

ministration. When first elected to the presidency, nine years ago, the association, while a most useful one to its members, was not characterized by the same enthusiasm and prestige as at present. The number of companies at the Syracuse convention in 1894, at which Mr. Rogers was first elected president, was twelve, with the same number of visiting delegates, while only three papers were presented. Since that date President Rogers has succeeded in demonstrating to every street railway interest in the State the importance of an association of this kind, and he retires from office leaving the organization in the most prosperous condition. Two features introduced by him, so far as the meetings are concerned, undoubtedly added greatly to the interest and value of these gatherings. One is the annual address presented by the president, which summarizes the progress made in the State by the street railways during the preceding year. These addresses are the best summaries with which we are acquainted of the important events of any State during the year. They not only have a present interest in outlining to the members the events which affect their properties favorably or unfavorably, but they also constitute a fund of information of ever-increasing historical value as time elapses. The other feature introduced by Mr. Rogers at the annual meetings was the elimination of the long papers and the presentation in their stead of a larger number of short papers or addresses on practical subjects by different members of the Association. The result of this policy has been to interest a great many members of the Association, to produce discussions on a large number of topics and impart an eminently practical character to the meetings. We regret that the pressure of private business has compelled Mr. Rogers to resign his office as president of the Association, but in doing so he can have the satisfaction of looking back upon a work well performed, and also in relinquishing the duties to such competent hands as those of Mr. Connette.

In referring to the past work of the Association we must also congratulate the body upon having secured and retained the services of H. A. Robinson as secretary and treasurer for so long a period. We believe that all of the members of the Association realize that the work of this office involves a large personal sacrifice of time and energy, and this has been particularly true in the present instance owing to the very responsible duties of Mr. Robinson as head of the legal department of the Metropolitan Street Railway Company. Nevertheless, Mr. Robinson has attended all of the meetings of the Association, has conducted its business with the same ability and success which has characterized his important legal duties, and through his department has contributed a number of valuable papers on this branch of street railway operation.

Tickets and Transfers

Two interesting papers were submitted at the Syracuse Convention by John E. Duffy, of Syracuse, on the "Use and Abuse of Transfers," and J. E. Stephenson, of Buffalo, on "Inter-urban Ticketing." Both writers emphasized the importance of adopting a system that would involve as few complications as possible, and they called attention to the fact that the duties and responsibilities of a conductor of an electric car were far greater and more numerous than those of the man in charge of a steam passenger train. Mr. Stephenson put the case concisely when he said that an electric car was at once a passenger coach and a moving ticket office, that its conductor was both a conductor and a ticket agent, that its stations were on every street corner, at each highway crossing, and, indeed, almost

anywhere along the line. On interurban railways passing through two or more cities the requirements are even more numerous and exacting than in city service, for the conductor must be familiar with the city as well as the rural traffic. He must know the transfer points, the prominent places in the cities, and such other information as may be required by patrons. Consequently, it should be the aim of every manager to adopt the most simple, efficient and satisfactory ticket and transfer system, especially for interurban work.

Mr. Duffy's paper naturally treated more particularly of city service, and he also made a strong appeal for simplicity, both on behalf of the conductor and the public, as it was the surest means to secure higher efficiency in the service. He warned managers not to make transfers so complicated that their examination, when presented, would take so much time that the conductor would lose in the meantime three or four fares that he might have collected. Generally speaking, it is admitted that the transfer has proven advantageous to the company as well as to the passengers, and like most street railway men who have had practical experience in this matter, Mr. Duffy recognizes the importance of extending the system as much as possible, and at the same time guarding against the abuse of these privileges by the public. He points out that the public knows that it is entitled to certain privileges upon payment of fare, but it is hard to satisfy as to how far these privileges extend. It is suggested that concerted action might be taken on the part of the railway companies to have the courts define exactly their rights and those of the public under the law, as experience has shown that regardless of how much is given the public will demand more with the ever-increasing use of the street railway lines. Up to the present time the companies have been satisfied with the knowledge that their business has been increased by the adoption of the transfer, and very few, if any, of them have found out whether they are receiving an equitable portion of the advantages.

The Treatment of Accident Cases

One of the most interesting and fruitful topics discussed at the Syracuse Convention was that in relation to the treatment of accidents from a legal and medical standpoint, represented by the papers of Mr. Dibbs and Dr. Moorehead, of the Inter-urban Street Railway Company, of New York. So far as we can recall, this is the first convention at which the accident question has been discussed from the standpoint of the physician, a somewhat surprising fact, because the legal department of all railway companies is almost wholly dependent upon a medical examination for competent knowledge of the actual injuries received by a claimant, and most of the large companies have organized a medical staff consisting of one or more physicians. The fact that this topic has not been taken up more thoroughly at previous conventions is undoubtedly due to the reason that an exact discussion of it by a physician would involve a knowledge of medical affairs and definitions which is not possessed by those outside the profession. Nevertheless, Dr. Moorehead succeeded in outlining in a clear and untechnical way the advantages of the medical examination, and his paper in conjunction with that of Mr. Dibbs, which discussed the same subject from the standpoint of the claim department, form a series of treatises which are worthy the earnest consideration of those railways whose accident account is of considerable magnitude.

If a medical diagnosis is difficult of comprehension by the ordinary layman, what must it be to the average jurymen, especially when the medical experts on both sides disagree as

to the cause or results of the injury upon which the jurymen are called upon to assess the monetary damages? This is especially the case when one or both sides, intentionally or unintentionally, define their views and base their conclusions on premises which can only be understood by an expert. Experience has shown that in cases of this kind, the only solution is a compromise verdict, independent entirely of the justice in the case.

While ordinary surgical cases are difficult enough to adjust, damage cases for personal injuries are often complicated by those effects, which Dr. Moorehead classes in general as nervous prostration or neurasthenia. To what extent this trouble is caused by the injury itself and to what extent by inheritance, previous shock, the attitude of mind of the patient himself, or other outside cause, even the actual physical condition of an injured person with neurotic tendencies, are very serious problems to members of the medical profession themselves, and the reference of such cases to an absolutely unqualified jury, no matter how well-intentioned they may be, is almost certain to carry injustice with it. Such damage claims can be properly adjudicated only by a selected body of experts, and if this was done the mystery which surrounds the conflict of medical evidence in personal injury cases would largely pass away.

Incidentally, in this connection, the system described by Dr. Moorehead in examining cases of this kind in the course of his duty, and some of the benefits derived therefrom, are worthy of most careful consideration.

Train Despatching on Electric Roads

The discussion on this topic at the Syracuse Convention recognized the lack of uniformity in the methods employed, and freely criticised the defects in the systems that have been commonly introduced in electric interurban service. The Association showed a commendable spirit in recommending this subject to the special consideration of the committee on rules, expressing the wish that a standard system might be evolved. This action followed a suggestion contained in Mr. Hart's paper, that in view of the widely differing practice in electric signaling a convention of despatchers be held during the coming winter for the purpose of discussing the question of safe operation under the train order system and also for adopting a set of rules and forms for the government of all the companies represented. Such an association, it is needless to say, might be productive of many improvements in existing systems and might tend to institute reforms in the methods employed on many roads, especially if working in conjunction with the State or national body. The principal advantage, of course, would be in the exchange of ideas among practical men of this department, which eventually ought to develop the groundwork for a standard system of signaling, especially adapted to electric railway operation, subject to such modifications as would be necessary to meet local conditions.

Two papers were read before the convention, and both were highly commended in the debate that followed. Mr. Hart, in his paper entitled "Despatchers' Duties and Electric Signals," devoted considerable attention to the importance of the despatcher because of the dependence placed upon him for the safe operation of the road. The author dismisses the consideration of electric block signals, as applied to trolley lines, and used alone as an operating measure, with the statement that they do not possess the first principles of a safe device. He declared that no signal should be used as a running measure that does not provide, in case of any break or disarrangement,

for the signal going immediately to "danger," and he disapproves of the use of any device as an absolute running signal which depends for its means of operation on either the car or crew.

Mr. Wilcoxon's contribution on "Interurban Train Despatching" is interesting and valuable as an expert opinion on the several systems of signaling in vogue and because it contains a description of a practical installation in everyday commercial service. He admits that an automatic block signalling system in conjunction with an efficient telegraph system would be an ideal situation, but he contends that this is not to be expected, as the cost would be prohibitive, and either one of these factors of itself, it is pointed out, would not be satisfactorily applicable to electric railroading. Mr. Wilcoxon looks with disfavor upon the telegraph and block signal systems because the first requires a larger force and much greater expenditure of money than the electric interurbans are in position to pay, and the second cannot be depended upon solely owing to atmospheric conditions and mechanical defects. Mr. Wilcoxon declares that provision must be made for other methods of controlling the operation of trains when the electric block system is out of order. For these and other obvious reasons the telephone is regarded with general favor for this class of work. The system used on the Rochester & Sodus Bay division of the Rochester Railway System is described in detail, and its advantages enumerated.

The interest manifested in this subject by the delegates throughout the discussion is indicative of the growing importance attached to it by managers of interurban properties, and the action of the convention can be accepted as assurance of an earnest desire to solve the problems involved.

Pegging Up the Record

Not only have the experiments at Zossen already reached and passed the allotted 125 m. p. h. speed, precisely as we predicted in our issue of Oct. 3, but they are going on toward the new and magnificent objective of 140 m. p. h. Whether this will be reached or not remains to be seen, but we are inclined to think it will. A new stage of strain on the track may be reached at the increased speeds which may call a halt, and there may be trouble encountered from the call for large output at the increased frequency demanded, but the outlook upon the whole is good. An amusing feature of the press reports of the tests is the grave statement that the lives of those on the car were heavily insured. If this is correct it indicates that the German insurance companies are not worrying much about the dangers of high speed unless they are permitted to operate on a far less conservative basis than American companies, which we hardly think is the case. The result of the work thus far has been a well-won victory against Father Time—won by careful investigation and persistent effort. We know of no other case in which a great engineering problem has been thus attacked by the united efforts of a great group of engineers, backed by a syndicate organized for the especial purpose of solving it. This is the sort of combination that can do great things for the world's industry. It is no trust for the purpose of limiting production and squeezing the consumer, no merger for the purpose of attaching a fictitious value to worthless securities, but a united and deliberate effort on the part of the captains and pilots of industry to find a new channel for the world's communications. We rejoice in the success of the undertaking and earnestly hope that no unexpected difficulty will arise in the extension of the work beyond the limits originally assigned. It has been a great work magnificently carried out.

PROCEEDINGS OF THE SYRACUSE CONVENTION

The twenty-first annual meeting of the Street Railway Association of the State of New York, was held at the City Hall, in the city of Syracuse, N. Y., Oct. 6 and 7, 1903.

The meeting was called to order by President G. Tracy Rogers, of the Association, at 10:35 a. m. After the secretary, Henry A. Robinson, had called the roll, the president introduced to the members of the convention Mayor Jay B. Kline, of Syracuse, who welcomed the delegates to the city of Syracuse.

The president then delivered his annual address, which was published on page 703 of last week's issue. Secretary Robinson then read the reports of the secretary and treasurer, which were approved. The secretary then read a communication from Professor George F. Comfort, inviting the members of the Association to visit the Museum of Fine Arts, and another from the Central New York Telephone & Telegraph Company tendering to the Association the use of its service during the convention.

On motion, duly seconded, it was voted to extend the thanks of the Association to Professor Comfort and to the officers of the telephone and telegraph company for their kindness.

The President—The first paper will be Mr. Duffy's, on "Transfers, Their Use and Abuse." (This paper was published last week on page 705.)

Mr. Rockwell—There is one part of that paper to which I would like to take exception, and that is the statement that the transfer has come to stay. I would like to see it abolished altogether. It is the most burdensome thing that has been imposed upon railroad companies. I would rather give the passengers a 4-cent fare and abolish the transfers altogether. They charge for transfers in Philadelphia, and I don't know why it can't be done in other places.

Mr. Cole—In Elmira the demand for transfers is probably greater than that in any other city of its size. Every other passenger calls for a transfer; 50 per cent of the travel upon the road is upon transfers, so that we have had to take the question up very carefully. I think one point that might be brought up is the consideration of a standard method throughout the State of the use and handling of transfers, in order to educate the public up to their proper use. To-day there are hardly any two roads using similar transfer punching systems or having transfers that look at all alike, so that the people in using them don't know how to see whether they are punched right or not. One of the sources of kicks from the public is that they claim that the transfers have not been issued properly, and it has been the occasion of several law suits. I think there is no question that the use of transfers has effected an increase of riding in cities of the third class. Take our own city, for instance. A few years ago there were very few transfers given, but after the consolidation of all the lines there was inaugurated a general transfer system, and it had the effect largely to increase our receipts—about 22 per cent for that one year. So I do not think the transfers are entirely an evil. The evil comes from the abuse and improper handling of them. If the misuse of transfers could be done away with I think there is no question that their use would lead up to a great increase in our receipts.

The President—Have you any objection to telling the convention what the results of your law suits were?

Mr. Cole—In each case we have won. In fact we have never lost a law suit in eleven years in Elmira. I understood you to ask in reference to test cases on the use of transfers. The contest was on the time limit, and the company was upheld in insisting upon the time limit.

Mr. Nicholl—The experience of the reader of the paper in

Syracuse is very much the same as that which we have had in Rochester. I must say that I would very gladly, in some respects, do away with the transfer altogether, and, as the gentleman has remarked, accept a cheaper fare. But I don't believe that would quite remedy the trouble. I really think that the liberal use of transfers will increase our receipts. We have got to educate the people, especially in a city of the lay-out of Rochester, where it is very easy to walk anywhere and find the center, and I presume the same thing is true in Syracuse. In such cases I think we want to make it as easy as possible for people to ride. In our city the increase has not been very great in the use of transfers. It has kept at about 30 per cent, I think, ever since the use of transfers was adopted. I am very much in favor of what Mr. Cole says, that there should be some action taken in the way of standardizing transfers. I can see, however, many difficulties in that respect, because all cities are not laid out the same and would require different forms of transfers. But at the same time I think there might be something done to educate the people to the use of a certain form of transfer, so that there would be no mistake, and a conductor going from one road to another would understand the system easily without receiving fresh instructions.

Mr. Mitten—I hardly think we can look for the doing away of the transfer system, because in the way that lines are laid out and built in cities of the size of ours, it would create a clamor for the different operation of the lines, or with the majority of the passengers it would become very unpopular. Such a change would make the expense of operation very much greater on cross-town lines or lines which do not directly reach the center of the city, and the residences thereon would be very hard to rent, for the reason that the people would be obliged to pay two fares to get to or from their homes. For this reason we would find a condition of quite high rents in localities reached with one fare, and houses going begging on the lines where two fares were demanded. That would be against the interest of the railway company. We now endeavor, in Buffalo, to use the transfers as a method of building up the newer districts, and as soon as the volume of transfer passengers becomes great enough we endeavor to run such lines of cars directly to the center of the city. If we should cut out the transfer system it would be a great many years before those districts became paying portions of our system. Personally, I believe in the transfer to an extent, and where there is the issue of a transfer upon a transfer, if it is confined to pleasure travel, I don't think its effect upon the earnings will become very detrimental. If the passenger can go to his place of business or his objective point, and by the payment of one fare can procure a transfer which will take him home on the return trip, then, of course, you have lost a fare. But with us, where belt lines are becoming quite popular, if our passenger in an effort to beat the company leaves his home to go to an outlying district and rides around a belt line, then takes a transfer and riding around the entire distance, transfers home, he is getting a pleasure ride; he is acquiring the habit, and we have got his 5 cents. I don't think we lose in those cases. So that while the transfer is not a unmixed blessing, I think it can be used to our advantage.

