Company and the American Railways were published in the ELECTRIC RAILWAY JOURNAL of Nov. 6 and 27.

Arkansas Valley Railway, Light & Power Company, Pueblo, Col.—The Arkansas Valley Railway, Light & Power Company has sold to H. M. Byllesby & Company $450,000 of 6 per cent notes, dated Jan. 3, 1916, and due on July 1, 1919. The notes will be offered at 98½, yielding 6.5 per cent. In addition to these notes the company recently sold $240,000 of 7 per cent cumulative preferred stock. Proceeds of the new securities will retire all the floating indebtedness of the company and provide funds for extensions and additions to the generating and transmitting equipment of the company.

Cincinnati, Dayton & Toledo Traction Company, Hamilton, Ohio.—It is reported that five accepted verdicts aggregating more than $16,000 were recently returned by Judge Cushing's jury in the Common Pleas Court against the Cincinnati, Dayton & Toledo Traction Company and in favor of the owners of debenture bonds issued by the Dayton Traction Company in March, 1898. The bonds (total issue $50,000) matured on March 1, 1913. The owners of the bonds claimed that the Cincinnati, Dayton & Toledo Traction Company had assumed them and was responsible for their payment. Payment was refused, however, and suits were filed by five of the bondholders. A previous reference to a similar settlement was published in the ELECTRIC RAILWAY JOURNAL of Aug. 14, 1915.

Cities Service Company, New York, N. Y.—At a meeting of the directors of the Cities Service Company, George A. Archer, president Commercial National Bank, Columbus, Ohio, was elected a director to fill a vacancy.

Duluth-Superior Traction Company, Duluth, Minn.—The Duluth-Superior Traction Company has passed the semi-annual dividend of 1 per cent on its common stock, due on Jan. 1. The company paid quarterly dividends of 1 per cent on this stock up to April 1, 1915, when the quarterly dividend was passed, and a semi-annual dividend of 1 per cent payable on July 1 was declared. In a statement regarding the passing of the common dividend the directors say that the company has not yet recovered from the effects of the strike in 1912, and also that the earnings in the current year have fallen off because of business depression and jitney competition. Business conditions have now greatly improved, however, and earnings are now showing an increase. Ordinances have been passed regulating the jitneys, and it is believed that when these ordinances, now held up by court proceedings, are declared valid, the jitney competition will come to an end.

Forest Grove (Ore.) Transportation Company.—Interests controlling the Forest Grove Transportation Company, a 2.7-mile line connecting Forest Grove and South Forest Grove with the Southern Pacific depot, have sold their stock, and the company has now gone out of business. No receiver was appointed.

Fresno (Cal.) Interurban Railway.—The California Railroad Commission on Dec. 31 authorized the Fresno Interurban Railway to issue 2125 shares of common stock of a

total par value of $212,500 in lieu of a like amount of stock authorized on Nov. 23, 1914; also $350,000 of first mortgage 6 per cent twenty-five-year bonds in lieu of a like amount previously authorized, and certificates of indebtedness for $350,000.

Interborough Rapid Transit Company, New York, N. Y.—Guy E. Tripp, A. D. Juilliard and A. J. Hemphill have been elected directors of the Interborough Rapid Transit Company and the Interborough Consolidated Corporation. Two of these filled vacancies caused by the deaths of E. R. Bacon and Andrew Freedman.

Kansas City, Clay County & St. Joseph Railway, Kansas City, Mo.—Motion for the dismissal of the receivers of Kansas City, Clay County & St. Joseph Railway was made in Judge Bird's division of the Circuit Court by Frank Hagerman on Dec. 24. I. D. Hook and J. G. L. Harvey were appointed on July 14, after the Interstate Railway had obtained a verdict of $1,500 000 damages for the taking of right-of-way on which it held options. The motion sets forth that the receivers must be dismissed since appeal bond has been perfected in the Supreme Court.

Newport News & Hampton Railway, Gas & Electric Company, Hampton, Va.—Brown Brothers & Company, New York, and Alexander Brown & Sons, Baltimore, are offering at 91 and interest, to yield 5.65 per cent, $2,000,000 of first and refunding mortgage 5 per cent gold bonds of the Newport News & Hampton Railway, Gas & Electric Company, dated Feb. 2, 1914, and due on Jan. 1, 1944. These bonds, which are part of an authorized issue of $7,500,000, are redeemable as a whole or in part at 105 and interest on any interest day. The company was formed in 1914 by a consolidation of all the street and interurban railway, gas and electric companies in and around Newport News, Hampton, Phoebus and Fortress Monroe, and the bonds are substantially a first and only mortgage on the gas properties and on the principal street railways and the electric light and power system in Newport News. They are a general mortgage on the remaining electric railway and lighting properties. It is said that as a result of improvements and increased business, the gross earnings have increased more than 20 per cent and net 47 per cent in the last three years.

New York (N. Y.) Railways.—The New York Stock Exchange has listed $1,772,000 of additional first real estate and refunding mortgage thirty-year 4 per cent bonds of the New York Railways, due in 1942, with authority to add $228,000 of this issue on official notice of exchange for outstanding fractional scrip. The company has purchased to date at $350 per share 5075 shares of an outstanding issue of 6000 shares of the Twenty-third Street Railway and issued therefor these $1,772,000 of bonds and $4,250 face value of fractional scrip. This stock has been deposited with the mortgage trustee.

Nova Scotia Tramways & Power Company, Halifax, N. S.—The Board of Public Utilities of Nova Scotia recently denied the application of the Nova Scotia Tramways & Power Company to increase its capital stock from $6,000,000 to $10,000,000 on the ground that no organization had been effected, and it was therefore impossible to secure a vote of shareholders authorizing the increase, as required by the charter. The increase was desired to finance the acquirement of the Halifax Electric Tramway, Ltd., and other properties, as stated in the ELECTRIC RAILWAY JOURNAL of Aug. 14, 1915.

Oakland, Antioch & Eastern Railway, Oakland, Cal.—The California Railroad Commission has issued an order revoking its previous order by which the Oakland, Antioch & Eastern Railway was authorized to issue notes to certain stockholders who have made advances amounting to $90,911. The previous order was mentioned in the ELECTRIC RAILWAY JOURNAL of Jan. 1. It is reported that the directors of the company have unanimously agreed that the plan of refinancing, first approved by security holders and later authorized by the commission, should be carried out. This plan was described in the issue of Dec. 4. Howard Smith and three other holders of first mortgage bonds are said to have filed a complaint in a foreclosure suit and asked for a receiver. This action is said to be unfortunate and ill-advised on account of the progress of the reorganization plan and the recent increased earnings shown by the system.

Philadelphia Company, Pittsburgh, Pa.—The stockholders of the Philadelphia Company on Dec. 28 voted to increase the capital stock from $69,433,400 to $71,933,400, the new stock all to be common. The proposal of this increase, the purpose of which is to provide funds for paying off floating indebtedness, was noted in ELECTRIC RAILWAY JOURNAL of Nov. 6.

San Francisco-Oakland Terminal Railways, Oakland, Cal.—The San Francisco-Oakland Terminal Railways has completed, within the six months' grace after maturity, the payment of all coupons of the bonds of its constituent companies falling due last July. The banks which then offered to purchase the coupons from the holders have been paid their advances in full. The same thirteen banks have again offered to purchase the coupons due in January, 1916, and the company will repay the banks from time to time from earnings for the purchased coupons.

Sunbury & Susquehanna Railway, Sunbury, Pa.—Judge Cummings on Jan. 5 filed an order for foreclosure sale of the property of the Sunbury & Susquehanna Railway by Frederick J. Byrod and Charles H. Grant, receivers. The line runs from Selinsgrove to Northumberland, a distance of 8 miles. A previous reference to an attempted foreclosure sale was published in the ELECTRIC RAILWAY JOURNAL of Jan. 2, 1915. The receivers were appointed in 1913.

United Railroads of San Francisco, San Francisco, Cal.—An ordinance authorizing an offer to be made by the city officials to the United Railroads of San Francisco for the company's Sloat Boulevard, Twentieth Avenue and Parkside lines was recently approved by the public utilities committee of the Board of Supervisors, and will now go to the board. These lines would be connected with the railway which the city is to construct through Twin Peaks tunnel. The committee estimates that the city will have to pay about $500,000 for these lines.

United Railways & Electric Company, Baltimore, Md.—It is reported that H. Crawford Black has resigned as a director of the United Railways & Electric Company.