Mr. Rockwell—I am perfectly willing to agree with all that the gentleman says in regard to building up suburban property through the use of transfers. But let us look into the matter a little farther. When I suggested making a universal 4-cent fare I did not mean that you should charge 4 cents for your average riders; each fare would remain the same 5-cent fare. But I should use something similar to that used in Philadelphia, which is the interchangeable or exchange ticket. That



OFFICERS, DELEGATES AND VISITORS IN ATTENDANCE AT THE TWENTY-FIRST MEETING OF THE STREET RAILWAY ASSOCIATION OF THE STATE OF NEW YORK, AT SYRACUSE, OCT. 6 AND 7, 1903

exchange ticket is sold for 3 cents extra and is practically a transfer. In going to work in the morning the passenger buys an exchange ticket, paying, we will say for example, 8 cents, as it is in Philadelphia. That exchange ticket is good for a transfer if the passenger wants to use it that day. Fifty per cent, I think it is safe to say, of the regular riders in Philadelphia don't want a transfer; they don't want to go on another line; but they buy the exchange ticket just the same, and that ticket is good at any time, just the same as though bought from the ticket office. The passenger accumulates those tickets. Every time he gets on a car, if he hasn't got an exchange ticket in his pocket he buys one, and he accumulates them in that way. Then, when he wants to ride again if he doesn't happen to have an exchange ticket he pays his fare. If you can obliterate the transfer I am satisfied that you are going to increase your gross receipts, provided it does not do the harm which Mr. Mitten suggests to suburban property. I admit that is an important point. But I don't see why it cannot be worked out. Local conditions have always got to be taken into consideration. The same rule would not apply in Rochester and in Buffalo and in New York. The local conditions have got to be always worked out by the local management, and each can work out a transfer system of his own in the shape of an exchange.

Mr. Cole—I would like to ask some gentleman in regard to ringing up transfers, whether they find that they have any difficulty or greater loss in ringing transfers up than those who don't ring them up. I think that is a point that is of considerable interest in handling transfers.

It was stated in answer to the president's inquiry that in Buffalo and Rochester transfers are rung up, but in Utica and New York city they are not.

Mr. Cole—I would like to ask Mr. Allen how his inspectors can tell whether the correct number is registered? Suppose a conductor has twenty passengers, five of whom are riding on transfers, and should only ring up fifteen fares, how can the inspector tell which are cash fares and which are transfers?

Mr. Root—Our inspection force is instructed to pay no attention to the comparative number of people in the cars and the number on the register. Any one familiar with New York and the conditions under which we operate, will know the number of short rides we have and will immediately recognize the impossibility of trying to reconcile the number of people recorded on the register and the number of people in the car. It is not at all an unusual occurrence to have a car on Broadway start at Bowling Green and go up to Wall Street and have twenty-four or twenty-five on the clock and only have four or five in the car, the distance from the Bowling Green to Wall Street being probably half a mile. And that condition, to not so exaggerated an extent, prevails all over New York, or at least on the island of Manhattan; so that with very few exceptions on isolated portions of the road it is impossible to reconcile the number of fares on the clock with the number of passengers on the car. Like a great many others we are very strongly against the ringing up of transfers. We have followed the matter up very closely in all its relations, and we don't consider that the company is defrauded to any material extent in the use of the transfer system. I might add that we are using now on the average about 550,000 transfers a day.

Mr. Clark—I think that a very important point bearing upon the question of whether transfers are a good thing in connection with the operation of a railroad, particularly in provincial or smaller cities, is their use in connection with pleasure resorts. In the city of Binghamton we have had a practical experience both ways. Our franchises are of such early date that we are not required by them to issue transfers. For a number of years we operated without the issuance of transfers. In the meantime we established pleasure resorts in connection with our lines, which are a very prominent factor in our earnings, particularly during the summer months. We found that it was

an absolute necessity to issue transfers in order properly to maintain the resorts. There was an unjust discrimination arising in this respect. Parties might live possibly a mile from the resort and be obliged to use two lines, and be charged to cents (or, if you please, 6 cents or 8 cents, as some gentleman has suggested). Such a state of affairs would lead them to believe that it was for their best interest to stay at home. Therefore, we have found that the issue of transfers in Binghamton has stimulated our traffic, particularly during the summer months, from 20 per cent to 30 per cent, and we don't believe that we could maintain or operate the two pleasure resorts that are controlled and operated by the Binghamton Railroad Company were it not for the transfer system. That the privilege is abused frequently and repeatedly there is no question. The only thing we can do is to keep the closest watch possible. I quite agree with Mr. Cole and Mr. Nicholl that if a standard form could be agreed upon it would be advantageous to the railroads, but I firmly believe that the transfer is one of the modern street car conveniences that the public has a right to expect and that the roads in their own interest should maintain.

Mr. Allen—I think Mr. Root answered Mr. Cole's question, Mr. President. With us in Utica (it being a very small town) we don't register the transfer; we treat it as of no value. The inspector's duty is to tell what transpires on a car, not to make any comparison of the condition of the register with the number of passengers, except to tell what the condition of that register is and what passengers are on the car. We take the transfers from the conductor each trip. Of course, he has his envelope in which he encloses his transfers, and in comparing the conductor's statement the inspector's statement must be taken into account. We are firm believers in transfers. We do everything we possibly can to urge the people to use them. We have increased our receipts very materially since the use of transfers has been inaugurated upon the system. I would like to ask if there is a member of this Association who has tried the use of transfers who would now withdraw them if he could?

The President—You have heard the question, gentlemen. Is there any man who has tried the use of transfers who would like to abandon it? There seems to be no response.

I will ask Mr. Allen one question. You told me recently of having 4-cent fares. Have you 4-cent fares now?

Mr. Allen—We had until recently a nickel fare, but we placed on sale six tickets for a quarter on Dec. 1, 1902.

Mr. Root—It may be of some interest to the convention, although a little aside from the question, to know that the Interurban Street Railway Company of New York about six months or eight months ago obtained a very satisfactory contract with an advertising concern for advertising on the back of transfer tickets. We have a contract now which more than pays us for the price of the tickets, which is quite material where the number runs up to 200,000,000. And it has a secondary value, in that it makes it much more difficult—practically impossible—for the tickets to be duplicated by any outside parties, as has occurred in other cities. No ticket is gotten up that cannot be duplicated; but with the advertising matter on the back of it it is made very difficult, because no one knows until the ticket is presented for that day what the advertising is to be, as it is changed every day.

The President—If there is no more discussion on this paper we will hear Dr. Moorehead, of New York, on the topic, "The Physical Examination from the Physician's Standpoint." This paper is published elsewhere in this issue.

Mr. Almy, of New York—It seems to me there are two or three things that Dr. Moorehead did not touch upon along this line. I speak from the standpoint of the lawyer, and I would like to present two or three points that seem to me to need attention. In the first place, it has been my experience that a

doctor who makes a physical examination for a railroad company, and is employed by the company, is always open to the suspicion of being biased. It is, therefore, not always wise for a railroad company to put the examining physician upon the stand. His testimony in the case seems to me to be the smallest element of the value of a physical examination. But you find that when a lawyer goes into court with the papers in a case, the first thing he looks at is the physical examination, because there he finds the patient's first version of how the accident occurred, not in legal form, but what he has told the physician about how the accident occurred. You get his version. So many times in the trial of these cases we find that the few words that the patient has said to the physician about how the accident occurred give a clue whereby his testimony can be broken down absolutely. Again, they very often make admissions to the physician, which, when brought to their attention, cannot be denied. They haven't mentioned to the other lawyer that they told the physician certain things, and very often you will find an instance where you can win a case on admissions made about the circumstances of the injury or something that happened at the time. I remember a case where an old Irishman was suing a railroad company, and in the course of the examination the physician found an old break in his arm, and he said to him that the arm was broken years before. The patient said: "How do you know?" The doctor replied, "I know it was." The patient then said, "Yes; it was broken twenty-eight years ago, in Ireland." For the moment I think the old man had forgotten that. He went on the stand and swore that the crookedness of that arm and the fact that it had been useless for nearly a year and a half were due to a bruise received on it just above the elbow. When faced by that physician and put back on the stand after the physician had testified, he admitted the statement, and we won the case. That was a serious case, and one which, if it had not been for that admission, I am satisfied would have been lost.

There is another thing to which Dr. Moorehead referred to a limited extent. A lawyer going into a case wants to know in the first place what the injury really is, in order to carry on his case. Another thing; if you have a physician who has examined the patient and you know that what he tells you is right, you can depend on it and go as far as you like. I know of a case in Brooklyn only last year where three reputable physicians, supposed to be experts along their line in New York city, went on the stand and testified that a man had a heart murmur, and that it was the result of a bruise received upon the chest in a collision, by reason of being thrown upon the seat in front of him in an open car. We had a physician who examined that man—a physician in whom we had confidence, and he said positively that there was no such thing, that there was no heart murmur. It came to issue in court, and the judge said that he thought the case was particularly a case where doctors disagreed, and that we ought to have some person who had no interest in the case examine it. There were three eminent experts on one side, on the plaintiff's side, and there was a doctor on the defendant's side who had examined the man and knew what was or was not the matter with him. Of course, we consented to the suggestion of the judge in a minute. A doctor was called, and examined him at the order of the court; he didn't see either side and didn't know what he was examining for except that he was to examine his heart. He came directly from the examination and went on the stand, and nobody had said a word to him. He said there was no heart murmur. The result of that was that we won that case, because they were putting up a fraudulent proposition. So where doctors disagree, if you have got a man that you can depend on, you can take any kind of chances.

In the line of the thumb illustration, I saw a case one time where the plaintiff claimed that she could not shut her hand, and the doctor said she could shut it. So when the doctor was

on the stand he was asked that question, and he said that she could shut it. The patient was brought up, and the doctor shut the hand. Now, you wouldn't dare take chances like that unless you had a physical examination and knew absolutely what the situation was. Therefore, I think, from the lawyer's standpoint, for the purpose of preparation and for the purpose of the trial of cases of that kind, that there is no one element in the investigation of an accident that is so valuable as a physical examination of the claimant. (Applause.)

The President—The next paper is along the same line, "Physical Examinations in Accident Cases," by W. A. Dibbs, of New York. This paper appears elsewhere in this issue.

Mr. Cole—I would like to ask Mr. Dibbs a question. Take a case where the company's physician has attended a case of, we will say for instance, compound fracture of the elbow or wrist, in a comparatively aged person, and the wrist or elbow after it has been treated is stiff. Has anyone ever known of a suit being brought against the company and an attempt made to prove that there was improper treatment on the part of the physician?

Mr. Dibbs—We don't allow physicians to attend the cases all the way through. They simply conduct an examination for the purpose of adjustment or disposal of the case.

Mr. Danforth—I hardly think I can add much to the very able papers on the subject of medical examinations. The practice in our city of Rochester is to employ not one physician but a number; we distribute our work around among the reputable physicians of the city. Our physicians in these cases do not attend the injured party but simply make examinations.

The President—What is your experience, Mr. Allen?

Mr. Allen—The same that Mr. Danforth has just described, with this exception (and I presume our practice in that regard is governed by the fact that Utica is a small town), our physician looks after the injured party or attends to him until recovery.

The President—Let us hear from some of the smaller roads. What is your experience, Mr. Smith?

Mr. Smith—We don't have any accidents in Fishkill, so we have no occasion to employ physicians.

The President—If there is no more discussion of either of these papers we will listen to Mr. Parsons, of Glens Falls, in regard to "Hydraulics in Connection with Street Railway Operation." This paper was published on page 709 last week.

Mr. Clark—I would like to inquire into the advisability or the non-advisability of labeling poles for high-power transmission wires with danger signals, and what the legal status of the proposition is.

Mr. Parsons—I am not prepared to say in regard to the legal status. We label all our high-tension wires dangerous where they go through villages. Usually where 20,000 volts or 30,000 volts are used the danger signal is put up.

The President—What is the custom in the Western part of the State, Mr. Mitten?

Mr. Mitten—We have not labeled ours. We only go through very small hamlets and on what is practically a private right of way. The wires pass the streets only at highway crossings.

Mr. Danforth—Our line passes largely along private way. The poles are not labeled except where the line passes through a small hamlet.

On motion, duly seconded and carried, an adjournment was taken until 2 o'clock p. m.

TUESDAY AFTERNOON'S SESSION

The President—The first paper to be read will be Mr. Wilson's, on "Track Construction and Maintenance." This paper is printed on another page.

Mr. Cole—I would like to ask how long do you allow your cement to set before you begin to run your cars over it, after you have graded on the side?

Mr. Wilson—Seventy-two hours.

Mr. Pouch—Might I ask Mr. Wilson if he has any trouble with snow and ice?

Mr. Wilson—We haven't noticed any. We haven't any Trilby rails.

Mr. Danforth—The city of Rochester has a considerable mileage of Trilby rails. Within the city 25 per cent of the total mileage is of the T-rail, laid at the side of the street, outside of the curb. We find the greatest trouble with the Trilby rail in connection with snow and ice. The conditions in Northern New York, and particularly the Western part, is that during the winter we have a great deal of very damp weather and wet snow. This snow falling on a grooved rail packs readily and fills the groove and causes considerable difficulty in operating. The best rail for the operation of cars in our section of the State, of course, is the T-rail. We have not attempted to use the T-rail in paved streets, excepting cross streets. I should quite agree with Mr. Wilson in limiting the use of the T-rail to small towns or in streets where there is extremely light traffic. I see no objection to the use of the T-rail, particularly the Shanghai 6-in. rail, in brick-paved streets, residence streets, where there is very light or almost no teaming. Mr. Wilson has brought out convincingly the danger of using the T-rail in a street where there is a heavy vehicular traffic. As I have said, we have T-rail on 25 per cent of our tracks, but it is so situated that we are not bothered with teams.

Mr. Lewis (of Schenectady)—Mr. Wilson's experience in track work and my own have been so nearly along parallel lines that I do not imagine that I would voice any sentiment in regard to track construction or building essentially different from those which he has already expressed. I think it is true that the question of track construction is becoming very important. I don't think it has had attached to it in the past the importance that it should have had; but I think the necessity of having a better roadbed than has been had in very many instances is being recognized. I have had a chance lately to witness some very fine track construction showing all the essentials of a good track which Mr. Wilson spoke of until it got to the bottom of the ties. The roadbed and track from the ties up, or from the bottom of the ties up, was as good as could be put in, but it was laid on mud. It seems to me strange that such things as that are done in this day of electric railroading. I believe with Mr. Wilson that concrete construction is absolutely essential in paved streets for this reason: In open track work, where the joints can easily be gotten to at any time of the year, flexibility is correct theoretically and practically. But when it is not possible to get at the joints a construction must be used which will make the joints practically indestructible. Now, if a road is so small that it cannot afford to put in electric or welded joints, it should use the very best type of mechanical joint, such as a bridge joint of some kind. There are several good examples of bridge joints in the market, among them the joint of which Mr. Wilson speaks as being used in Philadelphia. I think that is perhaps one of the very best mechanical joints which is in the power of a small road to have. An electric welding plant is expensive. I don't suppose any railroad company in the country to-day owns one, but there are some roads which do own a cast-welding plant. But the day of the old girder rail-joint, the old fish-plate, the ordinary joint, which is not a bridge joint, is past; just as distinctly past in open T-rail work as it is in girder work. We should at least have a bridge joint if we can't get something better. There is no question in my mind about the matter of paving around the T-rail. I have passed through the same experience that Mr. Wilson speaks of. A T-rail in paved streets is not to be thought of for permanent work.

There is one thing I have had in mind since the Saratoga Convention. I don't know just how much the managers of electric railways are interested in it, but I have felt considerably interested in it and want to mention it. There is a new

association in the electrical field, the American Railway Mechanical and Electrical Association. It has been organized by the master mechanics and electrical engineers, but it does not take in the extremely important question of roadbed construction and maintenance. I tried to interest some of the mechanical and electrical engineers in it, but I didn't have much encouragement. I talked afterward with some managers of railways and found more encouragement. But I believe that the parent association is so taken up with questions of policy and management that the matter of track construction and maintenance, which is of such great importance with our present heavy cars, will not receive proper attention and discussion. It must be taken up by those who are practically concerned with it—the engineers. The organizations of different railway officials, owing to the difference in the management of different roads, overlap each other. Some departments embrace both operation and track work; some have the mechanical department in the track work, and some the electrical department in the track work. So there is no clear-cut distinction as far as the engineering and mechanical part are concerned. But there is quite a clear-cut distinction between the management and all the engineering questions proper. It would seem to me that if track construction and maintenance are going to receive proper attention and be systematically discussed and standards adopted it must be by some association which takes up particularly engineering topics. I thought, perhaps, I might interest some one at least in that question, so that topics embraced in practical railway construction could be taken up in the Association and the scope widened. I believe if the engineers were interested in it perhaps the scope of the present Association could be changed so it could be taken up. There are these questions of standard track construction, standard construction of rail, the depth of throat, width of throat, and special work of various kinds for suburban, interurban and city tracks. More than that there is the matter of interurban roads which nearly every large city has or will have. Nearly every large system has an interurban proposition; the work which has been done on many of those lines has been far from creditable, and there is a good deal to be discussed along those lines. I, for one, would be very much pleased, indeed, to see the engineering association of the street railway companies embrace in its scope the question of track construction and maintenance.