Winnipeg (Man.) Electric Railway.—William P. Bonbright & Company, New York, are offering at 100 and interest $750,000 of Winnipeg Electric Railway 6 per cent gold notes, dated Jan. 15, 1916, and due on Jan. 15, 1918. These notes are the direct obligation of the Winnipeg Electric Railway and are specifically secured by pledge and deposit with the Central Trust Company, New York, as trustee, of approximately $970,000 of 4½ per cent perpetual consolidated debenture stock secured by trust deed creating a mortgage on all property of the company, subject only to $5,000,000 of underlying bonds.

DIVIDENDS DECLARED

Bay State Street Railway, Boston, Mass., 3 per cent, first preferred.

Boston Suburban Electric Companies, Newtonville, Mass., quarterly, $1, preferred.

Citizens' Traction Company, Oil City, Pa., quarterly, 1½ per cent, preferred.

Dayton & Troy Electric Railway, Dayton, Ohio, quarterly, 1¼ per cent, preferred; 1¼ per cent, common.

Green & Coates Streets Passenger Railway, Philadelphia, Pa., quarterly, $1.50.

Holyoke (Mass.) Street Railway, 3 per cent.

Iowa Railway & Light Company, Cedar Rapids, Iowa, quarterly, 1¾ per cent, preferred.

Manchester Traction, Light & Power Company, Manchester, N. H., quarterly, 2 per cent.

Ottawa (Ont.) Traction Company, Ltd., quarterly, 1 per cent; bonus, 1 per cent.

Ottumwa Railway & Light Company, Ottumwa, Iowa, quarterly, 1¾ per cent, preferred.

Rome Railway & Electric Company, Rome, Ga., quarterly, 1 per cent.

Thirteenth & Fifteenth Streets Passenger Railway, Philadelphia, Pa., $6.

Western New York & Pennsylvania Traction Company, Olean, N. Y., 3 per cent, first preferred.

ELECTRIC RAILWAY MONTHLY EARNINGS

BANGOR RAILWAY & ELECTRIC COMPANY, BANGOR, ME.

Period	Operating Revenues	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Nov., '15	$65,711	*$33,353	$32,358	$17,624	$14,734
1 " " '14	64,570	*30,293	34,277	17,484	16,793
12 " " '15	787,035	*395,785	391,250	212,351	178,899
12 " " '14	777,888	*376,192	401,696	209,014	192,682

CHATTANOOGA RAILWAY & LIGHT COMPANY, CHATTANOOGA, TENN.

1m., Nov., '15	$98,812	*$61,537	$37,275	$29,623	$7,652
1 " " '14	84,896	*55,377	29,519	29,122	397
12 " " '15	1,071,013	*730,036	340,977	357,315	†16,338
12 " " '14	1,096,462	*694,357	402,105	336,185	65,920

CLEVELAND, PAINESVILLE & EASTERN RAILROAD, WILLOUGHBY, OHIO

1m., Nov., '15	$31,862	*$15,773	$16,089	$11,096	$4,993
1 " " '14	29,191	*16,447	12,744	10,880	1,864
11 " " '15	373,318	*201,314	172,004	120,938	51,066
11 " " '14	378,612	*202,461	176,151	120,886	55,265

COLUMBUS RAILWAY, POWER & LIGHT COMPANY, COLUMBUS, OHIO

1m., Nov., '15	$277,008	*$154,959	$122,049	$41,197	$80,852
1 " " '14	261,656	*150,457	111,199	39,170	72,029
12 " " '15	3,091,422	*1,833,337	1,258,085	475,142	782,943
12 " " '14	3,063,753	*1,903,810	1,159,943	470,308	689,635

COMMONWEALTH POWER, RAILWAY & LIGHT COMPANY, GRAND RAPIDS, MICH.

1m., Nov., '15	$1,323,673	*$674,794	$648,879	$403,980	$244,899
1 " " '14	1,185,319	*613,645	571,674	361,227	210,447
12 " " '15	14,317,036	*7,599,095	6,717,941	4,428,639	2,289,302
12 " " '14	14,097,962	*7,685,481	6,412,481	4,185,446	2,227,035

CUMBERLAND COUNTY POWER & LIGHT COMPANY, PORTLAND, ME.

1m., Nov., '15	$213,206	*$130,086	$63,120	$66,163	$16,957
1 " " '14	196,249	*121,462	74,787	62,385	12,402
12 " " '15	2,615,620	*1,490,833	1,124,787	789,231	335,556
12 " " '14	2,515,657	*1,448,814	1,066,843	759,912	306,931

EAST ST. LOUIS & SUBURBAN COMPANY, EAST ST. LOUIS, ILL.

1m., Nov., '15	$219,595	*$127,551	$92,044	$62,679	$29,365
1 " " '14	207,713	*122,761	84,952	58,401	26,551
12 " " '15	2,442,300	*1,441,179	1,001,121	765,081	236,040
12 " " '14	2,648,458	*1,650,308	998,150	676,854	321,296

FORT WAYNE & NORTHERN INDIANA TRACTION COMPANY, FORT WAYNE, IND.

1m., Oct., '15	$115,293	$91,448	$23,845	$54,404	††$30,181
1 " " '14	148,821	83,706	63,115	54,381	‡8,873
10 " " '15	1,386,303	827,742	558,561	537,909	‡24,703
10 " " '14	1,521,493	880,754	640,739	527,581	‡116,897

GRAND RAPIDS (MICH.) RAILWAY

1m., Nov., '15	$99,020	*$66,024	$32,996	$14,223	$18,773
1 " " '14	98,208	*68,834	29,374	13,701	15,673
12 " " '15	1,190,353	*823,215	367,138	164,874	202,264
12 " " '14	1,283,116	*837,226	445,890	162,037	283,853

KENTUCKY TRACTION & TERMINAL COMPANY, LEXINGTON, KY.

1m., Oct., '15	$73,638	$37,355	$36,283	$20,496	‡$16,925
1 " " '14	71,191	37,362	33,829	29,788	‡15,404
4 " " '15	306,027	155,378	150,649	81,610	‡73 173
4 " " '14	304,561	159,385	145,176	78,888	‡72,241

LAKE SHORE ELECTRIC RAILWAY, CLEVELAND, OHIO

1m., Nov., '15	$112,682	*$74,626	$38,056	$35,992	$2,064
1 " " '14	105,143	*70,098	35,045	35,802	†757
11 " " '15	1,263,332	*821,245	442,087	397,108	44,979
11 " " '14	1,317,848	*816,958	500,890	390,840	110,050

LEWISTON, AUGUSTA & WATERVILLE STREET RAILWAY, LEWISTON, ME.

1m., Nov., '15	$57,229	*$40,667	$16,562	$15,950	$603
1 " " '14	49,437	*37,253	12,184	15,670	†3,486
12 " " '15	729,994	*473,190	256,804	189,531	67,273
12 " " '14	677,269	*466,270	210,999	186,121	24,878

NASHVILLE RAILWAY & LIGHT COMPANY, NASHVILLE, TENN.

1m., Nov., '15	$185,260	*$117,567	$67,693	$42,902	$24,791
1 " " '14	184,099	*104,308	79,791	41,899	37,892
12 " " '15	2,136,817	*1,313,008	823,809	498,720	325,089
12 " " '14	2,240,922	*1,363,748	877,174	497,631	379,543

NORTHERN OHIO TRACTION & LIGHT COMPANY, AKRON, OHIO

1m., Nov., 15	$341,974	*$200,063	$141,911	$54,241	$87,670
1 " " '14	286,732	*186,008	100,724	50,261	50,463
11 " " '15	3,510,934	*2,155,045	1,355,889	575,269	780,620
11 " " '14	3,319,704	*2,040,013	1,379,691	556,365	723,326

PORTLAND RAILWAY, LIGHT & POWER COMPANY, PORTLAND, ORE.

1m., Nov., '15	$455,165	*$250,683	$204,482	$182 363	$22,119
1 " " '14	494,626	*257,639	236,987	183 066	53,921
12 " " '15	5,542 900	*3,073,832	2,469,068	2,208,504	260,564
12 " " '14	6,366,154	*3,284,272	3,081,882	2,165,187	916,695

VIRGINIA RAILWAY & POWER COMPANY, RICHMOND, VA.

1m., Oct., '15	$473 072	$218 361	$254,711	$143.304	‡$120 709
1 " " '14	446.704	212,315	234.389	133 732	‡107 620
4 " " '15	1,816,634	870 387	946.247	572,979	‡407,939
4 " " '14	1,761,703	846,890	914,813	543,690	‡399,002

*Includes taxes. †Deficit. ‡Includes non-operating income.