I just happen to think of one more thing that Mr. Wilson spoke of, and that was the ballasting. We are building some track from Troy to Schenectady, and nowhere are we putting less than a foot of ballast under our ties. On our Albany road we are putting in a foot of crushed stone. That crushed stone costs us less, perhaps, than it would in many locations, because we have our own quarry and plant for crushing. We are putting crushed stone under the track. We think the conditions of the traffic warrant it, and the maintenance will be sufficiently less to justify it. On our other interurban propositions we are putting in a foot of gravel, as good as we can get.

Mr. Wilson—Before we leave the question of snow and ice on the Trilby rail I would like to hear from some one connected with the Metropolitan, which, perhaps, has more of the Trilby rail than any other company in the country.

Mr. Starrett—The climatic conditions in New York city are widely different from those which obtain in other parts of New York State, especially in the Northern and central parts. We do not look for the trouble that we should expect in this vicinity, and practically don't get it. There are only a few days in the year when we have snow enough to appreciably affect the Trilby rail. We, in fact, don't have as much trouble with the groove in the Trilby rail as we used to have with the rail which was formerly laid, which was a semi-grooved rail. That rail used to fill up with mud, and in the winter with snow, so that we had to run a scraping car or digger over the road to clean it out. We rarely do that with the Trilby rail. The de-

sign of the groove in the Trilby rail is such that it is practically self-cleaning—that is, if used with the proper flange on the wheel; but in order to be at all self-cleaning the proper flange must be used with it.

Mr. Allen—On interurban work we have tried to follow as nearly as we could the type of construction that has been used on large steam roads in the past few years. We have made great efforts to secure a roadbed on the Utica & Mohawk Valley that was properly drained. Our roadbed for more than 90 miles out of our 114 miles is constructed on private right of way. Passing, as we do, through a valley and on the hillside, we have encountered some difficulties in the way of drainage that would seem to be hard to overcome. We have constructed on the uphill side of our roadway a series of two ditches; one near the line of the right of way, just within the right of way, which receives the water that comes from the hillside; and from this outer ditch it is conducted to and through and under the roadbed and under the track structure. About 4½ ft. outside of the end of the ties on the hillside we have constructed still another ditch, which gathers what water falls on the right of way and would overflow the outer ditch. Drainage may not seem to be a very important problem to some interurban roads, but with us it is different. Our road being at practically the summit of the Mohawk Valley, in the watershed of Lake Ontario and of the Mohawk River and Hudson River, we have an enormous rainfall. In fact, the records show that the rainfall at the Little Falls station is considerably greater than it is at Syracuse or Oswego. The question of drainage structures beneath our roadbed is, consequently, one with which we have taken a great deal of pains. Our culverts throughout are built of concrete, and are, as we believe, sufficient to take care of all the drainage. Our roadbed is made of the excavated material which we have found in the cuts. On top of this roadbed we have placed 8 ins. of gravel or crushed stone ballast. Upon the crushed stone ballast we have laid oak or long-leaf yellow pine ties, spaced from 18 ins. to 2 ft. centers, depending upon their proximity to joints. The rail we have used has been the A. S. C. E. standard 80-lb. T-rail, in 30-ft. lengths, and supported by one or the other of two types of bridge joints. We have used the Weber and the Continuous joint. We have had the greater portion of this road in operation somewhat over a year. Our cost of maintenance has varied, as the quality of the gravel under the track structure has varied. I believe that if we had the roadbed to build over again, instead of spending the labor and energy we have in placing the gravel which we have found and which has been accessible to our work trains, we would pay the additional cost of putting broken stone under the track structure. The first cost of crushed stone would be, perhaps, 25 per cent greater, but the cost of maintenance would be considerably less.

Mr. Mather—In our Auburn & Syracuse road the part that has cost the most in maintenance from Skaneateles to Syracuse has been the stone part. I think in the first year or two more work will have to be put on that to get it into a good road, but afterward I admit it will outlast the gravel. But the gravel that we have on about 7 miles of the distance from Syracuse to Skaneateles has lasted very well; it has kept up under heavy traffic. More curiously still, the 60-lb. rail laid three years ago from Skaneateles to Auburn has not cost during that time over \$400 for maintenance for the entire 7 miles. In the 60-lb. rail one can notice more flexibility of the track itself than with a 70-lb. rail; but the rigidity of the 70-lb. rail is all that we desire. I have my own opinions, of course, about the weight of rails. I don't object to the use of a 100-lb. rail, if one can get it, but I would rather put the money into about a 70-lb. or a 75-lb., or even an 80-lb. rail, which is ample for all the requirements of interurban traffic. Given sufficient ballast, a well-drained road, and plenty of ties, I would rather accept the lighter rail. I think too much im-

portance is attached to the weight of the rail. I notice the first thing the financial companies ask about is the weight of the rail. If a rail will break in the distance between the ties its utility as a carrier is ended. One cannot expect that throughout a 30-ft. rail there will be no deflection. From the foundation to the top of the tie is, in my opinion, the important part. Any neglect there will certainly redound to excessive cost of maintenance of track. I would very much rather, personally, take a light rail (say 50 lbs.) with plenty of ties and plenty of ballast, and put the roadbed down as it ought to be put down, and guarantee a better track than with a 90-lb. rail, with fence-posts for ties, spaced 4 ft. or 5 ft., as many early roads were built, and without ballast. Rock ballast is undoubtedly, once it is settled, the very best that can be obtained. I would have it crushed not to exceed 1½ ins. I would, to a certain extent (depending on the nature of the rock), have it screened, so as to get the most perfect drainage. But an important thing to be considered in laying a new roadbed with rock ballast is that the ties in one or two places may rest on the edge of a stone. A car running over that tie will disturb the stone, and the tie certainly will go down. I think the experience of all railroad builders would be that no amount of tamping will put a stone-ballasted road in as good shape or order as the more compact gravel-ballasted road would be in at the same time; but I think at the end of three years the advantage will be very much in favor of the stone ballast.

So far as our city traffic in Auburn is concerned, we have been unable to use concrete, not having had the means. The road is too small to go into very expensive construction. We have found that 6 ins. of crushed stone, thoroughly rolled, and with gravel on top, gave the best results. In laying this track care should be taken that nothing be done during wet weather, and that the roadbed be allowed to be dry before the superstructure was put on. We have had some of this track down for eight years, and I don't think in probably 9½ miles of girder rail construction we have nine low joints. It has stood wonderfully well. The earth was very rigidly packed at the bottom, part of it being old macadam, and had been built for a great many years. Auburn has well-macadamized streets. We had a magnificent base to work on. That, with the precaution of packing the earth and our foundation stone well into this has had practically the same result as if concrete had been used. There has been no possibility for that stone to shift in any way, and to all intents and purposes it was concrete. In a great many places the streets have since been repaved, and in only one or two places has the foundation been able to steal away from the ties and leave any hollow, and that was over bridges, where we couldn't help it. We have had some thought of filling that up with concrete, but we haven't done it. The brick paving has gone over it. We filled it in with crushed stone the last time it was paved, and since then have had very little trouble, but that is only a comparatively short time. That is about our experience in ballasting.

We are all very much in love with the T-rail construction. For our projected road from Rochester to Syracuse we have secured through all the villages the right to lay T-rails, and at Fairport we have put in about ½ mile of 70-lb. T-rails. That is the only construction we have on the Rochester, Syracuse & Eastern at present. We have very carefully looked after the foundation and have put in specially made brick. Teams are able to drive, even with 1-in. tires, upon the track. It allows a 1-in. tire to go in exactly ⅝ in., and as far as vehicular traffic is concerned it is far ahead of any other rail. Whether it will last under that traffic or not I do not know. I have not had experience. I have no doubt that Mr. Wilson's observation will be ours, probably, except that we have through those villages very tight traffic compared with what he speaks of. But we are in hopes that we shall be spared the taking up

of that pavement for some years. In Auburn we have about 2 miles of such rails (in macadamized streets), and the maintenance of that, although it is only a 45-lb. rail, has been comparatively light. The maintenance of the macadam has been very light indeed, but, unfortunately, for the purpose of illustration, it is on Seymour Street, a street that is not much affected by heavy traffic. We have, unfortunately, for illustration, no T-rail in any street that is heavily affected. On the brick pavement the tram rail does not seem to have worn at any particular point, other than on the head, but there is not much traffic, and we have had the brick pavement in there for the last eight years. There is no point in that pavement that has shown any particular wear. Still, the outside of the girder rail would be as susceptible to wear as the inside of the T-rail. I am quite sure that under heavy traffic there would be the chance that Mr. Wilson speaks of, of wearing a rut that would be objectionable for vehicular traffic, and probably dangerous. But we feel in our interurban building that we desire as much T-rail construction as possible, and in the villages I think we can maintain it to the satisfaction of all parties.

The President—I would like to ask if anybody has used to any extent the 60-ft. length T-rail?

Mr. Mather—We have used it, and at a place that is especially dangerous for expansion, since it is in a rock cut and the reflection from the rocks surrounding it raises the temperature to a very great extent. When I saw it in construction in the winter time I was very much afraid the first thing we would have to do in the spring would be to relay it, but there hasn't been even there that objection. That is between Skaneateles and Syracuse. But on the 60-lb., 60-ft. length from Skaneateles to Auburn the first two years that we operated it we had two places that sun kinked. There were two each year, and, rather to my astonishment, in each case it has been on the top of a hill, not in the hollow. All we have done for it has been to slack off six or eight joints on each side and throw the rail in place, and we have had no returns of the trouble. This year I don't know of any place where there has been a sun kink on the entire line, and the rails are all in 60-ft. lengths.

The President—Then, do you recommend the 60-ft. length?

Mr. Mather—My practice has been largely before this on steam roads. From a steam road point of view I don't like the 60-ft. rail. From the point of view of bonding I think I do. I think as long as no danger shows in it we shall continue to use the 60-ft. length, for the sole reason that it is more easily bonded. I don't know that it affords any better riding. I have not noticed that. But we have a pretty fair riding track.

Mr. Nicholl—We have 34 miles out of 38 miles on our Sodus Bay line laid with 60-ft., 60-lb. T-rails. The superintendent of that division is present.

The President—I would like to ask him his experience.

Mr. Wilcox—We use the 60-ft. rail on the Rochester & Sodus Bay division, and we found that it ran about three or four or five joints very nicely. Then we would get an opening all the way from ½ in. to an inch, sometimes breaking the bolts right off. We haven't had any trouble outside of that.

Mr. Wilson—The Lockport division of the International Railway for a distance of about 32 miles is entirely laid with 85-lb. rails in 60-ft. lengths, with the exception of about 2 miles. We had some trouble at the curves because they were not fully filled up to the top of the ties and sufficient shoulder given. But since that work has been done we have had no trouble on account of expansion or contraction.

The President—Then do you recommend that length of rail?

Mr. Wilson—I do; on account of the bonding and the joints.

Mr. Rockwell—There are 22 miles on the Lakeside road laid with 60-ft., 56-lb. rails from beginning to end. For trolley road work I wouldn't use anything else.

Mr. Wilson—I would say that the American Society of Civil

Engineers has recommended 33-ft. lengths. Of course, they probably had in mind steam railway practice.

The President—That is the steam railroad standard, isn't it?

Mr. Wilson—Yes.

Mr. Lewis—Mr. Wilson speaks of the rail on the Lockport line and the difficulty he has had. I remember distinctly the trouble we had when I was in Buffalo. It occurred in a section of road a mile or two outside of Lockport. The track was laid in the middle of the winter and laid with very tight joints, and the contraction sheared the bolts in some places in the winter time, and in the summer time the expansion threw some of the joints out of line. We easily overcame the difficulty, and I don't think that there has been any serious difficulty since.

The President—What is your judgment about it?

Mr. Lewis—Decidedly in favor of the 60-ft. rail. I don't think there can be any question at all with reference to rails laid in city streets which are paved. I think that has been demonstrated. And I think that very much better bonding can be got by laying a 60-ft. rail in open track work.

Mr. Mather—There is one other thing that I have in mind that may not be generally known. As the section of the rail increases the expansion may be disregarded. A light rail will expand more per foot of track than a heavy rail. That is accounted for by the fact that the entire section of a light rail may heat up from the sun's rays, clear to the center of the metal, while in a heavier section there is always a part which remains cool and does not expand so much. The result is, the expansion of an 80-lb. rail will not be so great as with a 60-lb. rail, yet it is the 60 lbs. that I have given my experience with.

The President—I have heard all kinds of woods mentioned for ties except chestnut. We have with us a great deal of chestnut. Have any of you used chestnut?

A delegate whose name was not stated replied that his road had used a great deal of chestnut.

Mr. Clark—I would like to ask Mr. Wilson if one of the plans he advocates for the drainage of the ordinary gravel-ballasted interurban or outlying track (and how far it is practicable and advantageous, if at all) is to leave the tie exposed in accomplishing the drainage?

Mr. Wilson—I think that by following steam railroad practice on our suburban roads we can get very fair drainage. By that I mean the giving of a slant to the roadbed, so that the water will drain from the center into the ditches. On city work we lay a drain tile on each side of our track. It is a 4-in. tile, and is connected into the sewer.

The President—If there is no farther discussion we will now take up the time which has been allotted for discussion of the Railway Young Men's Christian Association work. F. J. Pearsall, of New York, is with us and will address us.

Mr. Pearsall—There are two topics that I noted in the list of topics sent me by your president that it seems to me are intimately related. They are "Reading and Club Rooms for Employees," and "How Can We Increase the Efficiency of Employees?" One of the significant developments of recent years has been an increasing recognition of two things on the part of employers and men. One is that the way a man spends his time when off duty has a direct relation to the efficiency of his service when on duty. If I am correct, it is this to no small extent that justifies this Association in devoting some time to the consideration of a topic of this kind. The second significant thing is a recognition on the part of employers that their full duty is not done when the employee is given his wages. That was emphasized most happily by your president this morning, when, in his opening address he said, "It is our duty to make the life and lot of our employees as comfortable as possible; we should even go out of our way to do this."

Now, in connection with the opening of club rooms and reading-rooms for men, we have in mind more than merely the occupation of the men's leisure time. In connection with some

of the work which has been done among the street railway men of the State (and as to which in a few minutes I am going to ask a statement to be made by two gentlemen who are members of your organization) there is more than merely the filling in of the time by games. There is the giving of those men an opportunity to have a bed in a convenient place. I learned quite recently in connection with one street railway company in the State which is operating a reading-room, that some of the men got in from their runs late at night, and being unable to get the last car out, living far out in the suburbs, from necessity, on account of small rents, and unable to walk the distance home, they have spent every night in the car house, sleeping on the seats of the cars, as in this particular case, or in other cases sleeping on wooden benches in the reading-room, and getting up in the morning in that condition to go to work. That was the best they were able to do. I am glad that there is under consideration in that particular city a plan for the introduction of dormitories in addition to reading-rooms and game rooms.

It was thirty-one years ago that the first Railroad Young Men's Christian Association was organized, and that was in Cleveland. The growth of the organization during the last ten years has been by far greater than its growth during the first twenty years. This is a significant statement when it is understood that the organization has been dealing with the presidents and the managers and the superintendents of railroads—gentlemen whose hard business sense enables them to see through a proposition about as soon as any class of men on top of the ground; gentlemen whose occupation is such that they have all kinds of propositions made to them, most of them not worth considering. Now, after close contact with the kind of work that the Railroad Young Men's Christian Association has done through these years, the managers are giving their hearty co-operation in extending these organizations among their men, more than ever before, because the organization is better understood. The Railroad Young Men's Christian Association is the railroad man's club, and when I say that it is putting it as briefly as it is possible to put it, and as accurately. They spend their time bowling, playing billiards, in the reading-room, or in the lunch room, for many of the organizations have lunch rooms for the men; or in the dormitory upstairs. Many men who run from one point to another, and are away from home every other night, find this place a club, where the privileges are within their reach.