Traffic and Transportation

NO REDUCTION IN SCHOOL FARES

Massachusetts Commission Enunciates a Policy in Refusing to Change Present Blue Hill Arrangement

The Massachusetts Public Service Commission has refused to reduce the fares of school children on the Blue Hill Street Railway below the statutory half-rate, acting upon complaint of the Canton School Committee. The decision enunciates a policy.

On Sept. 22, 1915, the committee asked the board for an opportunity to present orally a request for a change in the existing arrangement of fares for school children on the Blue Hill road. In accordance with this request, a conference was held at Boston on Oct. 5 at which representatives of the company were present. A petition was presented from residents of Ponkapoag, in Canton, protesting against the rate of fare for pupils to and from the Canton high school and asking that a reduction be ordered.

The finding states that the half-fare rates for school children on all the street railways in Massachusetts except the Boston Elevated Railway, are the result of a special act of the Legislature (Chap. 530, Acts of 1908), which provides that the rate of fare for school children shall not exceed one-half the regular fare. The burden so imposed upon the companies is in the nature of special taxation and rests upon an authority possessed by the Legislature but not delegated to the commission, for there is no claim that it costs appreciably less to transport school children than other patrons of the railways. The commission could indirectly reduce the school rates by making such reductions in the regular rates as might be found reasonable, but it would seem that it has no authority to require direct reductions, in the case of school children, below the standard fixed by the general court.

This complaint grew out of the raised schedule of fares adopted by the Blue Hill company pursuant to an order of the board issued on July 31, 1915. Prior to this revision there were three overlapping fare zones on the main line, the unit fare being 6 cents. In place of these three zones the company was allowed to substitute four, the unit fare remaining 6 cents in the zone from Mattapan to the Blue Hill reservation and being reduced to 5 cents in the other three. Before the revision, pupils of the high school residing in any part of Canton could ride from their homes to the school for a single half-fare, or 3 cents. Since the revision, a similar ride, in the case of some of these pupils, covers a portion of two contiguous zones and requires the payment of two half-fares, or 5 cents.

This revision of fares was the result of a petition by the company for an increase in the prevailing unit fare from 6 to 8 cents. For reasons stated in its opinion in the case the commission found that, while the company was entitled to additional revenue, an 8-cent unit fare was open to objections. The only other method of increasing revenue was by a change in the system of fare zones, and a trial of this alternative method was therefore permitted. The board further says:

"Of course, by making changes in the arrangement of the fare zones a different basis for the fixing of the particular rates for school children might be established but the present arrangement was put into effect only after careful consideration, and the commission believes that its success or failure can only be determined fully by actual trial. For that reason, it fixed a trial period of one year, at the end of which time the question of modifications can be taken up in the light of experience gained under the varying conditions of all the seasons."

Since the adoption of the new zone plan various complaints have been made to the commission by patrons of the road, the one under consideration being the most important. The board does not feel, however, that modifications should be attempted before the new system has had a full and fair test In conclusion the finding says:

"It might be added that half-fare rates for school children

are a privilege possessed by the people of Massachusetts which other States have not as a rule seen fit to impose by law upon street railways. So far as this commission has been able to ascertain, the only other State which has a similar law is Vermont, although municipalities in other parts of the country have at times made such fares a condition of franchise grants, and companies voluntarily have put such rates into force."

2,468,970 PASSENGERS HANDLED IN A DAY

Theodore P. Shonts, president of the Interborough Rapid Transit Company, New York, N. Y., stated on Dec. 29 that during the holidays of 1915 the company carried the greatest number of passengers ever transported over the entire system in one day. The passenger traffic for Dec. 20 was as follows: Subway division, 1,385,253; Manhattan division, 1,083,717; total, 2,468,970. A statement of the holiday passengers carried this year compared with the corresponding period for 1914 follows:

	Week Ended Dec. 18, 1915	Week Ended Dec. 19, 1914
Subway division	7,800,828	7,593,295
Manhattan division	6,217,298	6,002,433
	14,018,126	13,595,728

	Week Ended Dec. 25, 1915	Week Ended Dec. 26, 1914
Subway division	7,565,314	6,952,403
Manhattan division	6,093,535	5,645,553
	13,658,849	12,597,956

	Dec. 1 to 27, inclusive, 1915	Dec. 2 to 28, inclusive, 1914
Subway division	29,806,662	27,918,770
Manhattan division	23,544,611	22,399,672
	53,351,273	50,318,442

The company operates 85 miles of track on its subway division and 118 miles of track on its elevated division.

TWIN CITY LINES TO ITS PATRONS

The Twin City Rapid Transit Company, Minneapolis, Minn., published in the *Bellman* for Dec. 25, 1915, over the signature of A. W. Warnock, general passenger agent, greetings and a message of good-will to those who ride on its cars. The ad was in red and black, most artistically displayed. In it was reiterated the general policy of the company. It is reproduced in full as a striking illustration of a forceful statement of a company with an unusual record of successful achievement over a long period of years.

"It is the intention of the Twin City Lines to serve the communities they reach in the best possible way by furnishing first class dependable electric car service at all times; smooth tracks, clean, comfortable, well-lighted, ventilated and heated cars, manned by civil-spoken, courteous, considerate employees who shall be watchful of the passenger's safety and comfort first, last and all the time.

"We welcome constructive criticism with an open mind and endeavor to remedy defects in our service whenever they are brought to our attention. We do not wish to impose any arbitrary or unjust regulations upon our patrons, but, on the other hand, we hope they will recognize that it is necessary to adopt some rigid rules, but this is always with the idea of being reasonable and just to both the company and its passengers.

"Our conductors deal with more persons every day than the average man encounters in many weeks. In all weathers and at all hours, they meet every fashion of folk, the well and the sick, the pleasant and disagreeable, the worst and the best. Do they fail sometimes? Very probably. They are only men after all, with their own individual characters. But when they do fail, they have broken the rule, the reasonable rule for which we stand. If a man is unfit, sooner or later he is dismissed from our employ. We keep only the best of them in our service and we want all of them to be efficient in their duties as well as civil and courteous in their manners.

"In the same way that the manager of a large store or hotel does not know how his employees are treating customers or guests unless the employees are reported, so it is with us, although the store or hotel manager has the great advantage over us in usually having all his employees beneath one roof and under his own observation.

"When it is considered that we carry an average of nearly 700,000 passengers every day in the year (a number equivalent to the population of Minneapolis, St. Paul, Stillwater, and the suburbs of these cities), each passenger representing a separate business transaction, and that we operate approximately 1000 cars over 440 miles of track, each car in charge of two men, and far away from close supervision, would it not be surprising if all those men were conducting themselves exactly as we expect them to, and waiting on each of those 700,000 customers as they should be waited upon, and as we desire that they should be served?

"We prize very highly the good-will of the people of the Twin Cities, as it is constantly being shown us, and we wish to assure them, in return, that we will strive harder than ever during the year to come to merit their friendliness and confidence."

SAN DIEGO FARE INCREASE ALLOWED

In the case involving the San Diego & Southeastern Railway, San Diego, Cal., the Railroad Commission of California has ruled that the public itself as well as the public utilities should bear a share of the burden caused by business depression. It was found that in addition to business depression, this company had suffered largely both in freight and passenger revenue as a result of the frost of January, 1913, which reduced the lemon crop and affected the prosperity of the territory served.

The company operates 75.08 miles of main track in San Diego County, 61.71 miles by steam and 13.33 by electricity. The electrically operated part of the system does passenger business almost exclusively, while freight constitutes the larger volume of business on the steam lines. The company showed that the earnings for the fiscal year ended June 30, 1915, were $86,287 less than the operating expenses, and that the increase in rates asked was only sufficient to bring the revenue up to a figure which would cover operating expenses and interest on unfunded debt, without giving any consideration to return upon other capital invested in the property.

In granting the application of the company the Railroad Commission authorized an increase in freight rates which will amount to approximately $14,000 per annum, while the passenger rate increase will bring the company $72,000 per annum. In granting the application the commission has ordered that the one-way passenger fare between Third Street, San Diego, and the city limits shall remain at 5 cents and that the one-way passenger fares to other points on the southern division shall be based upon 2 cents per mile for electric road mileage and 3 cents per mile for steam road mileage beyond the city limits instead of beyond Thirty-first Street.