At the present time, after this thirty-one years of effort, it is rather significant that the organization possesses a membership of 62,000 railroad men. It owns in buildings and real estate property amounting to \$1,250,000. Another significant thing connected with those figures is this: That at the outset the leaders of this movement among the railroad men felt that if they were able to get the men to contribute one dollar for every two dollars that the companies contributed, it was a good proportion, and about as much as they could be expected to do. But during these years the proportion that the men have given has increased so that the men now give more than a dollar for every dollar that the companies contribute. If I read that statement aright, it means that the men themselves are more interested in this organization than the companies. It is not a missionary movement to them, but it is a movement among themselves; it is not a going-down of outsiders among the railroad men to do missionary work with them. It is a club composed of railroad men themselves. Eighty-seven of the 114 railroad branches in the country own their own buildings, and buildings are going up faster than one a month, and only in one case in two years has one of these buildings been erected for the Railroad Young Men's Christian Association where it has not been opened entirely free from debt. In erecting the buildings the companies usually contribute three dollars to one dollar contributed by the men, and in that ratio

they agree to contribute up to a certain amount, that ratio being larger than the ratio for support, which is about dollar for dollar.

Now, I have spoken somewhat at length in describing this kind of work, because it seems to me that there is a similarity between steam railroad men and street railroad men. I have been interested to hear one or two gentlemen speak inferentially of the fact of their having been connected with steam railroads formerly. The two are so related that the character of the employees is quite similar; their tastes, their mode of life, all mark them as being men of similar caliber, and men who can be reached by the Railroad Young Men's Christian Association on the steam railroads can be reached, I believe, with equal efficiency by the same organization among street railway employees. Before I speak further about this matter I want to call on two gentlemen who are here to-day, members of your organization, who have some knowledge of this work as it is now being done in the State of New York, and I am going to call first upon Mr. Nicholl of the Rochester Railway.

Mr. Nicholl—I was rather under the impression that my friend Pearsall was going to make more of a speech before he called upon me. If I had not, I think when I went out a few minutes ago I would have stayed out longer. Aside from any religious views that I may have, or that I ought to have, I am really very much struck with the Young Men's Christian Association work among street railway men, and I have good reason to feel that way, from the fact that a little over a year ago we, in Rochester, organized the first street railway Young Men's Christian Association, they tell me, in the world. I have my doubts about the correctness of that statement, but they say it was the first in the world. And I promptly became the first member, not because I knew anything about religion, because you know street railway men can't possibly know much about religion; they don't get any opportunity to go to church or to attend religious services of any kind; on the contrary, they are continually up against the real thing in the way of dealing with the public, who are not, as you know, always considerate, and very often liable to try your patience, try the patience of the conductor and motorman, as well as of the man in the office.

A little over a year ago we started with one member, and two or three persons joined very soon afterward. In May last our Association was asked to send delegates to Topeka, Kan., to attend the conference, as they call it, of the Railroad Men's Young Men's Christian Association. We sent, I think, four delegates to that conference, and at that time we had less than 100 members. That was in May. To-day, in Rochester, we have nearly 200 members of the Young Men's Christian Association, men to whom really it has been of assistance, who have watched the development of things and have made up their own minds, without the slightest coercion, that it was the proper thing for them to do to join this Young Men's Christian Association. You understand we have outside of the Young Men's Christian Association a benevolent association that takes care of the men in the way of providing for their families should they be disabled or sick, built very much upon the same lines as the Metropolitan and other associations. But the Young Men's Christian Association comes in and takes charge of our rooms particularly, and of the conduct and morals that are in vogue in those rooms. In Rochester we spent between \$5,000 and \$6,000 in fixing up the rooms for reading, where we have all the popular magazines of the day, newspapers, billiard rooms, ping-pong tables, etc., besides toilet, bath rooms and a nice room where they can retire for religious meetings. Let me say that we are somewhat religious, for on Sunday morning last I understand that they had thirty-five of our boys who voluntarily attended what they call a prayer meeting in the morning. It certainly has done a great deal of good morally. Before we had the Young Men's Christian Association in

charge of the rooms there was a great deal of blasphemy and all sorts of funny talk about the rooms. Since they have been in charge we haven't heard a word of it. Everything has been nice and courteous. The men have been courteous to each other, and you will never hear a blasphemous word spoken, because as soon as there is something of that kind the secretary goes up and in a very quiet and gentlemanly manner does not insist but requests that it be discontinued, and rather shames the man. I think it has a subduing effect on those men and has made them more patient than they otherwise would be in their connection with the public.

I cannot help but say that I am heartily in favor of it, and I think that the manager makes a mistake that does not allow the Young Men's Christian Association, where they can do so, to exercise its influence in the same way as it has in Rochester, through their secretary, who is the only man that they appoint, the other men being appointed by our own men themselves. Of course, there is an incentive to the men to belong to the Young Men's Christian Association. Men outside of the association are required to pay a little more for their games of billiards and bowling and for the use of towels, etc., than the men that belong to the association, but it is quite trifling. Still it is sufficient to make the men feel that it is a good thing to belong to the association. They, of course, come under the influence of the secretary and others, perhaps, who feel religiously inclined.

I don't know that I have anything farther especially to say about the matter. I have been rather, you might say, forced by the officers of the Young Men's Christian Association into the position of standing up and speaking for them, but I do so most heartily, feeling that it is a good thing. Although not a religious man myself I must say that I appreciate it for others.

Mr. Pearsall—I would like to have the gentlemen here know that Mr. Nicholl was at the big railroad gathering at Topeka, where President Roosevelt and he made the two leading addresses in the convention of railroad men, which was attended by thousands, and his speech was applauded most heartily and circulated in the press.

I would like to say this with reference to the religious element of the organization. In the first place we don't hide it. In the second place we don't apologize for it. And in the third place we don't intrude it. I ask your attention to this one fact, that in the thirty-two years that we have been working among railroad men—and I was a railroad man myself; I went into the secretaryship out of the railroad service—in that time the religious side of the work has been handled so wisely and unobtrusively that it has won its way into the confidence of railroad officials who, if it were sectarian in its character or obtrusive in its methods, would throw it out of the railroad service. The association stands for twentieth century religion. It believes that affording a man chance to have a clean bed and a square meal is a religious act. It stands for the kind of religion that I believe you gentlemen stand for and believe in. A significant thing is that railroad officials who were afraid of this movement fifteen years or twenty years ago are now not only its leading supporters but are the leading officials in the State and national organization.

I am going to ask now if Mr. Clark, of the Binghamton Street Railway, will say a word.

Mr. Clark—I feel myself in a somewhat embarrassing position at this time in attempting to discuss a proposition concerning which I have a comparatively limited knowledge, and particularly in following in the wake of my friends, Secretary Pearsall and Mr. Nicholl, who, to my knowledge, made a long, extensive and very eloquent address upon this subject at the national convention held recently at Topeka, which address I read with a great deal of interest and a great deal of pleasure.

My first contact with Railroad Young Men's Christian Association work occurred about three or four months ago, when

it was my pleasure and my privilege to participate in the dedicatory exercises of the new Railroad Young Men's Christian Association Building in Binghamton. I am ashamed to say that notwithstanding there had been a local branch in the city of Binghamton bearing the name of the Railroad Young Men's Christian Association for a number of years, I was not aware of its true character, the class of work it was performing, or the great benefit it was extending to its members. You may imagine my surprise when I accepted an invitation to make a few remarks, upon entering a beautiful brick structure of considerable size and finding gathered there several hundred railroad employees with their families, who were to be addressed by President Truesdale, of the Delaware, Lackawanna & Western Railroad Company, and F. M. Olyphant, secretary of the Delaware & Hudson Company, and two or three prominent Erie officials. Before we commenced the exercises we were shown about the building, and we found a splendidly equipped place. We were taken up-stairs first, where we were shown a succession of nicely furnished bedrooms or dormitories; we were shown into several first-class bath rooms or lavatories, and everything that goes toward completing the sanitary regulations of a well-kept institution of that character; and when I was informed that all those advantages and all those privileges were afforded to the members of the Railroad Young Men's Christian Association at a very nominal cost, I can assure you I was surprised. Upon going down-stairs we were shown through a handsomely equipped reading room, a finely furnished billiard room, card rooms, a first-class assembly hall and the office. We were then taken to the lower floor and were shown splendid bowling alleys and other athletic conveniences. I can assure you, gentlemen, that it was one of the most completely equipped club houses that I ever visited.

At the completion of the exercises I casually said to the secretary of the local association that I thought privileges of that character would be a great thing for street railroad employees. "Well," he said, "why don't you take advantage of them? You are eligible. Your boys are at perfect liberty to attend and participate in these benefits upon paying a nominal fee," I think two dollars a year. "They can enjoy the bedrooms upstairs at a cost of 10 cents a night. While we have not, perhaps, presented the proposition as thoroughly to the street railroad interests of the country as we should have done, yet your men are eligible, and we should be glad to welcome them to membership at any time." As a result, the following day I posted an order on the bulletin board setting forth what I believed to be the advantages and stating that those privileges would be accorded to them gladly; and I am pleased to state that within ten days from the posting of that notice upward of seventy of our 200 motormen and conductors connected themselves with the Railroad Young Men's Christian Association, of Binghamton, and have from that time enjoyed its privileges and advantages with great benefit to themselves and to ourselves. There is no question but that the refining influences of the association are a benefit to the men. I am not speaking from a spiritual standpoint at all; I am going to put it upon a plain, ordinary business basis. I think as a business proposition that this subject is worthy of the most thorough and careful consideration of the street railroad companies of the State of New York, because anything that has a tendency to refine or elevate men necessarily increases their efficiency. And I believe that the seventy men from among our motormen and conductors, notwithstanding the fact that they have been members comparatively a short time, are improved and benefited by the privileges which they have enjoyed. I think as an economic proposition the street railroads of the State can well afford to consider the advisability of taking advantage of the privileges that the Railroad Young Men's Christian Association affords.

In a conversation with National Secretary Moore, following

the occasion which I mentioned a while ago, he stated to me that they were going to take up more actively the question of identifying street railroad employees with their work; and he said, furthermore, that when our membership had increased in the city of Binghamton to one hundred he would be very glad, indeed, to establish a railroad branch, and I shall be very glad (and I am sure Mr. Rogers bears me out in the statement) to have him do exactly that thing. We believe, irrespective of any spiritual or religious benefit that they may derive from their intercourse with the officers of the Association and their associates, that as a business proposition it will be both profitable and pleasant. Therefore, I say, without taking up further time, that I think this is a matter of considerable importance to the street railroad companies of the State of New York, and a question to which they should and, I believe, will give due consideration.

I presume it goes without saying that if the street railroads of the country generally take advantage of the throwing open of the doors of these various associations throughout the United States, possibly the question of their assisting in their maintenance may arise; but I believe that any co-operation along consistent and economical lines tending toward the development of the Railroad Young Men's Christian Association movement among street railroad employees will be money well invested and well spent.

Our boys, irrespective of creed or of belief, take advantage of the manifold privileges which they enjoy; you can see them daily enjoying the privileges of the lavatories; you can find them at the tables in the reading-room; you can find them participating in games. I say to you unhesitatingly that I believe it is infinitely better for an employee of any street railroad company, when his day's work is ended, to seek diversion with the Railroad Young Men's Christian Association rather than in the temptations of the saloon. As I stated before, anything that has a tendency to elevate, or that has a tendency to improve the morals and conduct of the men is a good thing for them, and necessarily the railroad companies must inherit a benefit therefrom also. Therefore, I say in closing that I am most heartily in sympathy and accord with the work, and I sincerely trust that the street railroad companies, not only of the State of New York, but of the United States generally, will give this question careful consideration.

Mr. Pearsall—I wish to make two statements. The first is that I presume that in New York State there are only a few cities where the street railway men are as closely related in various ways to the location, for instance, of the steam Railroad Young Men's Christian Association building as to enable them to take advantage of the facilities to the same degree that they do in Binghamton. In most cases it is very likely that the managers will find it desirable, if not necessary, to establish reading-rooms for their own men, as Binghamton may, in the course of the months, as they find out that the men themselves call for such an organization and promise their support to it.

Now, with the relation to the Young Men's Christian Association form of organization, I have three things to suggest regarding it. I believe it is desirable, because in the first place it brings into its work the experience of more than thirty years and adopts methods which have been tried and proven by time. In the second place, it has been training secretaries, many of whom came from the ranks, and know how to appeal to the men; and after all that is the chief difficulty in any kind of work of this character. It is not the money that is the chief difficulty. It is one of the hardest things in the world to try to do good to others, and I believe you gentlemen know it quite as well, if not better, than I do. The difficulty is in helping a man in such a way as not to pauperize him for one thing; not to knock his support from under him by making him think that you are going to carry him in your arms and

help him unduly. It is not the lack of money chiefly that stands in the way. One of the wealthy men of the United States, feeling his responsibility in view of his great wealth, has apparently searched to find how best he could spend his money for the benefit of his fellows, in order that he may not die a rich man. To-day he has only found one method, so far as we are able to see, and the danger seems to be as great that he will die in spite of all a rich man, as that some of us may die poor men. The third thing regarding the Young Men's Christian Association is this. There are two supervisory organizations which look after these individual associations, which isolated would be likely to do a less efficient work, the State committee, whose secretary for the railroad work I am, and the national committee, whose secretary Mr. Clark mentioned a moment ago. We follow up these individual organizations, try to co-ordinate their efforts, and carry along the plan from one place to another, and in any way we can, without cost to those organizations, endeavor to make their work efficient.

I hope, gentlemen, that the support which has been given to this work by the officials of the steam railroads, men who stand and have stood as leaders in all that is best and largest in the steam railroad world, men such as Mr. Ingalls, Mr. Depew and Mr. Vanderbilt, that the support which has been accorded to the Association of railroad men by these gentlemen may be emulated by similar cordial support by the leaders in the street railway work of the Empire State. I want to suggest, if it is considered wise to devote any farther time to the consideration of this topic, I should be glad, so far as I am able, to answer any questions that may be asked.

Mr. Nicholl—I must say that the eloquence of our friends, Mr. Pearsall and Mr. Clark, together, has made me more convinced than ever that I did right in starting this movement in the city of Rochester, and I am more convinced than ever that it is a very important thing for this Association to take in hand. Having that in mind, if it is in order, I would be glad to move that this matter be referred to our executive committee, to take it into consideration and under investigation through the proper channels and make recommendations as to what we shall do at another meeting.

The motion, as suggested by Mr. Nicholl, was put by the president, seconded and carried unanimously.

The President—We will now hear from J. B. Storer, of Syracuse, on "Power Transmission for Interurban Lines." This paper is printed on another page.

Mr. Barnes—We have had two very interesting and instructive papers on high voltage transmission. In the discussion of the first one of them the question was asked whether the poles were labeled "Dangerous" or not, and the answer was made that in some cases they were so labeled. Seeking for information, I would like to inquire why a pole carrying a high-voltage current is labeled "Dangerous?"

Mr. Storer—I don't see any reason, if the transmitting line is operating successfully, why the pole should be labeled "Dangerous" with a 20,000-volt circuit any more than with 2200 volts. The general conditions, of course, are such that if a high-voltage circuit drops on a cross-arm or on a pole, you can't help but notice it, because it generally sets fire to the pole or the cross-arm and begins to burn it up. But I don't think the amount of leakage that would come from an ordinary pole would be sufficient to injure any person. It is more with the idea of keeping people away from it and impressing them that it is not safe to throw wires across transmitting lines than it is from any actual danger of the operating line itself.

Mr. Barnes—Have any tests been made of the voltage that can be taken from a pole in wet weather with defective insulation? Do you know of any tests of that kind?

Mr. Storer—No, sir; I don't know whether any tests of that kind have been made.

Mr. Barnes—My questions were based on the idea of securing information as to whether defective insulation on a high-voltage transmission line would affect the pole in a manner which would produce or result in a serious shock to people coming in contact with the pole.

Mr. Storer—No, I don't think it would.

The President—I will ask if the wire came in contact with the pole wouldn't it char it?

Mr. Storer—It usually sets fire to it.

The President—In wet weather wouldn't there be danger?

Mr. Storer—Well, the pole is part of the ground just as much as the person who is standing on it and touching the pole, and for that reason I don't see that there could be any great danger in a person standing on the ground and touching something which is actually connected with the ground.

Mr. Rockwell—Mr. Storer means that 22,000 volts wouldn't kill any quicker than 2000.

Mr. Storer—I have known of people taking everything up to 30,000 volts and lived through it, so I don't think that electricity will necessarily kill.

Mr. Danforth—I would like to ask Mr. Storer concerning his statement or recommendation of six wires on single-pole lines, for instance, in preference to three heavy wires, in giving more reasonable, proper or continued service. In case of the breaking of an insulator on one circuit, or the breaking down of the insulation in any way, or a wire dropping off from the insulation upon a cross line the cross line may be burned off, and very frequently the pole is burned to the ground. Doesn't that endanger the other circuit?

Mr. Storer—Certainly it endangers it, but in general the damage is not carried that far before it is discovered that one circuit is in that condition. Your ground detector should enable you to know that there is a grounding of one wire, and that circuit should be thrown out of service at once and the service put on the idle line before the damage could have reached any such serious stage, while a person operating a system with one line would be forced into on account of the necessity of keeping the cars moving. With merely one transmission line you have got to keep the cars moving and keep the line in service, whereas if you have duplicate lines you could detect it almost instantly and could take advantage of the ground detector and transfer the pressure over to the idle circuit and let the defective circuit remain idle.

Mr. Pardee—I would like to inquire if any one has had any experience with municipal interference with high-voltage lines near highways?

Mr. Allen—We have a transmission line operating at 22,000 volts, and of about 31 miles of that line 1000 ft. is in a street in a village of about 1200 inhabitants. A resident on that street made a complaint to the State Board of Health, claiming that we were operating a line at 22,000 volts pressure over and above his sidewalk, and that he thought it was dangerous. That communication was referred to the Board of Railroad Commissioners, and in turn was referred to Mr. Barnes, and the matter is now being held without determination by the Board of Railroad Commissioners. I think that is a very important question. I know of one situation on this line now, in a city of 25,000 inhabitants, where a transmission line of 16,000 volts is being held up awaiting the determination of the State Board of Railroad Commissioners in this matter.

Mr. Barnes—I am not going to make any official report, but I agree with Mr. Allen in thinking that this is an important subject, and one which should receive the serious consideration of this convention. The increase in the weight of cars operated, and the speed at which they are run on suburban lines located through highways, has materially increased the danger, not only to the operation of the electric road, but to travelers on the highway. There is this new element of danger appearing, if it is such; and if it is not, this convention should take

steps to let the public know that it is not dangerous; and this new element is the construction of high voltage transmission lines. When you put poles through the streets and label them "dangerous" the public has a right to believe that they are so; and if they are not dangerous the public should be informed, and not be misled into believing that they are dangerous. It is a very serious question, I think, and one that should be thoroughly discussed.

Mr. Wilcoxon—We found labeling the poles on our high-voltage line a very good thing. I don't know whether it is so in other parts of the State, but every boy out of Rochester for 40 miles has got a gun, and when the line was first put up the insulators made the best kind of targets. We had a great deal of trouble with broken insulators, and finally we labelled the poles. We had some signs printed and they were placed on about every tenth pole. Copies of the signs were given to the different public schools in the villages through which we ran, and the principals of the schools were requested to show the signs to all the school children and explain to them that the line was very dangerous, and that there might be a liability to accidents in shooting the insulators, providing the wire should drop or anything of that kind happen. Since that was done we have had very little trouble with insulation along the line.

Mr. Brady—It seems to me the question of what is high voltage is something that has hardly been settled. In 1886 there was a war between the Edison Company and the Westinghouse Company regarding high voltages. The Westinghouse Company at that time spent a great deal of money in trying to convince people that a 100-volt line was not dangerous. Now you are talking about 2000, and 10,000, and 20,000. I know that both of the large electric companies have reached a point where they are transmitting at 60,000 volts. I think the General Electric Company has several plants out West of that voltage, and I know the Westinghouse Company has installations where it is using as high as 60,000 volts, and that it is being done with success. This question is one that immediately affects the matter of insurance. The board of underwriters presented some resolution on the subject at their last meeting, and it was held up for the time being, with the suggestion that these high-voltage transmission lines be restricted from approaching within a certain distance of buildings. It would not surprise me to see an effort made to have legislation enacted that would be very detrimental to the transmission lines which are using high voltage, and, inasmuch as the railroad business is developing so fast that would be very bad, I think.

You will have to face the question sooner or later. I know now steps are being taken to bring the St. Lawrence power down through Central New York as far as Utica and to Syracuse; and if that is done they must use 50,000 volts or 60,000 volts. The time is coming when I don't believe there will be as much water going over Niagara Falls as would run a 100-hp wheel, but the power of that falls will be distributed east and west of that point for hundreds of miles. I don't believe there is a railroad west of Syracuse that within the next ten years will not be served by power from Niagara Falls.

Mr. Cole—At the last electric light convention in Chicago the question was very instructively discussed between the underwriters and electric light men as to what constitutes a dangerous current for high potential transmission, and a complete report is to be made on that subject at the next meeting of the National Electric Light Association. The claim among the electric light men was that a 22,000-volt current was no more dangerous than 2200 on a well-constructed line, so that no shock could be received from the pole in case of leakage or during rain storms, and that there should be some standardizing of the method of construction of high-potential lines. That was conceded by both sides.

Mr. Storer—Referring to Mr. Brady's remarks concerning what is high voltage, I wish to refer to a conversation that I had some time ago with Professor Ryan, of Cornell University, who had been conducting some experiments in connection with the protection of transformers and high voltages. He ventured the prediction that in our lifetime we should see power transmission circuits operated at not less than 500,000 volts. If that is the case it will be a very simple matter for the Manhattan to use its steam power plant as a reserve for the Niagara power. I would not be at all surprised if we were to see that time come, and the question as to what is high voltage to-day is no more settled than what high voltage was twenty years ago. The question is merely relative. With reference to the question of its effect on human life, that is a question depending entirely on the physical condition of the person getting the shock. We know of people that have been killed with 100 volts, and we know of those that have taken all the way up from 100 to 30,000 without being killed. One person that I know of particularly was connected with a 30,000-volt current so long, and was burned so badly that both feet and one arm were amputated as a result, yet he still lives, and aside from that he is in reasonable health, considering that there is only part of him left. I think that any steps that the Legislature or the underwriters may take with reference to transmission lines and regulations as to their position and construction should be taken with a great deal of care, for if it is done unwisely it will certainly restrict transmission line construction and the distribution of power to such an extent as to be very detrimental to all railroad interests.

Mr. Connette—We have one employee connected with the Syracuse Rapid Transit Railroad Company who will stand with his bare feet on the ground and take hold of a trolley wire with his bare hands without any apparent disturbance.

Mr. Barnes—The matter that I had in mind was not a theory. It is a fact. The companies are to-day using a 22,000-volt current. In some cases those currents are transmitted on the highway. What Mr. Brady suggested I think is so: That the Legislature may be called on to take some steps to prevent a danger which, perhaps, does not exist. And I think this Association can do a great deal in heading off unnecessary legislation in that direction by taking some initiative action in the matter. Without expressing an opinion, there is a great question whether the current transmitted at that voltage in the way it is at present is a danger to the community. One man may take 30,000 volts and live, but we know that an electric current will kill, and the general public know it. They know that people can be killed with a great deal less voltage than 20,000. Some intelligent action on the part of this Association in determining whether the present transmission and construction of lines over which power is transmitted is dangerous or not would do a great deal to satisfy the public mind in the matter. If it is not dangerous they should be convinced that it is not, and if it is dangerous some steps ought to be taken to minimize that danger. My suggestion is that a committee be appointed by this convention that shall undertake an investigation of the conditions as they exist to-day, and report at the next convention.

Mr. Peck—As the American Society of Electrical Engineers have taken this matter up, I think it would be proper for this Association to appoint a committee of three (and I would so move) to act jointly with that society and the National Board of Underwriters, the committee to be appointed by the chair and report later.

The motion was seconded and carried.

The president appointed as members of the nominating committee Messrs. T. E. Mitten, H. A. Nicholl and J. T. Smith.

On motion of Mr. Connette, duly seconded and carried, the convention adjourned until 9:30 a. m. on Wednesday morning.

WEDNESDAY MORNING'S SESSION

The convention met, pursuant to adjournment, and the president introduced Orlando W. Hart, who read his paper on "Dispatcher's Duties and Electric Signals," which was printed last week on page 708.

The President—Mr. Hart's paper and the discussion by Mr. Wilcoxon, of Rochester, are so closely related that we will take up the discussion after Mr. Wilcoxon reads his contribution on the topic of "Car Despatching." The next order will be Mr. Barnes' paper.

Mr. Barnes—Unfortunately I was seated near the speakers' table last night and I have got such a cold that I don't think I could make myself heard by the convention, and for that reason I have asked Mr. Clark, of Binghamton, to present the paper for me, and he has kindly consented to do so. Mr. Clark thereupon read the paper of Mr. Barnes on "Steam Railroad Crossings, or Right-Angle Crossings of Electric Lines," which appears in this issue.

On motion of Mr. Connette the thanks of the convention were extended to Mr. Barnes for his paper.

Mr. Barnes was asked whether the number of crossings stated included crossings of switches, and he replied, "Yes. Every crossing of a steam railroad track over which there is any operation, whether freight or passenger, is considered as a crossing of a steam railroad."

A member mentioned that his company reported one crossing, but there were two or three switches which were crossed, and he asked whether those were considered steam railroad crossings.

Mr. Barnes—Yes. We have had accidents occur at crossings of that character, and experience has led us to consider them as steam road crossings.

Mr. Hart—I would like to know if Mr. Barnes prefers a stop-block or a derailing switch on street railroads.

Mr. Barnes—I don't want to express an opinion on that. Any means of derailing a car or preventing its passage onto a steam railroad track in the manner described in the paper is sufficient protection in my judgment, whether a stop-block or otherwise.

The President—The Board of Railroad Commissioners has suggested two topics for discussion here, one of which is "The Advantages and Disadvantages of Oil Tail Lights for Interurban Cars." I would like to have some remarks upon that subject.

Mr. Barnes—A number of accidents have occurred in the State which have been caused by cars breaking down, being derailed, or stopping from other causes, and losing their supply of electric current, thus leaving them in darkness. Cars following have run into the rear end of them, and the Board of Railroad Commissioners has suggested to the managers of the roads the plan followed by steam roads of having an oil light or signal on the rear end of each car, especially on suburban or interurban cars. This is not restricted to roads operating at high speed, because we have had a number of accidents of that character on what might be termed ordinary interurban or suburban roads. I am glad to say that nearly every road, with few exceptions, to-day has its cars of that class equipped with oil tail lights.

The President—The next topic is "Street Car Controllers—Their Proper and Improper Operation."

Mr. Barnes—In some respects it seems hardly possible that there can be any defect in the modern controller as manufactured by the leading electrical companies, but in the case of nearly every collision investigated the motorman has a stereotyped answer in reply to the question why he didn't bring his car to a stop, and that is, "The brake wouldn't work, and I tried the controller and that wouldn't take." In some cases I have come to the conclusion that that is the fact, whether through inexperience in its use or lack of knowledge of its construction, or because of an inherent defect in the controller

itself. The matter is one which will bear discussion at this convention.

Mr. Cole—I think there is no question that all mechanical appliances, especially those with as many moving parts and as many working parts as a controller, afford some chance for a defect; but I believe that has got to be taken care of in the inspection. When a motorman turns his car in at night it should be either reported O. K. or defective, and a system should be developed that will check off the repairs to the car before it goes out in the morning, showing what inspector made the repairs. It is entirely up to the inspection in the car house to keep it in order.

The President—We will now proceed with the discussion of topics suggested by Mr. Vreeland last year. One of these is "Interurban Service," divided into three heads; the first part treating "Standard Equipment." C. Loomis Allen, of Utica, has kindly consented to open this topic.

Mr. Allen—Standard equipment for the successful operation of interurban lines is a very large question. To-day, within the limits of the State of New York you can visit many interurban systems or lines and you will find in operation as many different types of cars, and as many sizes and types of motors as there are roads. Whether it is possible to adopt a standard car for interurban service is a question, in my mind. Each system, or each road, has some peculiar conditions that must be dealt with. I have in mind to-day a road operating through about 40 miles of sparsely settled farming country, in which there are three or four hamlets, and I do not presume that the gross receipts of that property will exceed \$100,000 in a year. Still, upon that road are operated large interurban cars that weigh not less than 30 tons to 35 tons, and will seat comfortably sixty-two people. I cite this instance as one where a road has purchased equipment that is far greater than the demands of the traffic require. I have in mind another interurban road whose gross receipts are approximately \$650,000 a year, whose service every day between the termini is never less than thirty minutes, and on Saturdays, Sundays and all holidays is cut to fifteen minutes and possibly seven and a half minutes. The equipment used on that road is not heavy, so far as weight is concerned, the cars seating approximately forty-eight people and weighing not to exceed 50,000 lbs. light. This is the other extreme.

What kind of car and equipment could be used as a standard is a question which I think this Association should take up. Perhaps I might give my personal experience. At the time the Utica & Mohawk Valley Railroad Company was purchasing cars for the operation of the road the question arose whether long, heavy cars should be purchased, or whether cars of less length and not so great weight, but more of them, should be purchased. A study of the conditions as they existed at that time showed that it was not the long rider we would have to deal with; that we would have to deal with the rider who would be on our cars not to exceed forty-five minutes. We adopted a car not of great length, and not of great weight. We believe that the people in that particular territory have responded to the service and to the policy which we have adopted in giving them that service; namely, that it was not a large car hourly that the people wished, but it was a comfortable car and more frequent service. To be a little more explicit: We could have placed upon our system a car weighing approximately 35 tons to 40 tons, and seating from sixty to seventy people, and could have taken care of the traffic with hourly service, but we have adopted a shorter car and have given half-hourly service.

As to the electric equipment on a standard car for interurban service, I hardly think it is possible to attain that point. There are so many local conditions controlling, grades, frequent stops, and the alignment of the road that they should determine the question of the size of equipment to be placed under

an interurban car. As to the trucks, I think interurban practice has settled down practically to three types of trucks. First, the master carbuilders' truck, which has come into general use; second, the large, heavy truck, as built by the Brill Company and sold for heavy elevated service and for heavy interurban service, and practically the same type of truck which is built by the Peckham Manufacturing Company.

When we take up the question of trucks the question of wheels naturally follows. Those who have been operating cars at fairly high speeds with chilled wheels wish that they could feel sure the wheels were thoroughly safe. It has been a question in my mind why we do not get the quality of wheels that we did ten years ago. I am sure that in city service the mileage we are making to-day on chilled wheels is not as great as we made in the years from 1893 to 1898. The question whether a chilled wheel or a steel wheel is the proper thing to use on interurban cars from an economical standpoint is one that should be investigated very carefully. On the question of safety, I think general practice has shown that there is but one wheel to adopt; namely, the steel wheel. The question of whether the steel wheel is economical or not depends very largely upon the dimensions of the flange and tread; the greater the depth of the flange and its width the greater the life will be of the wheel. What I have said of the dimensions of the steel wheel is true also of the chilled wheel. Steel wheels that by reason of local conditions have to be designed with shallow treads and with shallow flanges will not, of necessity, give the service that a wheel that has the large tread and the deep flange will give. I think the consideration of safety alone should control the question of wheels. One of the most serious accidents that occurred in the territory surrounding the city of Cleveland last winter was due to the breaking of a wheel while the car was in motion at a speed of approximately 40 miles an hour. The body of the car left the trucks completely, and rolled over on its side, and some of you probably will remember the photograph that was shown in the *STREET RAILWAY JOURNAL* of a car lying on its back. The photograph was published in an advertisement of the quality of cars of a certain car builder.

As I said in the beginning, it seems to me a difficult matter to adopt a standard car. In steam railroad practice this was not so. Steam railroads are built with as little grade and as little curvature as possible. If the trolley road were limited to low grades and light curvature it would not exist. The trolley has made its success through the fact that it has been possible to overcome grades and overcome difficult locations by the use of very sharp curves. Those two things alone would control, in my mind, to a large extent, the question of what the car should be on any interurban line.