JITNEY BONDING DIFFICULT IN WASHINGTON

I. M. Howell, Secretary of State of Washington, estimates that approximately half of the genuine jitney bonds have been cancelled. It is thought that by Sept. 1, 1916, through a lack of desire on the part of any bonding company to stand sponsor for their operators, as required by act of the recent Legislature, nearly all of the jitneys will have abandoned service. The Pacific Coast Casualty Company, the only concern undertaking this line of business in Washington, withdrew temporarily from the State last September, because it was unable to meet the requirements of the State insurance code. The company is being reorganized, but it is stated unofficially that when it re-enters the Washington field no more jitney business will be written. Other bonding companies are willing to write jitney bonds only if the owners deposit $2,500 in cash or its equivalent.

Group Insurance for New Bedford Employees.—The Union Street Railway, New Bedford, Mass., has arranged for group insurance for its employees, numbering about 500.

Liberal Use of Sand Urged.—Conductors and motormen of the International Railway, Buffalo, N. Y., are to be held responsible for accidents to passengers caused by snow and ice on the car floor, platform or steps. The men

have been instructed to use sand liberally to prevent ice and snow from accumulating.

Warning in Buffalo Against Spitting.—Signs are being displayed in all cars of the International Railway, Buffalo, N. Y., warning passengers against spitting on the floor and platforms of cars and calling attention to the penal code, which provides fine and imprisonment for each offense. Police officers have been ordered to enforce this provision of the law. The health authorities are co-operating.

All Brooklyn Employees to Ride Free.—It has been decided to allow free transportation to all employees in the mechanical, electrical and way and structure departments of the Brooklyn (N. Y.) Rapid Transit Company. This will extend the privilege of free transportation to approximately 2500 men, and when the law is in effect every employee in the company's service will be able, either by means of pass books or badges, to ride free on the company's cars.

Ordinance Forbidding Jitneys on Profitable Route.—The City Council of San Diego, Cal., has passed an ordinance forbidding jitneys to operate on Fifth Street, the main artery of jitney traffic and profit. The clause in the jitney ordinance under which the decision was made allows the refusal of license renewals "when adequate transportation facilities are in operation on any certain street; when traffic would be congested by the granting of the license, or when the safety of the public is at stake."

Jitney Accidents in Newark.—Careless driving is running up the number of accidents to jitneys operating in Newark, N. J. On Christmas day two serious accidents were reported. In one of these an auto speeding against a street car skidded and headed for the Roseville cut of the Lackawanna Railroad. The machine broke through the iron guard rail, but the concrete base in which the fence is anchored acted as a barrier for the rear wheels and prevented the machine from falling into the cut. The victims of these accidents required hospital treatment.

"White-Gloved Squad" Used Again in Kansas City.—The Metropolitan Street Railway, Kansas City, Mo., had one of its largest holiday-period records during the week preceding Christmas. The company again installed in the shopping district its "white-glove squad" of about seventy-five men whose sole duties were to assist women and children to board the cars. This service was given for the entire week before Christmas. The company also added to its force of front-end collectors uniformed men who collected fares while standing in the safety zones where the front ends of the cars stop.

Mayor Vetoes Newark Jitney Ordinance.—Mayor Raymond of Newark, N. J., has vetoed the ordinance regulating the operation of jitneys. He has sent his message of disapproval to City Clerk Archibald for submission to the Common Council. It is declared that his objections to the ordinance are those to which he gave voice at the recent public hearing when he declared that he regarded the ordinance as loosely drawn and pointed out certain provisions which he said he considered meaningless or a hardship on the jitney men. The attempt made on Dec. 29 to pass the measure over the Mayor's veto failed.

Parked Automobiles a Menace in Kansas City.—The suggestion of the board of control of the Kansas City (Mo.) Railways that more stringent regulations be established for automobile and vehicle traffic downtown to prevent obstruction of street car traffic has received practically an indorsement from the city police court. Judge Kennedy discharged W. H. Miller, who was charged with obstructing traffic at Twelfth and Grand Streets with his livery cars. The Judge declared that Miller's offense in obstructing the street was no worse than that of private owners, the drivers of delivery cars and taxicabs. The chief of the police and the judge are now planning traffic regulations that will free the business streets of automobiles that park at the curbs.

New Equipment on Los Angeles-San Bernardino Run.—Eighteen of the new interurban cars recently purchased by the Pacific Electric Railway were put in service on the Los Angeles-San Bernardino run on Dec. 18. These cars were equipped at the Los Angeles shops of the Pacific Electric Railway and the remaining six of the twenty-four which comprised the order will be ready for service shortly. The cars weigh 105,000 lb. each, are equipped with four 140-hp. GE-254-A motors, and are expected to make as high as 70 m.p.h. Redlands, which is 66½ miles from Los Angeles, is the terminus of the line on which these cars will be used. Under the present program eight trains a day each way will be operated, the normal time for the run being two hours and fifty-eight minutes.

Chicago Elevated Advertises Improvements.—"Millions Expended for Better Service" is the title under which the Elevated Railroads of Chicago, Ill., announce the completion of a new elevated roadway being built by the Chicago, Milwaukee & St. Paul Railroad, the tracks of which are also used by the Northwestern Elevated Railroad from Wilson Avenue to Howard Street, a distance of 4 miles. This work has been under way for some time. The cost will be about $3,000,000. The advertisement calls attention to the improved service and the safer operation which will result by reason of the elimination of forty-eight street crossings. It states that the style of construction received very careful consideration in order not to mar the attractiveness of the residential district.

B. R. T. Monthly.—The Brooklyn (N. Y.) Rapid Transit Company has begun the publication of the *B. R. T. Monthly*. The first issue of the paper is dated January. The publication will be issued on or about the first of each month. A principal feature of it will be reports of the social and business activities of the company's employees during the month previous. Special articles by officials of the company and heads of departments, bearing upon the business of transportation, will be handled individually. Through these articles *B. R. T. Monthly* readers will be kept in touch with the progress of new construction and informed of important improvements contemplated. The first issue contains sixteen pages. It is introduced with a statement by T. S. Williams, president of the company. No advertising is carried. The paper will be edited by Garrow T. Geer, who has been engaged in newspaper work for ten years and was formerly with the New York *Times*.

Safety Watchword Sounded by Baltimore Company.—Special attention of the readers of *Trolley News*, published by the United Railways & Electric Company, Baltimore, Md., is directed in the issue of Jan. 1 to an outline drawing showing how pedestrians should cross the street. The company says: "It is our purpose to publish drawings of this character from time to time, illustrating safety-first ideas that should be indelibly impressed on the minds of every man, woman and child. We are especially anxious to impress upon the children our safety-first messages, and in this particular you can help by making it a point to show and explain these drawing to them. In other words, appoint yourself a committee of one to look out for the safety of others. Many cross the street intersections diagonally, or cross the street in the middle of the block, placing themselves in great danger every time they do it. Play safe with yourself under all conditions, keeping ever in mind that self-preservation is the first law of nature."

Chicago Safety Commission Appointed.—Mayor William Hale Thompson of Chicago has appointed a citizens' traffic and safety commission composed of thirty-three members representing the City Council, the courts, the police, the newspapers, automobile clubs, teamsters and chauffeurs organizations, park boards, the Chicago Surface Lines and other establishments closely related to the question of traffic safety. It will be the duty of this commission to investigate and report to the City Council, concerning street traffic conditions, routing of street traffic, plans and devices for the control of street traffic, treatment of dangerous crossings and turns in streets, accidents in streets and remedies therefor, and ordinances and rules concerning the regulation of the traffic. The ordinance authorizing the creation of this commission has been passed by the Chicago City Council. H. B. Fleming, chief engineer of the Chicago Surface Lines, and H. L. Brownell, chairman of the public safety committee and safety advisor of the Chicago Surface Lines, have been made members.

New Jersey Accident Faker Convicted.—A middle-aged man known as Harry Peterson, was convicted before Judge Boyle in Camden, N. J., on Jan. 4 of a specific charge of obtaining $30 from the Public Service Railway under false pretences. Sentence was deferred. It was shown that on

Aug. 7, while passing through Gloucester City, Peterson supposedly slipped on the car floor and later complained he had fractured his skull. When the claim agents of the company called on him, the man said he had tripped over a nail in the car floor. This nail was later found in the bottom of his shoe. He agreed to settle for the $30, which was paid him. The company's representatives subsequently found that the man was known as James Ryan, Charles and Joseph Miller and Richard Boschart. It was also gleaned he had made similar claims at Rahway, Worcester, New Haven and Gloversville. In each instance he complained of pains in the head and asserted his skull had been fractured. In the Worcester case he collected $125. The case against Peterson was referred to previously in the ELECTRIC RAILWAY JOURNAL of Nov. 13, 1915, page 1013.

Pensions for Omaha Employees.—The Omaha & Council Bluffs Street Railway, Omaha, Neb., put into effect on Jan. 1 a plan of pensions for all employees whose salaries are less than $125 a month and who comply with the provisions as to age and length of employment. The expense of the pension fund is borne by the company. The pensions will range from a minimum of $20 a month to a maximum of about $30 a month. Compulsory retirement is required at the age of seventy years, but retirement is optional upon the part of the company after twenty years of continuous service, if the employee is permanently disqualified for service. Conductors and motormen eligible to pensions, upon going on the pension rolls, will receive $1 a month for each year of service, the minimum to be $20 and the maximum $30 a month. All other employees upon being pensioned will receive 1¼ per cent of their annual wage, multiplied by the number of years of continuous service, the minimum amount to be $40 and the maximum $500 per annum. If an employee desires, he may retire at or after the age of sixty-five, provided he has been employed continuously with the company for twenty years.

Co-operating to Make Suburban Day a Success.—The Louisville & Interurban Railway, Louisville, Ky., is cooperating with two of the Louisville papers in endeavoring to make "Suburban Day" a shopping institution in Louisville. Ten or more of the leading merchants of the city are working with the two papers and the attempt is being made to set aside Thursday of each week as the day on which the merchants will undertake to give special values to the residents of the country surrounding Louisville. Suburbanites will be identified by buttons supplied when they register at the offices of the newspapers. The Retail Merchants' Association of Louisville pays railroad fares to and from Louisville to those whose purchases reach a stated figure. Some of the merchants who are participating in the plan believe that this "Suburban Day" plan will ultimately take the place of the fare-refunding plan. The Louisville & Interurban Railway carries many of those who benefit by the "Suburban Day" bargains and in connection with the special advertising section, prints a schedule of its charges for delivering package freights to stations along its lines.

Toronto Overcrowding Case Before Highest Court.—The Toronto (Ont.) Railway has received word through its solicitors that the Privy Council has granted leave to appeal the decision of the Ontario Appellate Court upholding the decision of Justice Riddell on the overcrowding case. The company was indicted in 1911 and the case was tried in the Assizes before Justice Riddell and a jury. The company was found guilty. The application for a stated case was granted, but before anything was done the company was again indicted early in 1915 by order of Justice Latchford. When the case came to trial before Chief Justice Falconbridge the company was again found guilty of the charge of overcrowding and another application for a stated case was granted. Argument on the first stated case took place before the Appellate Division in the fall of 1915, and the conviction before Justice Riddell was sustained. Counsel for the company decided that a point of law was involved on which the case could be carried to the Privy Council. Petition for leave to appeal was presented by the company's agents in London, England, and this has now been granted. The Toronto Railway is thus granted a year within which it may prepare its case for submission to the highest court in the empire.

Personal Mention

Mr. Robert Colgate Wood has resigned as a member of the Public Service Commission for the First District of New York. Mr. Wood was appointed to the commission by Governor Martin H. Glynn in 1914.

Mr. Edwin T. McMurray, San Francisco, who has been secretary of the Petaluma & Santa Rosa Railway, Petaluma, Cal., has been elected president and a director of the road to succeed the late Elmer M. Van Frank.

Mr. Fielder Sanders, appointed as street railway commissioner by Mayor Harry L. Davis of Cleveland, Ohio, was confirmed by unanimous vote of the City Council on the evening of Jan. 3. Mr. Sanders succeeds Mr. Peter Witt.

Mr. E. H. Maggard, general freight and passenger agent of the Petaluma & Santa Rosa Railway, Petaluma, Cal., has been elected general manager of the company to succeed the late Elmer M. Van Frank, who was president and general manager of the company.

Mr. H. O. Butler, for the last eleven years superintendent of the Grand, Lee and Bellefontaine Divisions of the United Railways, St. Louis, Mo., has been promoted to assistant superintendent of transportation. Mr. Butler has been connected with the company for more than thirty years.

Mr. A. Merritt Taylor has resigned as director of the department of city transit of Philadelphia, Pa. On May 27, 1912, the Mayor of Philadelphia appointed Mr. Taylor transit commissioner to investigate the problems of improved transit. He was later appointed director of the department of city transit. Largely as a result of his work the city has before it a complete plan for transit development. Mr. Taylor is president of the Philadelphia & West Chester Traction Company.

Mr. Manfred Freeman has been elected public utilities commissioner for Lethbridge, Alta., over Mr. Reid, who held the office for the last term. Mr. Freeman is a native of Hamilton, Ont., and has lived in Lethbridge since 1890. He was at different times chief engineer, manager, and secretary of the Lethbridge Waterworks & Electric Light Company during its existence as a private company. As public utilities commissioner he has charge of the Lethbridge Municipal Railway.

Mr. Godfrey Goldmark, a member of the firm of Steele, De Friese & Steele, has been appointed by Chairman Oscar S. Straus of the Public Service Commission of the First District of New York as his private secretary. Mr. Goldmark was born in New York City thirty-four years ago and was graduated from the Cornell Law School in 1902. Upon graduation he went into the office of Judge Steele and in 1903 became a junior partner. He has had very considerable practice, particularly in connection with corporation matters. He collaborated in the preparation of the seventh and eighth editions of "White on Corporations." He is one of the authors of "Non-Stock Corporations" by White and Goldmark.

Mr. George J. Baldwin, president of the Savannah (Ga.) Electric Company, has been elected vice-president of the American International Corporation, New York, N. Y., recently formed to extend and cement the foreign financial and commercial relations of the United States. Mr. Baldwin will in the future spend most of his time in New York, but will not relinquish his connections in Savannah or as president of the Jacksonville (Fla.) Traction Company, Key West (Fla.) Electric Company, Pensacola (Fla.) Electric Company and Tampa (Fla.) Electric Company. It is stated that Mr. Baldwin will have immediate direction of the investigations that will precede affiliations and investments by the American International Corporation. Mr. Charles A. Stone of Stone & Webster, who control the Savannah Electric Company, is president of the American International Corporation.

Mr. Foster Hannaford, son of Mr. J. M. Hannaford, president Northern Pacific Railway, will be the new superintendent of the St. Paul division of the Twin City Lines.

to succeed the late Charles H. Rinker. Mr. Hannaford's appointment had been decided upon by President C. G. Goodrich just prior to his death. Mr. Hannaford was born in St. Paul and received his education in the St. Paul public schools. He is also a graduate of the Yale University Sheffield Scientific School. After his graduation, Mr. Hannaford was employed in the Westinghouse shops at East Pittsburgh for two years. A year followed in the Technical University of Karlsruhe, Germany. Returning to America, he was appointed superintendent of substations of the Illinois Traction System, which position he held for one year. He was then appointed chief engineer of the McKinley power house in St. Louis, the largest power plant of the Illinois Traction System. Later he went to Galesburg as operating engineer of the Galesburg Railway, Light & Power Company, and for the past two years has been general superintendent of that property.

Mr. Henry W. Hodge of Boller, Hodge & Baird, engineers, New York, has been named by Governor Charles S. Whitman of New York to succeed Mr. Robert Colgate Wood, resigned, as a member of the Public Service Commission for the First District. Mr. Hodge is an engineer. He started in as one of the field force on surveys of various branch lines of the Chesapeake & Ohio Railroad in West Virginia. Later he became chief engineer of the Union Iron Works, New York City, engaged in steel building construction. In 1895 he served as assistant to Mr. Alfred P. Boller, in charge of bridge design and construction. He became a partner in this firm in 1899, the title of which was Boller & Hodge, afterward Boller, Hodge & Baird. Mr. Hodge is now the senior member of this firm. Mr. Hodge's firm has designed some of the largest bridges and buildings in the country, among others being the Duluth and Superior bridge, the cantilevers across the Monongahela and Ohio Rivers at Pittsburgh and Steubenville for the Wabash Railway, the Municipal Bridge across the Mississippi River for the city of St. Louis, the bridges across the Connecticut River at Hartford, Saybrook, and East Haddam for the State of Connecticut. Mr. Hodge was retained by the Canadian Government as consulting engineer on the new design for the Quebec Bridge. He is a member of the Council of the American Insitute of Consulting Engineers, a director of the American Society of Civil Engineers, a member of the Institution of Civil Engineers of Great Britain, and of the Canadian Society of Civil Engineers. He is also a trustee of Rensselaer Polytechnical Institute, Rensselaer, N. Y.