Mr. Rockwell—I would like to ask Mr. Allen whether he considers a 1-in. flange sufficient for a 50-mile-an-hour-car?

Mr. Allen—I have operated cars having a $\frac{7}{8}$ -in. flange and a thickness of $\frac{3}{4}$ in. at speeds up to 50 miles an hour. We have adopted on the Utica & Mohawk Valley the standard master car builder's wheel, with the exception of the width of the tread. Our flanges are $1\frac{1}{8}$ ins. in depth, and $1\frac{1}{8}$ ins. in thickness, and our tread is $2\frac{3}{4}$ ins. Our special work has been designed and built for that. We have operated chilled and steel wheels over old girder rail sections which had originally only a depth of 1 inch from the head. This was a difficult task, and beyond doubt was expensive as far as the item of power was concerned, because the car was riding practically on the face of the flange. But since that time we have been operating those wheels and not confining them to any one piece of track, but have operated them all over our whole system. There is not a double-truck car in the city of Utica to-day that has not wheels having a flange of $1\frac{1}{8}$ ins. in depth and $1\frac{1}{8}$ ins. in thickness. We have chilled wheels in city and suburban service that have operated a mileage of 36,000 miles

to 40,000 miles, while wheels having a flange of only $\frac{7}{8}$ in. or $\frac{3}{4}$ in. depth have not given, on the same roads and the same streets, a mileage exceeding 20,000 miles to 25,000 miles.

Mr. Rockwell—I hadn't reference so much to mileage as I had to safety. The question in my mind is whether a $\frac{7}{8}$ -in. flange is sufficient for a speed of 50 miles or 60 miles an hour. No doubt we have all had the same experience with many sections of girder rail on which a deeper flange could not be used. In T-rail construction we don't have the same difficulty. Our T-rail work or special road work will carry almost any type of flange, but girder rails will not. The great difficulty I find with the Trilby rails is to keep them clean, and I find that there is great liability to spring an axle. In spite of all the care taken oftentimes the tracks will not be all alike, and if you do any interchanging with steam roads you will find many times cars that will not track at all; you will find the flange resting in such a way on the side that you are very likely to strain an axle. We use a 3-in. tread altogether.

Mr. Allen—I don't consider the flange the only dangerous point in the wheel; in fact, I believe that the tread is just as great a source of danger, if not greater, than the flange. The flange trouble may occur in a steel wheel, although not quite to such an extent as it does in the chilled wheel. But there are certain classes of accidents due to the bursting of the tread of the wheel that seem to me of far greater importance than the breaking of the flange. As an example, before we could equip our cars with steel wheels we had a chilled wheel burst, and approximately one-half of the rim of the wheel came off and protruded through the car floor while the car was running not less than 45 m. p. h.

The President—"Car Despatching" is the next sub-head under "Interurban Service," and Mr. Wilcoxon, of Rochester, has kindly consented to open the discussion.

Mr. Wilcoxon then read the paper entitled "Interurban Train Despatching," which is printed on another page.

Mr. Barnes—The two able papers that have been presented here are on the right line. I don't know of any department in the operation of electric cars that needs more overhauling and revising and improving than the one under consideration. Nine-tenths of the collisions that occur on electric railroads to-day are the direct result of defects in train despatching. It is a branch of the operation which should be improved for the protection of the public and for the financial interests of the companies. I was very much interested in both papers. Mr. Hart's paper included a new feature providing that where a train despatcher makes a mistake means are at hand of rectifying it before a collision occurs. As an additional means of preventing an accident caused by a mistake on the part of a train despatcher, I think a safer and easier method in such cases would be to enable the train despatcher, either through switches in his office or by direct communication with sub-stations or the power house, to shut off the current on the trolley wire; and if the train despatcher has made a mistake no collision will result from it.

A serious question, and one which should receive proper consideration, is whether it is advisable to give trains operating in either direction a superior right on electric roads. In deciding that question the class of employees on electric railroads must be taken into consideration. While that is the plan employed by steam roads, with their experienced engineers and conductors and train crews, it is questionable whether accidents on electric lines would not be lessened by not giving any train superior rights. The suggestion made by Mr. Hart that train despatchers should be brought together and these questions discussed and some plan adopted by them and presented to this convention for its approval, is a good one. The standardizing of equipment is a good thing, but the standardizing of train despatching is more important and will prevent more accidents.

Mr. Pardee—On the question of shutting off the power in case of a mistake by the despatcher, I would call attention to an accident that occurred last summer on the Grand Rapids & Muskegon road in Michigan. A despatcher found that he had made a mistake and the cars would probably come together head on. He immediately telephoned to the sub-station and had the current shut off. One of the cars was on one side of a valley and the other was on the other side; they both saw each other, but they had no power to stop the cars, and they came together in a head-end collision.

Mr. Hart—I will say that on the Boston & Worcester Street Railway, between Boston and Worcester, they have a device whereby they shut the power off the entire line, whether it be east or west of the despatcher's office; nevertheless, they have had accidents there. The only objection that I see to shutting the power off the entire line is that you upset your entire schedule, which you want to adhere to as nearly as possible. By a device which has been in use on the New Bedford road for the last two years a system is used whereby they can set a signal at any terminal by telephone communication, and after that signal has been locked in that position so it cannot be disturbed by any malicious person, the despatcher feels safe to run a train against that signal. The signal used is only a 7-in. disc, which, in my opinion, is not large enough. At least a 30-in. semaphore should be used, and I believe a constant light should be used in connection with it, not dependent upon the operation of the signal for its illumination.

On motion the question of car despatching was referred to the committee on rules, with instructions to present a standard system if possible.

The President—The next topic is "Standard Methods of Fare Collection and Ticket Taking."

Mr. Stephenson's paper on "Interurban Ticketing" was read at the opening of this discussion. The paper was printed last week in the STREET RAILWAY JOURNAL, page 707.

The President—We shall proceed to the topic of "Extra Freight and Baggage Service on Interurban Lines," under three heads, suggested by Mr. Vreeland. The first is "Traffic Arrangements with Steam Roads and Boats." It was found that no company had had extensive arrangements of this kind.

If there is no one here who wishes to discuss this subject, we will pass to the next topic, "Traffic Arrangements with Other Interurban Lines." Mr. T. J. Nicholl, of Rochester, will reply to that.

Mr. Nicholl—We have no special traffic arrangement with other interurban lines. We are running a freight and express business over our own lines, but we are not turning it over to other lines, except in one case where we turn it over to a steamboat company, and that is not sufficiently developed to be of any value to this convention. We anticipate that we shall be compelled to make arrangements with other interurban lines for the transportation of passengers as well as freight.

We have, however, a number of contracts with other interurban lines or lines entering our city, and possibly our form of contract may be interesting, as I don't know of any other company that has precisely the same form of contract that we have with other lines in our city. To begin with, our policy has been to welcome reliable promoters who were really going to build a road, and let them use our tracks under proper restrictions. One of the restrictions is that we retain the right to change the crews at the point of junction. That is, although we generally allow their crews to come into the city, at the same time we retain the right to put our own crews on their cars; and the crews of the entering company have to be under our orders and under our control. I presume the main feature of all these contracts is the same in that respect. We require the incoming road, in consideration of the privilege of doing such traffic as they wish on our streets, to pay us the gross

earnings on that line per car mile. They can pick up passengers or drop them off anywhere, or do a city business on the street on which they come in, but if the car earnings on that line are 20 cents we require them to pay us 20 cents for the use of track and power. They supply their own cars and provide their own men to run the cars and indemnify us from accidents. This is unusual, I think, for the companies are generally charged a fixed rate per car mile, and the expense of running the cars is divided, and the interurban company is required to pay to the city company so much for each passenger it picks up—about half or a little more, or something of the kind. That is the main difference between the contracts. We not only give the incoming road the right to use our tracks and use our power, and to do the same business that we do on those streets, but we give them the right to transfer. They issue a transfer which is specially designed or colored, upon which we carry a passenger to any part of the city on any other of our 5-cent lines, and in turn we agree, in some cases, to sell their tickets, where it can be done, to some resort point or some amusement point. Of course, we cannot carry a full line of tickets for a road extending from Rochester to Syracuse for all the way stations; but our conductors are allowed to carry, as a rule, one set of tickets to some special point outside the city. Those tickets we sell and we take up their coupons. The transfers that they issue, the special colored transfers, which we take and which we honor, and the coupons which we take up of theirs are redeemed at one-half fare. We think that is equitable, because we carry the passenger from some point on our line to the center of the city or to the connecting point with the interurban line, and we charge them 2½ cents for carrying them there. And when they bring a passenger into the city or pick up a passenger in the city, they issue one of their own transfers and they redeem the transfer at 2½ cents. That evens up the matter of fares. It has been suggested by some of our friends that our arrangement is a little hard on some of the interurban companies; but when you come to figure out the privileges that they are getting without the initial cost in obtaining rights of way through the city, and the value of the franchise, and the amount of fixed charges that we have to pay on the installation of the property, and power, etc., I think you will find that it is not very far out of the way. We have found it to work very satisfactorily to the companies that operate in that way.

The President—The next subject, and the last, is the "Development of Freight and Express Service."

Mr. Clark—The executive committee of this Association invited E. F. Seixas, of St. Catharines, Ontario, to respond to this subject. Mr. Seixas expected to be here, but at the last moment stress of business prevented. He forwarded his paper with the request that the same be read. I move that his paper be received and spread on the minutes, and the thanks of this convention extended to him therefor.

The motion was seconded and carried. The full text of this paper will be found elsewhere in this issue.

The President—I was to appoint a committee of three to act with the National Underwriters and the Electric Light Association. I will appoint J. B. Storer, of Syracuse; W. F. Rockwell and R. E. Danforth as such committee.

Mr. Connette, of the committee on rules, I understand, will report.

Mr. Connette—This Association adopted the report which was submitted at the last meeting of this Association at Lake George. Since that time the standard rules committee of the American Street Railway Association has submitted a report at the meeting in Saratoga last month, and the report, to a large extent, was about the same as was adopted by this Association, so far as the rules governing motormen and conductors are concerned. There were some minor changes made by that committee, but they were not essential. The committee of this

New York State Association believes that it is a good idea to recommend to this Association to adopt the report that was adopted by the National Association, because it differed but very little from the one which is already in vogue. The committee makes that recommendation. Now, as to the rules governing interurban service, it was deemed by the National Association, we believe, that action upon them should be deferred. However, the code will be submitted here, but we suggest that action be deferred until the State Board of Railroad Commissioners can have an opportunity to examine it and pass upon it. We would recommend, therefore, that the Association adopt the report so far as the rules governing conductors and motormen are concerned, and that the recommendations governing interurban service be postponed—that is, that action upon that portion of it be postponed until the State Board of Railroad Commissioners can have a chance to examine it and pass upon it, and that the committee be continued, and make its final report on the interurban service rules at the next meeting.

The President—Gentlemen, you have heard the recommendation of the chairman of the rules committee, what is your pleasure?

Mr. Allen—I move that the report of the committee on rules be accepted, and that the committee be continued for another year.

The motion was seconded and carried.

The President—The report of the nominating committee, of which Mr. Mitten is chairman, is now in order.

The Secretary—The committee has submitted in nomination for officers and members of the executive committee of the Association for the coming year the following:

For president, G. Tracy Rogers, of Binghamton, N. Y.

For first vice-president, E. G. Connette, of Syracuse, N. Y.

For second vice-president, Addison B. Colvin, of Glens Falls, N. Y.

For secretary and treasurer, W. W. Cole, of Elmira.

For members of the executive committee, C. Loomis Allen, of Utica; B. B. Nostrand, Jr., of Peekskill; W. H. Pouch, of Newburg, and J. H. Pardee, of Canandaigua.

The President—It is very kind of the nominating committee to send my name in, but I think it is time now for some one else to take the laboring oar. I find upon looking back for the last nine years that a good share of each year has been devoted to the interests of this Association. It has been a heart work with me, but my own interests are now getting larger, and I find I must devote some of the time in the future to my own affairs. The friendships that I have formed in the last nine years I will carry through life with me. My relations with the executive committee (who have worked equally as earnestly for the success of this Association and have not spared either money or time) have always been most cordial. Gentlemen, I thank you, but I must decline the nomination.

Mr. Ely—I quite appreciate the position taken by Mr. Rogers in this matter, and in moving you, Mr. Secretary, that the declination of Mr. Rogers be accepted, I only desire to say that I have often wondered how it was possible for Mr. Rogers to give so much of his time to the affairs of this Association. If he feels (as I know he does from personal conversation with him) that he ought to be relieved from these duties which have proven arduous and time-taking to him, I think that the Association owes it to him to grant his request in the most cheerful way. I know that even though we shall not have him as president of the Association longer, the welfare of the Association will always be very close to his heart and mind, and that those who may succeed him in the office which he has so long and so ably held will receive his cordial support and assistance all the time. I cannot say anything that would aptly or fittingly describe what in my judgment the Association owes to Mr. Rogers. As he described it last evening, when this convention

met here nine years ago, which was the occasion of his first being elevated to the office of president, it was a small, struggling affair; and I think it has been largely due to the time, the energy, and the ability which he has devoted to the affairs of the Association that it has grown to its present prosperous condition. It is at the present time, in my judgment, one of the greatest instrumentalities for the good of our business that there is. I have been much struck at these sessions with the attendance, the matters and things submitted, the discussions and the papers and the general esprit du corps, as I might term it, of this Association. I have the honor to be the president of the American Street Railway Association, and I may say that if during my incumbency of that office I were able to bring it, with the assistance of those who work with me, to such a high plane as this Association occupies, I should deem my holding of the office not to have been in vain. In making the motion that I do, gentlemen, I can only say farther that no words of mine could describe or fittingly characterize the debt

outlined in the report of the nominating committee. I wish to say that not only the future president but all of the officers of the Association will receive the earnest, the cordial and the hearty support and co-operation, whenever it is desired, and at all times, of those who have been in the immediate past officers of this Association. I know that I can make that statement with the feeling and in the belief that those who shall fill those places will never find that the word which I speak has been broken by any of those in behalf of whom I speak it. I wish to nominate for the office of president of this Association Mr. Connette, of Syracuse, who has entertained us so beautifully during our stay here. (Applause.)

The nomination was duly seconded.

Mr. Clark—Mr. President, I move you that the secretary be empowered to cast one ballot as the choice of this Association for E. G. Connette for president.

The motion was seconded and carried.

A. B. Colvin, of Glens Falls, was then elected first vice-



EX-PRESIDENT
G. TRACY ROGERS



EX-SECRETARY AND
TREASURER H. A. ROBINSON



PRESIDENT
E. G. CONNETTE



SECRETARY AND TREASURER
W. W. COLE

that this Association, in my judgment, owes to Mr. Rogers. I hope the motion will unanimously prevail.

The motion to accept the declination of Mr. Rogers was seconded, and upon being put by the secretary was unanimously carried.

Mr. Ely—Mr. Secretary, a vacancy now exists. I do not wish to seem to usurp any of the functions of the nominating committee, but as this matter has presented itself to my mind, as the result of careful thought and deliberation, I venture to rise again to place a name before you in nomination for the presidency. The gentleman that I will present is a very able man, a man of ideas and of ability in every way, devoted to the Association, and an able member of our profession or business. In making the nomination I feel that I should fail in my duty to him, to all of you, and to myself, did I not say a few plain, straightforward, candid words. From the report of the committee it seems to me that there must be in the minds of those who have considered the matter the idea that a radical change in the personnel of the officers of the Association should be made, and I think that it comes about in this way. For a long time certain gentlemen have occupied certain positions, and while I believe that it has, in the main, been for the best interests of the Association, still there comes a time in the life of such an Association as this when there ought to be a change in the personnel of the management, because, practically, the officers do manage the concerns of the Association. I know my own feeling. I know Mr. Vreeland's feeling, I know Mr. Robinson's, Mr. Nicholl's and Mr. Rogers'. We have talked this matter over very carefully and very earnestly. In consideration of the matters involved I must pay this tribute to my associates: that I have never seen questions more fairly met, more earnestly discussed, or more honorably dealt with than these particular questions that are associated with the change

president; John L. Heins, of Brooklyn, second vice-president; W. W. Cole as secretary and treasurer, and C. Loomis Allen, B. B. Nostrand, Jr., W. H. Pouch and J. H. Pardee as members of the executive committee. It was also decided to hold the next meeting at Utica.