OBITUARY

Ludwig Talbot Custer, identified with the organization and the financing of several of the companies now included in the system of the Reading Transit & Light Company, Reading, Pa., is dead. Mr. Custer was born in New Holland, Pa., eighty-one years ago. He retired from active business in 1903.

Dwight F. Cameron, at one time president of the South Chicago City Railway, now a part of the Chicago (Ill.) Surface Lines, died in Pittsburgh, Pa., on Jan. 3, 1916. Mr. Cameron was born in Peterboro, N. Y., eighty-one years ago. He practised law in Ottawa, Ill., until 1870, when he went to Chicago. He was later elected an officer of the Second National Bank and was a member of the contracting firm of George H. Norris & Company. Mr. Cameron died at the home of his daughter, Mrs. Williston Fish, wife of the vice-president of the West Penn Traction Company, Pittsburgh.

Otto T. Maier, vice-president and general manager of the New Orleans, Southern & Grand Isle Railroad and Algiers Railway & Light Company, New Orleans, La., died recently from wounds self-inflicted. In addition to being an officer of the two companies mentioned, Mr. Maier was president of the Maier-Watt Realty Company, president of the Burke Electrical Works and had an office in New Orleans, where he dealt in stocks and bonds. Mr. Maier was born in New Orleans on May 27, 1866. At the age of eighteen he entered the employ of the Germania Insurance Company of that city, finally succeeding his father in the presidency. He remained with the Germania company until four years ago, when he became vice-president and general manager of the Algiers Railway & Light Company.

Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

RECENT INCORPORATIONS

***Vercheres, Chambly & Laprairie Tramways Company, Laprairie, Que.**—This company will ask for a charter to construct a line between Saint Roch de Quebec and Chateauguay and from Laprairie to Chambly, with branches and loop lines to other places in the counties of Chateauguay, Laprairie, Chambly, Vercheres and Richelieu and the right to cross the St. Lawrence River and enter Montreal.

FRANCHISES

Lerna, Ill.—The Decatur, Sullivan & Mattoon Traction Company has asked the Council for a five-year extension of time on its franchise in Lerna.

McCallsburg, Iowa.—The Council has decided to submit to the voters the proposal to grant a franchise to the Iowa Railway & Light Company to erect an electric distribution system in McCallsburg.

Buffalo, N. Y.—The Council of Buffalo has approved the action of the Aldermen in granting a franchise to the International Railway to extend its tracks across Kenmore Avenue preliminary to striking the private right-of-way over which the company will operate a fast passenger and express service to Niagara Falls. The new line is known as the Frontier Electric Railway. The International Railway has received a franchise to construct a line and operate cars on Ohio Street between Illinois Street and Washington Street.

San Angelo, Tex.—The San Angelo Water, Light & Power Company has asked the Council for a street railway franchise in San Angelo. R. J. Irvine, vice-president and general manager.

Bingham Canyon, Utah.—Harry S. Joseph has received a franchise from the Council to construct and operate an electric interurban railway between West Jordan and Bingham Canyon. Under the provisions of the franchise, construction must begin on the line within one year and must be completed within three years. It is understood that the purpose of the franchise is to provide a connection with the Salt Lake & Utah Railroad into Bingham Canyon. [Dec. 4, '15.]

TRACK AND ROADWAY

Birmingham-Tuscaloosa Railway & Utilities Company, Tuscaloosa, Ala.—This company has recently acquired the property of the Tuscaloosa Ice & Light Company.

Fort Smith Light & Traction Company, Fort Smith, Ark.—The Fort Smith-Van Buren Bridge Commission has adopted a resolution awarding the Fort Smith Light & Traction Company a franchise to use the Fort Smith-Van Buren bridge. The contract now goes to the voters of the bridge district for their approval. The board fixed Feb. 8 as the date for this election.

Pacific Electric Railway, Los Angeles, Cal.—Announcement has been made that construction of elevated tracks from the Pacific Electric Building east to San Pedro Street will be begun within the next ninety days. The work of removing the buildings preparatory to the construction of the tracks has been begun.

***Martinez, Cal.**—It is reported that plans are being considered to construct an electric railway to connect Concord and Martinez. Judge Clifford McClellan, San Francisco, is interested.

Municipal Railways, San Francisco, Cal.—Notwithstanding the opposition of the Park Commission, City Engineer O'Shaughnessy has completed plans for a surface line across Golden Gate Park from Tenth Avenue to Fourteenth Avenue. The plans provide for tunnels under the main driveway, but the remainder of the route will extend through an open cut. The city engineer proposes to beau-

tify the line by planting grass and shrubs on either side. Mr. O'Shaughnessy reports that seven-eighths of the residents of the district to be served by this line have indorsed the project.

Chicago & Interurban Traction Company, Chicago, Ill.—A report from this company states that during 1916 it expects to rehabilitate 2½ miles of track in Blue Island, Ill., with 7-in. T-rail on wooden ties, 8 in. of crushed stone ballast and either brick or granite block pavement.

***Atchison, Topeka & Santa Fe Railway, Topeka, Kan.**—It is reported that this company plans to electrify its mountain lines between Raton and Trinidad, and that orders for work will be issued soon.

New Orleans Railway & Light Company, New Orleans, La.—Plans are being made by this company to install a new street lighting system in New Orleans at an estimated cost of $160,000.

United Railways & Electric Company, Baltimore, Md.—This company will construct a 1-mile extension from its York Road line along Regester Avenue to Idlewylde.

Mexico Investment & Construction Company, Mexico, Mo.—This company expects to build 10 miles of new line between Santa Fe and Perry during 1916.

Omaha, Lincoln & Beatrice Railway, Lincoln, Neb.—It is reported that interests close to the Lincoln Traction Company have acquired control of this company, and plans are being made to complete the line to Omaha, 50 miles.

Albany Southern Railroad, Albany, N. Y.—Arrangements are being made by this company for the installation of a new lighting system in Rensselaer. The company has submitted a proposal to the city offering to improve the lighting system and to double the present number of lamps at a cost of about $5,000 per year more than the existing contract.

Arbuckle Brothers, Brooklyn, N. Y.—This coffee importing company is considering the construction, subject to the approval of the Public Service Commission, of a connecting freight haulage line, to be known as the Jay Street Connecting Railroad between the foot of Jay Street, where the headquarters of this company are located, and the foot of Fulton Street. Two electric locomotives would probably be needed, although the type of this equipment has not yet been selected. P. H. Grimm is chief engineer.

Buffalo, N. Y. — Former Mayor Laughlin, of Niagara Falls, has leased the Whirlpool Rapids incline railway on the Canadian side of the gorge from the International Railway Company, and proposes to make many improvements before next season.

International Railway, Buffalo, N. Y.—Plans are being made by the Niagara Falls Country Club to request the International Railway to extend its lines from the present terminus at Pine Avenue and Sugar Street out Pine Avenue to the new clubhouse, about 1 mile.

Interborough Rapid Transit Company, New York, N. Y.—In accordance with the dual system contracts the Interborough Rapid Transit Company has made an agreement with the New York Central Railroad for the use of the Putnam division bridge over the Harlem River at Eighth Avenue and 155th Street. At present the Sixth and Ninth Avenue elevated lines terminate on the Manhattan side of the river at this point, where there is a joint station used both by the elevated trains and the steam trains of the Putnam division of the New York Central Railroad operating to Yonkers and other points in Westchester County. Under the dual system arrangement the elevated lines are to be extended across the Putnam bridge and through East 162d Street in the Bronx to a junction with the new Jerome Avenue Rapid Transit Railroad at 162d Street and River Avenue. The Interborough Rapid Transit Company has submitted to the Public Service Commission for the First District of New York for approval the agreement which it proposes to make with the New York Central Railroad for the use of the Putnam bridge. The commission also received a petition from the New York Central Railroad asking permission to discontinue the Putnam division station at 155th Street and Eighth Avenue, and to join the Interborough Rapid Transit Company in the erection and maintenance of a new joint station on the Bronx side of the Harlem River at or near 162d Street. The commission set both matters down for a public hearing to be held on Monday, Jan. 10, 1916, at 10.30 a. m.

Cities Service Company, New York, N. Y.—Plans for improvements and extensions for the coming year on the properties operated by the Cities Service Company, 60 Wall Street, are now being made. Improvements and extensions will be made at St. Joseph, Mo., Elyria and Warren, Ohio, and other cities.

Northern Ohio Traction & Light Company, Akron, Ohio.—Plans are being made by this company to construct an extension of its Canton city car lines to the northeast end mills in the spring.

Cleveland, Southwestern & Columbus Railway, Cleveland, Ohio.—This company reports that during the past year it renewed 5 miles of track with concrete foundation, steel ties, 100-lb. T-rail and brick pavements in Oberlin, Elyria, Lorain and Medina.

Scioto Valley Traction Company, Columbus, Ohio.—It is reported that active work will be begun next spring by this company on the construction of an extension from Portsmouth to Chillicothe.

Dayton & Troy Electric Railway, Dayton, Ohio.—During 1916 this company expects to build 1 mile of new track.

Hamilton, Ont.—At a recent meeting held in Hamilton representatives of municipalities interested in the proposed hydro-radials from St. Catharines to Guelph and Hamilton to Lake Erie decided upon a common entrance in the west end of the city, together with a central station in the center of the city. Under the existing agreement with the street railway the city may use the tracks for municipally owned railways. It was decided that a separate freight line should extend through the northern section of the city. The route of the branch from Hamilton to Lake Erie is to be settled by a special committee.

London & Port Stanley Railway, London, Ont.—This company has under construction an extension from Richmond Street to Ridout Street, about 1 mile.

Sarnia (Ont.) Street Railway.—It is reported that this company may be in the market for about 5000 ft. of 60-lb. rail early in the spring.

Niagara, St. Catharines & Toronto Railway, St. Catharines, Ont.—It is reported that this company plans to erect a new steel bridge on its line in Stamford Township during this year.

Schomberg & Aurora Railway, Toronto, Ont.—Operation by electricity has been begun by this company on its line extending from near Bond Lake, Ont., to Schomberg, 14.4 miles, hitherto operated by steam.

Toronto (Ont.) Suburban Street Railway.—It is reported that this company's line will be in operation as far as Georgetown, Ont., by February, and throughout the entire length to Guelph by March 1. The line will serve the towns and villages of Islington, Dixie, Cooksville, Meadowvale, Churchill, Huttonville, Norval, Georgetown, Limehouse, Acton, Blue Springs and Eden Mills. The line will be single-track.

Montreal (Que.) Tramways.—It is reported that from April 1 to Oct. 1, 1915, this company spent $500,000 on track laying. Considerable extension work has been done on Notre Dame, Outremont, Point aux Trembles, Montreal East, Verdun and Maisonneuve Streets, the total trackage of the company now being 270 miles.

Nashville-Gallatin Interurban Railway, Nashville, Tenn.—Plans for extension of the Nashville-Gallatin Interurban Railway in central Tennessee have been announced in considerable detail by H. H. Mayberry, president of the company. It calls for certain subscriptions to preferred stock by residents along the line and it is stated if these subscriptions are forthcoming promptly, work of actual construction will begin at once. The project contemplates building of another line to Springfield, Tenn., and organization of the Nashville, Springfield & Gallatin Interurban Railway, the line to touch Goodlettsville, Ridge Top and Greenbrier, an extension from Springfield to Adairville and Russellville, Ky., being a subsequent project. A committee which has been working on the plans consists of James E. Caldwell, president Fourth & First National

Bank, Nashville; C. M. Clark, of E. W. Clark & Company., Philadelphia; H. H. Corson, southern manager General Electric Company; N. S. Keith, Cincinnati, Ohio; and H. H. Mayberry, Franklin, Tenn., According to Mr. Mayberry, E. W. Clark & Company have agreed to build and operate the line upon the plan agreed upon by the committee.

Dallas (Tex.) Electric Company.—This company will spend about $80,000 in paving and laying new rails and ties on Commerce Street between the Houston & Texas Central Railroad and Exposition Avenue. The old rails will be replaced with 103-lb. girder rails, and new steel ties will be laid to take the place of the wooden ties.

***Union Terminal Company, Dallas, Tex.**—This company will construct 15 miles of terminal tracks in connection with the new Union Station. The contract for the construction has been let. C. H. Cana, chief engineer.

Janesville (Wis.) Traction Company.—Plans are being made by this company, which is operated by the Rockford & Interurban Railway, to attach its traction wires to the buildings in the business streets, as all poles have been ordered removed by May 1. Plans have been prepared where contacts with buildings will be necessary. These plans will be submitted to the Commercial Club, whose directors will take up the matter of getting contracts with the property owners for allowing the wires to be attached to the buildings.

SHOPS AND BUILDINGS

Grand Rapids, Grand Haven & Muskegon Railway, Grand Rapids, Mich.—Among the improvements being planned by this company is the construction of a new freight terminal at the intersection of Water Street and the Pere Marquette right-of-way in Marquette and a new depot for Muskegon Heights.

Dallas, Tex.—Five hundred tons of reinforced steel have been ordered for the construction of the union interurban terminal in Dallas.

POWER HOUSES AND SUBSTATIONS

Arkansas Valley Railway, Light & Power Company, Pueblo, Col.—The board of directors of this company has authorized extensive additions and improvements to its power plants and transmission lines during 1916. One of the large improvements authorized is the installation of a 7500-kw, steam turbine generating unit at the Canon City power plant, together with the necessary boilers, condensers and accessories. A new switchboard will be built, additional high tension transformers installed, etc. The distribution system will be enlarged by the construction of a duplicate 25-mile pole line between Canon City and the Cripple Creek district. The engineering department of H. M. Byllesby & Company will have charge of the work.

Louisville (Ky.) Railway.—This company is operating its power houses on coal bought under a contract which runs until March, 1917, the company consuming at the rate of 100,000 tons annually. This is pea and slack, western Kentucky coal.

Binghamton (N. Y.) Railway.—This company will soon rebuild its local station at Endicott and will install a 300-kw., three-phase, 2300-volt motor-generator set and will also rebuild its transmission line in the spring. E. L. Barnes, Endicott, is manager of the light department.

Cities Service Company, New York, N. Y.—Among the improvements planned for 1916 on properties operated by this company is the installation of four steam turbo-generators at Alliance, Ohio; Athens, Ga., and Hutchinson and Salina, Kan.

Rochester Railway & Light Company, Rochester, N. Y.—Contracts have been placed by this company for the installation of a 15,000-hp. steam turbine and generator at Station No. 3 at Brown's Race and Mill Street.

Halifax (N. S.) Electric Tramway Company, Ltd.—It is reported that this company contemplates extensions to its power system involving an expenditure of about $500,000. The additons will include a complete gas plant having a capacity of 600,000 cu. ft. with provision for further extensions. A machine shop, 146 ft. x 150 ft., will also be erected.

Montreal & Southern Counties Railway, Montreal, Que.—The rotaries for this company's substation at Granby have been received and are now being installed.

Manufactures and Supplies

ROLLING STOCK

Bangor & Portland Traction Company, Bangor, Pa., expects to purchase one passenger car.

Oklahoma Railway, Oklahoma City, Okla., has ordered six 29-ft. semi-steel, double-truck motor car bodies from the St. Louis Car Company.

Mississippi Valley Electric Company, Iowa City, Iowa, has ordered four 28-ft. one-man cars from the McGuire-Cummings Manufacturing Company.

Metropolitan Street Railway, Kansas City, Mo., has exercised its option with the General Electric Company for fifty four-motor and fifty air-brake equipments.

Michigan Railway, Jackson, Mich., has ordered six 53-ft. all-steel interurban trail coaches and four sets of interurban trailer trucks from the St. Louis Car Company.

Waterloo, Cedar Falls & Northern Railway, Waterloo, Iowa, has ordered fifteen A-1 suspension type single trucks from the McGuire-Cummings Manufacturing Company.

Athens Railway & Electric Company, Athens, Ga., advises that it may install light single-truck one-man cars, to be operated under shorter headway, if it succeeds in disposing of its double-truck car equipment.

Arbuckle Brothers, Brooklyn, N. Y., coffee importers, are considering the purchase of two electric freight locomotives for use on a proposed connecting railway, as noted in the Construction News of this issue.

Cambria & Indiana Railroad, Colver, Pa., is reported as expecting to purchase an additional storage battery car, somewhat shorter but otherwise similar to the storage battery car which was placed in service on this line about a year ago.

United Railways of Havana, Havana, Cuba, is reported as expecting to purchase about five new storage battery cars within the next two months. This company already has storage battery cars operating between Rincon and San Antonio, but it is said that the new equipment will be used elsewhere.

TRADE NOTES

W. L. Conwell, vice-president and treasurer of the Transportation Utilities Company, New York, has been appointed assistant to the president of the Safety Car Heating and Lighting Company.