Mr. Clark—I think it but just that before the close of the routine business of this meeting a formal expression of our thanks and gratitude should be extended to the local committee of Syracuse, who have so generously arranged for our splendid and hospitable entertainment. That we have been nicely cared for I think no one will gainsay. That the twenty-first annual convention has been an overwhelming success I think is generally conceded. That much of the credit for the success of this important and pleasant meeting is due to the local committee I am sure that you will all agree. Therefore, for the purpose of placing an expression formally before this meeting, I would move that the thanks of the Street Railway Association of the State of New York be, and they are hereby extended to each individual member of the local committee, to each member of the ladies' committee, to the citizens of Syracuse, and to the press of this city, to the city officials, and to all who have combined to make our stay in this, the Central City, pleasant and agreeable. I take pleasure in offering this motion, and I hope that it will be unanimously and heartily endorsed.

The motion was seconded and carried unanimously.

Mr. Ely—At the risk of being tiresome, I wish to say one word more. For years past—I don't just recollect how many—but for a number of years past, this Association has had as secretary and treasurer one of the ablest lawyers in street railroad law that there is in the United States of my acquaintance. I don't know of any association of business men with which I have ever been connected that has had, without cost and

without expense, the services of so able a man as the retiring secretary and treasurer, Mr. Robinson. I wish to make, in behalf of us all, a formal statement of the obligation which rests upon the Association and moves toward Mr. Robinson, and at the proper time I wish to make a motion that a committee be appointed to draught a suitable resolution to be spread upon the minutes with reference to the retiring president and secretary and treasurer.

The motion was put by Mr. Ely and carried unanimously, and Messrs. Ely, Cole and Allen were appointed to act on the committee.

The regular meeting was then adjourned.

PROGRESS ON THE BUFFALO, DUNKIRK & WESTERN RAILROAD

Work on the Buffalo, Dunkirk & Western Railroad, now under construction, from Buffalo (N. Y.) to Westfield, Chautauqua County, a distance of about 70 miles, is progressing rapidly. The line from Fredonia to Westfield, a distance of about 20 miles, is substantially finished, and the company will soon be operating cars on this section. The line from Buffalo west to Angola, a distance of 22 miles, has been graded for double track with all of the concrete, culverts and foundations for bridges in. The bridges have been delivered and will soon be erected. Ties and poles have been delivered along this section, and it is intended to have the line to Angola from Buffalo in operation before Jan. 1. From the rapidity with which construction has been progressing during the past summer the entire line should be in operation by July 1, 1904, which will be six months in advance of the date specified for the completion of the contract. The standard of construction of the track is that of the best steam railroad practice, and the electrical equipment is standard of that of the best constructed interurban electric railway. When in complete operation the system will comprise 90 miles of track. It is stated that the company has concluded an agreement with the International Traction Company, of Buffalo, by which passengers will be brought into that city from the city line by the International Company.

FREE LEGAL ADVICE FOR EMPLOYEES

The recent announcement that the Boston Elevated Railway Company would furnish advice on legal matters free to its employees has brought to light the fact that the Chicago City Railway Company has for years followed this practice for the benefit of its employees. The employees make considerable use of the legal department for this purpose, and the free service is evidently much appreciated.

SCHOOL TEACHERS "BEAT" CLEVELAND COMPANY

In connection with the recent reduction of fare to six tickets for a quarter, the Cleveland Electric Railway announced that all children more than six years of age would be charged full fare, and those younger than that age would be carried free; thus displacing with the half-fare rate formerly in vogue. It is apparent that the company did not figure on the possibilities of such a rule, as was demonstrated by a recent incident. Four young ladies accompanied by about forty tots from a kindergarten boarded a car. The young ladies paid their own fares, but protested against paying for the children, who were all under six years of age. The conductor maintained that the company had made no agreement to carry a whole kindergarten, and, on arriving at the ear house, the matter was laid before the superintendent. The latter decided the children would have to be carried free, but the rules of the company will be altered at once to provide for such cases.

RUMORED ELECTRIC CONVERSION

It is announced that the Cincinnati, Hamilton & Dayton Railroad Company, one of the leading Ohio steam systems, is planning to equip several of its short lines with electricity. The experiment will first be tried on the Findlay-Deshler branch, a line about twenty miles in length, which connects Findlay with the main line. Formerly it was quite an important part of the system, but recently the company acquired the Findlay, Ft. Wayne & Western Railway, so that the Deshler line is now used largely for local traffic.

INTERCHANGEABLE MILEAGE BOOK AT INDIANAPOLIS

Plans are being considered by the managers of the interurban electric railways entering Indianapolis looking to an arrangement for issuing interchangeable mileage books, also for the interchange of freight and express matter. As outlined unofficially, the mileage books are to be made up for 500 and 1000 miles, and are to be good over all lines entering the city and such other lines in the State as it may be deemed advisable to enter into an agreement with. The rate of fare charged by most of the roads is 1½ cents a mile. This fare will probably be cut to 1¼-cent rate. The Indianapolis & Northwestern Traction Company, which has not yet been operating a month, has already announced that it plans to issue mileage books, irrespective of the action of the other companies.

ASSESSMENTS OF IOWA INTERURBAN PROPERTIES

The Executive Council of Iowa has completed the assessment of interurban railway companies within the States. The Des Moines Interurban Railway Company was assessed \$2,500 per mile for 23.41 miles of track, or \$56,825 in all. The actual value of the property of the company is \$234,100. The Boone Suburban Railway Company, with 4.7 miles of track, was assessed \$1,000 per mile, or \$4,700 in all; actual value \$18,800. The Cedar Rapids & Marion City Railway Company, with 12.06 miles of track, was assessed \$3,731, or \$44,995; actual value \$179,983. The Mason City & Clear Lake Traction Company, with 14.62 miles of track, was assessed at \$900 per mile, or \$13,158; actual value \$52,632. The Tama & Toledo Electric Railway Company, with 2.75 miles of track, was assessed \$1,818 per mile, or \$4,999; actual value \$19,998. The Waterloo & Cedar Falls Rapid Transit Railway Company, with 40 miles of track, was assessed \$2,500 per mile, or \$100,000 in all; actual value \$400,000.

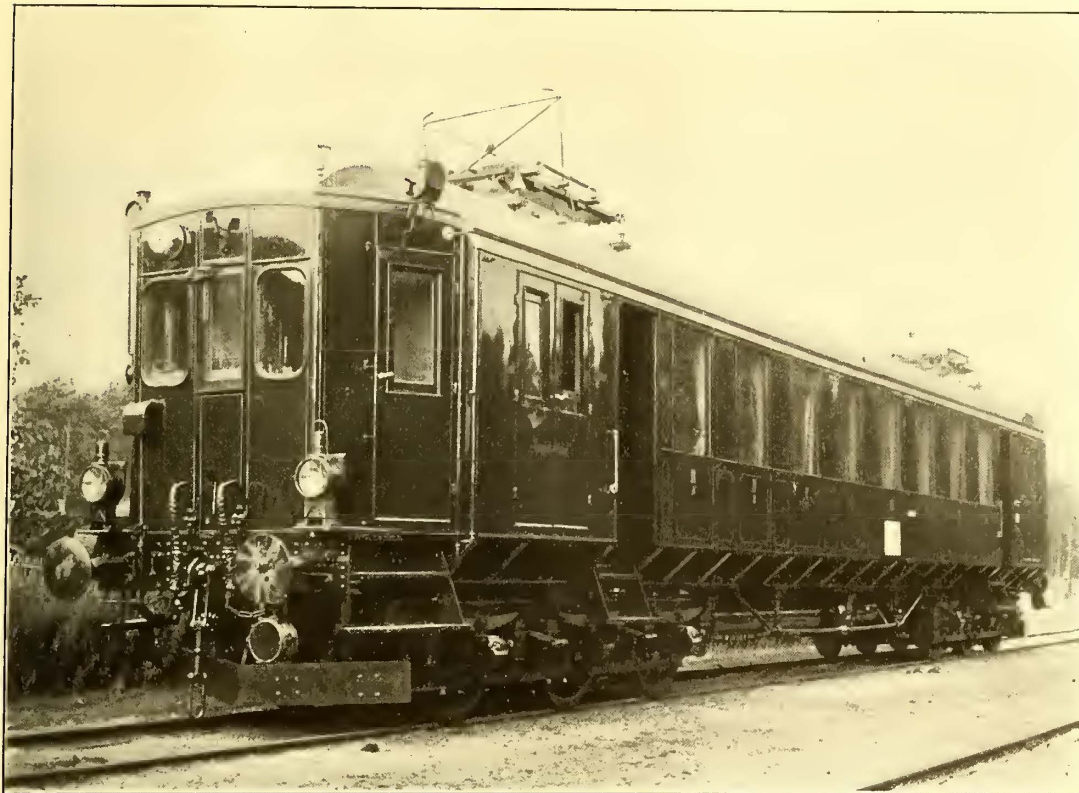
SATISFACTORY SHOWING OF A CONVERTED STEAM LINE

At the annual meeting of the Cincinnati, Georgetown & Portsmouth Railway, held a few days ago, the following officers were elected: J. W. Comstock, president; W. R. Todd, vice-president; R. E. Field, secretary-treasurer. The other members of the directorate are: J. S. Conner, W. J. Thompson and Samuel Tappin. This property was formerly a steam road, and the details of the work of changing it to an electric system were described in the STREET RAILWAY JOURNAL of Feb. 21, 1903. For the year ending July 31, 1903, the gross receipts of the property were about \$130,000, as compared with \$105,000 for the year previous. This, too, despite the fact that passenger rates were reduced from 3 cents per mile to 1½ cents per mile. The freight business, which is still handled by steam locomotives, also showed a large increase, and the company has just placed a contract with the Westinghouse Company for two 50-ton electric locomotives of 500 hp each. A spur line to Batavia has recently been completed, and work on an extension from Georgetown to West Union is under way.

NEW GERMAN SINGLE-PHASE RAILWAY SYSTEM

For several months past the Union Elektricitäts-Gesellschaft, of Berlin, Germany, has been conducting a series of important

Johannisthal and Spindlersfeld, suburbs of Berlin. The line is 4.1 km (3 miles) long, and all trial runs are made at schedule speeds between the regular steam trains. Its use for this purpose was secured through the efforts of Regierung and Baurat Wittfeld, of the Prussian State Railways.



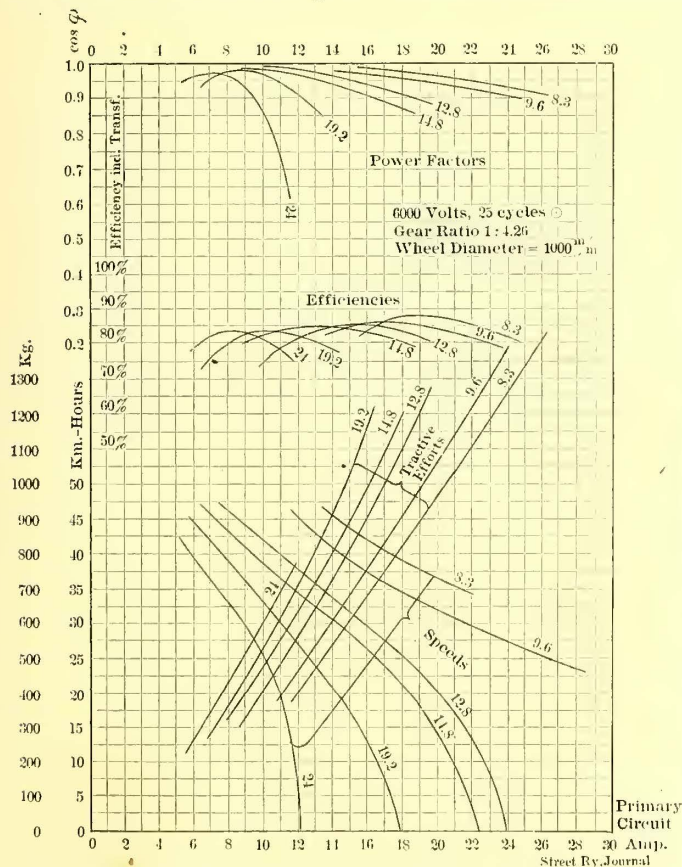
The principal feature of this system is the single phase motor designed by Messrs. Eichberg and Winter, and shown in the accompanying illustration. This motor is said to embody all of the electrical qualities of the direct-current series motor, besides having a large air gap. By reference to the accompanying performance curves it will also be seen that this motor possesses the chief characteristics of the direct-current series type, giving a great starting torque and automatically speeding up for light loads.

In addition to these features this single-phase motor possesses two others which are very important, namely: It can be wound for the direct application of any practical voltage; speed regulation takes place with-

EXPERIMENTAL CAR USED ON THE NIEDERSCHÖNEWEIDE-SPINDLERSFELD SINGLE-PHASE RAILROAD

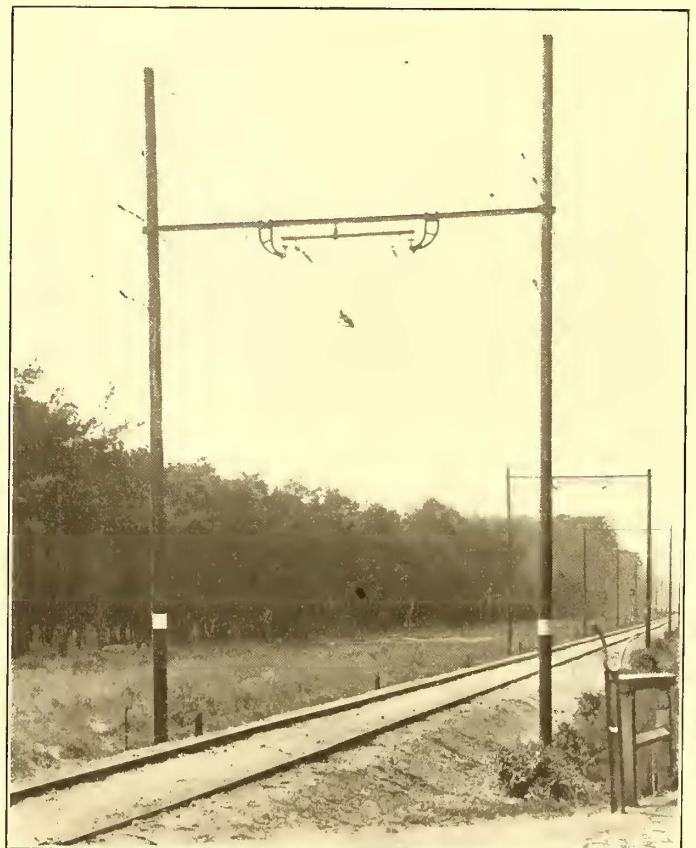
out any waste of energy in external resistances and without any wattless currents larger than the ordinary working ones, where the power factor amounts to 98 per cent.

any practical voltage; speed regulation takes place with-



Note.—The numbers placed on the curves refer to the transforming ratio of the regulating transformer under the conditions indicated, thus, 19 means a ratio of 19.1, etc.

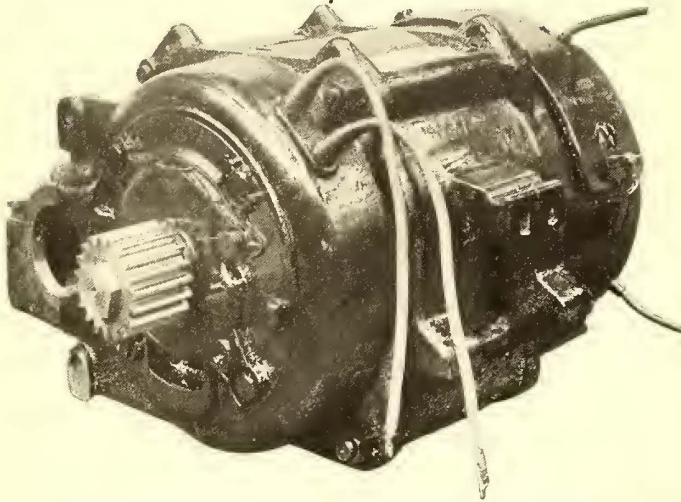
MOTOR CURVES



OVERHEAD CONSTRUCTION ON THE NIEDERSCHÖNEWEIDE-SPINDLERSFELD SINGLE-PHASE RAILROAD

The effect of these latter advantages is that sub-stations containing revolving machinery will not be required, in many instances no sub-stations at all, and in all cases where acceleration periods are frequent the energy saved by using this method of speed regulation should effect considerable economy.