Pyrene Manufacturing Company, New York, N. Y., has appointed chief William Guerin, formerly head of the Bureau of Fire Prevention of New York, as head of its new engineering bureau.

E. F. Carry, first vice-president and general manager of the American Car & Foundry Company, has been elected president of the Haskell & Barker Car Company, Michigan City, succeeding W. T. McBride.

Railway Track Work Company, Philadelphia, Pa., in order to meet the growth of its business in the manufacture of the reciprocating track grinder and grinding blocks, has moved its plant to larger quarters at Thirtieth and Walnut Streets in Philadelphia.

Railway & Industrial Engineering Company, Pittsburgh, Pa., manufacturer of Burke horn-gap switching and protective apparatus and out-door substations, has moved its sales department to offices in the People's Bank Building in Pittsburgh.

B. H. Forsyth, who for the past three years has been with the sales organization of Hale & Kilburn Company, Chicago, and previously served as sales manager of the Ford & Johnson Company, has resigned, effective Jan. 1, 1916.

H. E. Walker, who for a number of years has represented the S. K. F. Ball Bearing Company, New York, as railway representative, announces his resignation from that organization. Mr. Walker's plans for the future have not been announced.

Bell Lumber Company, Minneapolis, Minn., has been awarded the cedar on all the tribal lands on the Odanah reservation. This company already had secured all of the other timber on this reservation three years ago, and as the timber covers a number of years' operations, taken together with its previous holdings on the reservations at other points, it insures the company timber for white cedar poles for at least ten to twelve years to come.

Spray Engineering Company, Boston, Mass., reports that the two air washers and coolers installed as auxiliaries to the 35,000-kw. and the 30,000-kw. steam turbo-generator sets in the new A-2 Christian Street station of the Philadelphia Electric Company, are for the largest pair of units in the world. Other recent installations of the Spray air washers and coolers are the following: Commonwealth Edison Company, Chicago, Ill., three each, 80,000 cu. ft. capacity per minute; Toledo Railways & Light Company, Toledo, Ohio, 70,000 cu. ft.; Eastern Pennsylvania Railways, Palo Alto, Pa., 20,000 cu. ft.; New Orleans Railway & Light Company, New Orleans, La., 50,000 cu. ft.

Electric Storage Battery Company, Philadelphia, Pa., manufacturer of the "Exide" battery, the "Chloride Accumulator" and "Tudor Accumulator" and the "Ironclad-Exide" battery, announces that because of changes in the organization of Pierson, Roeding & Company, who have acted as this company's sales agents on the Coast since 1910, its business will hereafter be conducted on the Coast through George R. Murphy, soliciting agent, with offices in the Rialto Building, 118 New Montgomery Street, San Francisco. The Exide Battery Depot which was opened in San Francisco a number of years ago, and where a large amount of stock is carried, will give Mr. Murphy a base of supplies that will insure prompt shipments of batteries and parts.

Mudge & Company, Chicago, Ill., together with the A. O. Smith Manufacturing Company, Milwaukee, Wis., who have for the past two years been manufacturing the Smith motor wheel for application to bicycles, has worked out an application of the motor wheel to the railroad hand speeder or velocipede. The motor wheel is attached behind the velocipede, and employed as a pusher. Special appliances for attaching are furnished. The engine is of the 4-cycle, air-cooled type, 2⅜-in. bore by 2½-in. stroke, and develops 1½ hp. It is magneto equipped and is throttle governed by means of a flexible tubing control fastened to handlebars, or conveniently on seat board. Any speed from 4 to 25 m.p.h. can be set and maintained.

Pierson Roeding & Company, San Francisco, Cal., announces the resignation of Thomas Finigan as vice-president, who has been appointed Pacific Coast manager of the American Brake Shoe & Foundry Company, with offices at 301-303 Call Building, San Francisco. H. S. Whiting of Pittsburgh has been appointed vice-president of Pierson Roeding & Company to succeed Mr. Finigan. Mr. Whiting has already taken up his residence in San Francisco and is in active charge of the new office. Two important changes in this company's agencies have occurred. It has been decided to discontinue the association of this company with the Electric Storage Battery Company, Philadelphia, Pa., as noted elsewhere in these columns, and with the R. D. Nuttall Company, which now will be handled by the Westinghouse Electric & Manufacturing Company at its various offices on the Pacific Coast.

Economy Fuse & Manufacturing Company, Chicago, Ill.— The United States Bureau of Standards has at the request of the Underwriters' Laboratories, Inc., of Chicago, after elaborate investigations, announced its finding in regard to the relative fire hazard involved in the use of the renewable fuses manufactured by this company as compared with the standard inclosed cartridge fuses. The finding states that the evidence does not show either that the fire or accident hazard involved in the use of these fuses is greater or that it is not greater than the risk involved in the use of the standard fuses. It is recommended that, pending the accumulation of more service data, a continuation and extension of their use be permitted by municipal and underwriters' inspection departments under conditions where their performance can be observed by such inspection departments, but that for the present the fuses be not approved for general use on the same basis as those at present listed as standard by the Underwriters' Laboratories, Inc.

ADVERTISING LITERATURE

Searchlight Company, Chicago, Ill., has issued a pamphlet entitled "Oxy-Acetylene Rail Bonding," which is a summary of a talk before the Illinois Electric Railway Association by J. R. Brown, on Oct. 29, 1915.

Chandler Brothers & Company, New York, N. Y., have issued a special market letter describing the stock of the Philadelphia Rapid Transit Company. It is said that there are few stocks representing a safe and assured business, with an improving tendency, which can be bought at as low a price as the one in question. Although dividends are not in immediate prospect, the outlook is sufficiently good to make the stock one of the most attractive in its class, from the investment as well as from the speculative standpoint.

Stone & Webster, Boston, Mass., have issued a January list of securities that are recommended under present investment conditions. These include the following issues: Baton Rouge Electric Company first mortgage 5's, Cape Breton Electric Company first mortgage 5's, Eastern Texas Electric Company first mortgage collateral trust 5's, El Paso Electric Company first mortgage collateral trust 5's, Galveston-Houston Electric Company 6 per cent cumulative preferred stock, Northern Texas Electric Company 6 per cent preferred stock and Tampa Electric Company first mortagage 5's.

Edison Storage Battery Company, Orange, N. J., has issued a catalog containing numerous illustrations showing the adaptability of the nickel-iron-alkaline battery for commercial vehicle service. The catalog briefly describes the construction of the Edison cell and gives examples of some of its remarkable characteristics such as long life, great mileage, ruggedness, service efficiency, cleanliness and ability to withstand extremes of temperature. The bulletin is illustrated with pictures of trucks from practically all the manufacturers in a great variety of services, among which are included electric railway line repair service, as shown by an illustration of a vehicle used by the Bay State Street Railway.

General Electric Company, Schenectady, N. Y., has issued an artistically designed catalog descriibng and illustrating the Curtis steam turbine-generator. The catalog explains the general principles of this steam turbine, and with the help of illustrations goes into the details of their construction. The last part of the catalog contains views of representative installtaions of turbines operating under various classes of service, such as that required by the Commonwealth Edison Company, Chicago, Ill.; Metropolitan Street Railway, Kansas City, Mo.; Alabama Power Company, Gadsden, Ala., and Halifax (N. S.) Electric Tramways. Bulletin No. 47409 recently issued, describes its small capacity industrial oil switches, type F, form P-10, 30 amp., 600 volts, for three-phase induction motors of 10 hp. or less. Bulletin No. 44,409 describes the 600 and 600/1200-volt ventilated commutating-pole railway motor.

NEW PUBLICATION

Railroad Field Manual for Civil Engineers. By William G. Raymond, C.E., LL.D. John Wiley & Sons, Inc., New York. 390 pages. Morocco bound, $3.

As the title indicates, this field manual was designed for field rather than for office use, although it is adapted for both. The author introduces into his tables the novel feature of dividing the degree decimally instead of sexagesimally. The field of usefulness of this manual is largely confined to steam railroad and electric interurban construction and grade revision problems. Simple, compound and vertical curves with the necessary tables make up an important part of the volume. The theory of the spiral, spiral functions and the American Railway Engineering Associations' ten-chord spiral tables are included. Location theories, and tables, estimating and construction tables, turnouts and crossovers, methods of calculating azimuth, latitude and time, tables for metric curves, adjustment of instruments, logarithms and trigonometric functions and sexagesimal trignonometric functions make up the other important subjects treated. The explanations of the various field problems are complete but brief. No attempt was made to go into demonstrations, as the author believed such matter belonged more properly in a text-book.