Single-phase current at 6000 volts, 25 cycles, is conducted through an overhead wire suspended over the center of the track from one or two parallel steel wires, connected by cross wires spaced 3 m (10 ft.) apart. This construction, illustrated



THE EICHBERG-WINTER SINGLE-PHASE RAILWAY MOTOR

herewith, was adopted to prevent accidents caused by wire breakage. The steel wires are not insulated from the main wire, and, therefore, act as feeders. They are insulated from the ground, and suspended from cross-bars connected to the side poles. The current-collecting device consists of two sliding bows, from which the current is conducted to the transformers. A door-locking mechanism in connection with this current-collecting method prevents access to the high-tension apparatus when the bows are in contact with the power wire. The door can only be opened by taking off the collector bows, and as long as it remains open the collectors cannot be placed on the wire.

It is characteristic of this system that under ordinary operating conditions the high-tension circuit suffers no interruption, as all regulation takes place in the low-tension circuit, which even at the highest speeds does not exceed 190 volts. At a recent test it was noted that when the car was brought to a full stop the current in the primary circuit was from 8 amps. to 10 amps., and 30 amps. at 40 km (30 miles) per hour. As the line voltage was 6000 the product of current and voltage at full load was, therefore, 180 KV-A. The wattmeter on the car simultaneously indicated 180 kw, showing that the motor operates at unity power factor under regular running conditions.

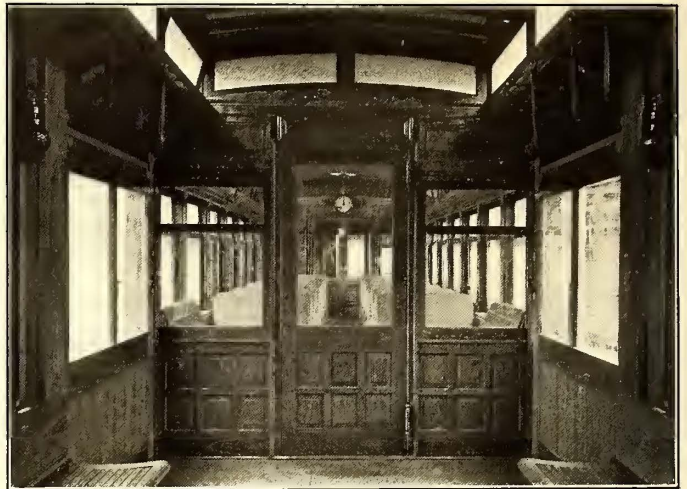
The complete electrical equipment includes two four-pole type WE-I motors, each of 125 hp, the necessary transformers, and controlling apparatus embodying the most advanced developments of multiple-unit control. The total weight of the electrical apparatus is 5600 kg (12,600 lbs.), which is stated to be somewhat less than for a corresponding direct-current outfit, principally on account of the omission of external resistances.

The complete experimental car shown herewith weighs 51,660 kg (116,200 lbs.). It contains twenty-one first and second-class seats and twenty-eight third-class seats. A motorman's cab and baggage room are furnished at each end.

Within a few weeks an additional car will be ready for service, after which complete trains, consisting of one motor car at each end and two or three non-motor cars in between, will be operated.

COMBINATION CAR FOR THE GALESBURG & KEWANEE RAILWAY

The car shown in the accompanying engravings was received by the Galesburg & Kewanee Electric Railway Company ten



INTERIOR OF GALESBURG & KEWANEE CAR

days after the contract for same was made with the American Car Company of St. Louis. The car was built originally for another company, but when the Galesburg company bought it, motors had to be brought from the East, the car mounted on trucks, the new name painted on it, the electrical equipment installed and other work had to be done. It was necessary to have the car on a certain day and the delivery was made on time.

The car measures 33 ft. 6 ins. over end panels and 42 ft. 11 ins. over crown pieces. The width over sills and sill plates is



COMBINATION CAR OF GALESBURG & KEWANEE ELECTRIC RAILWAY

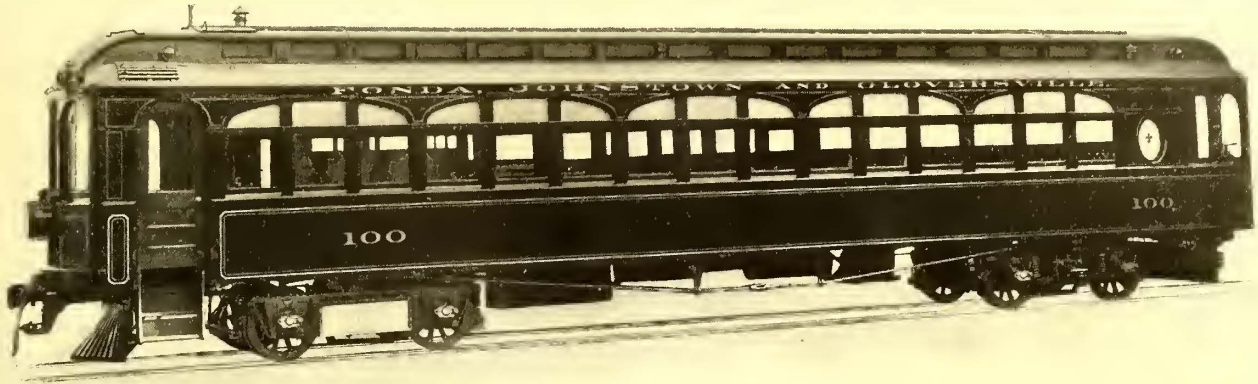
8 ft. 4 ins. It is vestibuled at both ends and has a steam car roof. The sides are straight and sheathed with tongued and grooved poplar boards. The vestibules are sheathed with metal outside and wood inside. The upper sashes of the windows are stationary and the lower arranged to drop into wall pockets. Between the passenger and baggage compartments is a hardwood partition, with glass in the upper part, and a swinging door.

Large sliding doors in the baggage compartment are glazed and two windows on each side of this compartment correspond in size to the rest of the windows of the car. Folding slat seats accommodate the passengers. The seats in the passenger compartment are placed transversely, with the exception of those at the corners. The trucks are Brill 27-G, equipped with two motors each.

FRAMEWORK OF CARS FOR THE FONDA, JOHNSTOWN & GLOVERSVILLE RAILWAY

In the *STREET RAILWAY JOURNAL* of May 9, 1903, the somewhat remarkable channel iron bottom framework for the cars of the Fonda, Johnstown & Gloversville Railway was briefly described and illustrated. In the issue of Aug. 29, 1903, a plan of this type was given, together with a photograph taken during

of the smoking compartment is distinct from the body of the car. The upper sashes of each window are stationary and filled with ornamental glass. The lower sash combines in the sash a plate glass window pane and a guard for protecting the window space when the sash is lowered to open the window. When the sash is raised to close the window the guard is obscured by the ceiling. The floors are double, and between the upper and lower floors are four thicknesses of asbestos fibre as



CAR FOR THE FONDA, JOHNSTOWN & GLOVERSVILLE RAILWAY

construction, showing the framework. The accompanying cut is an illustration of one of the finished cars.

These cars have excited considerable comment because of the unusually heavy steel bottoms and the extraordinary precautions taken in the car framing for withstanding collisions. All parts of the bottom frame are designed to minimize the effect of a head-on collision. The bumpers at the ends are so braced as to take up, without injury to the framing, a blow from 150,000 lbs. moving at slow speed, transmitting it to the longitudinal and diagonal framing of the bottom frame, after the destruction of the drawbars has allowed the bumpers to meet. The main sills consist of 10-in. channels bolted together, with malleable separators 3 ft. apart, and with transverse beams at the ends. The steel work riveting in the bottom is entirely independent of the woodwork. The outside channels are rounded at the corners and form the end of the sills. The transverse beams are 10-in. I-beams, fastened to the main sills with angles and plates. The frame under the platform consists of 6-in. channel irons. The bolsters are built up from 8-in. 24½-lb. channel bars and are reinforced with 1-in. x 7-in. plates. The steel in the bottom alone weighs 18,500 lbs.

At all important joints, where the body framing is attached to the bottom frame, the timber work is under compression. To relieve the wood framing of any lateral strain the truss rods, both top and bottom, are proportioned to put only compression stresses on the framing. The car lines are of steel in one piece across the entire car. They are shaped to form a double brace at the posts and are bolted from the top side of the cant rail clear through the posts to the under side of the steel bottom frame with heavy, round steel rods. The nuts on each end of the rods have metal bearings top and bottom, thus binding the side and roof framing together in a very rigid manner and preventing loosening up of any joints except by the rods being strained beyond their elastic limit. Another purpose in the use of rods is to prevent the shearing off of the posts in case of collision. The cant rail is further provided with 1½-in. x 3-in. steel plates on the inside, making a continuous steel band around the entire car, to which all carlines are rigidly secured. All steel connections in the car are on steel.

The cars are splendidly finished inside with African mahogany. They contain smoking compartments, which are partitioned off from the main body of the car by glass partitions, so that the view is not obstructed, as it usually is by smoking compartments built into the main body of the car. The ventilation

a precaution against the spread of fire. The cars are 55 ft. 10 ins. over bumpers, with 45-ft. bodies, and seat fifty-four persons. They are the work of the St. Louis Car Company.

SALT LAKE CITY NOTES

The Consolidated Railway and Power Company of Salt Lake City has begun work on an extension of its Murray line to Sandy, about fifteen miles from Salt Lake City. A branch of the new line, 1½ miles long, will also be built to Bingham Junction. The new work will comprise seven miles of single track, laid with 35-lb. rails, and with bracket overhead construction.

During the last few months the Consolidated Company has relaid two miles of double track on First South Street, in Salt Lake City, replacing the light rail with 60-lb., 60-ft., standard A. S. C. E. T-section rail. A half mile of paving has been done and another half mile is under construction. As the poles are placed in the center of the street in Salt Lake City, the car tracks are set 7 ft. apart, and the railway company is required to pave the center of the street to a total width of 21 ft.

On the North State Street line 1200 feet of double track is being relaid with 60-lb. rail, and considerable other new track work is proposed.

In the way of new equipment the Salt Lake Company is about to place in service eight new double-truck closed Laclède cars. These cars have 27-ft. bodies and are provided with longitudinal seats, with a capacity for seating forty passengers. The trucks are of the Laclède type and are equipped with four 12A Westinghouse motors of a total horse power of 108 per car. On account of the location of the local telephone poles and electric light poles in the center of the street and close to street crossings, the railway company is practically prohibited from using cars having bodies longer than 27 ft.

The company is in favor of all four-motor equipments for all new cars, as the added advantage in rapid acceleration and increased traction on grades and in wet weather are believed to offset the additional expense. The low platform is still adhered to, as only one step is necessary, and after passengers mount that one step to the platform they can take their time in mounting the other step to the inside of the car. From the company's standpoint the officials are in favor of longitudinal seats for closed cars, as the car is more easily emptied, it will carry more people and can be more easily cleaned.

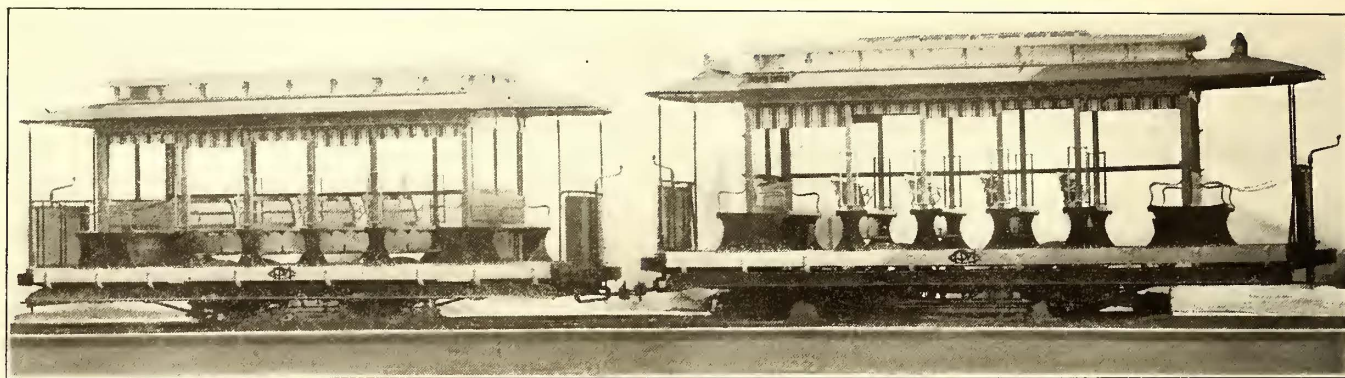
NEW CARS FOR CINTRA, PORTUGAL

The J. G. Brill Company recently shipped thirteen cars to Cintra, Portugal, a city about fifteen miles northeast of Lisbon. The lot was divided into four styles—four eight-bench open motor cars, four eight-bench open trailers, three closed motor cars and two closed trailers. As the width was restricted to about 6 ft. 6 ins. over all, and transverse seating arrangement was desired for the closed cars, double seats 33 ins. in length were placed on one side and single seats 17 ins. long on the other, leaving a 17-in. aisle. The seats are spring cane, with reversible backs. Double seats are placed longitudinally at the

iron bumpers, radial drawbars, ratchet brake handles, "Dump-it" sand boxes and "Dedenda" alarm gongs. Both the open and closed motor cars are mounted on Brill 21-E trucks, with 6 ft. 6 in. wheel base; 33-in. wheels; track gage, 3 ft. 3 $\frac{3}{8}$ ins. The trailer cars are mounted on Brill gear trucks, with 6 ft. 6 in. wheel base and 30-in. wheels. The cars were built in sections and knocked down for ocean transportation.

SAFETY DEVICE FOR USE WITH TROLLEY RETRIEVERS

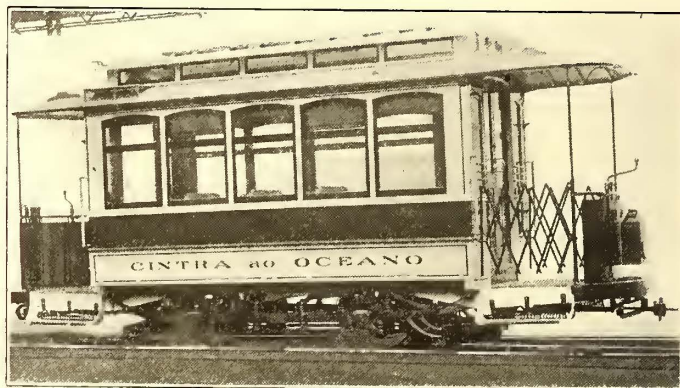
The Indianapolis & Martinsville Rapid Transit Company, in common with a number of other interurban roads around



OPEN MOTOR AND TRAIL CARS FOR CINTRA, PORTUGAL



INTERIOR OF CINTRA CAR



CLOSED CAR FOR CINTRA, PORTUGAL

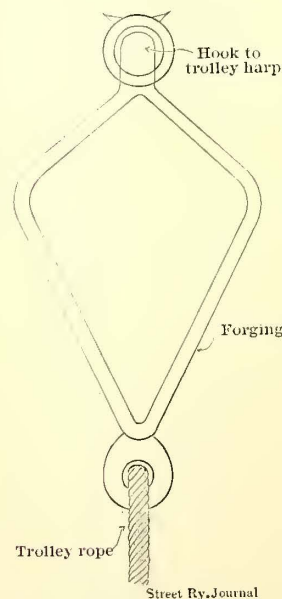
corners. The total seating capacity per car is seventeen. Both window sashes of these cars are arranged to drop into window pockets and hinged covers are provided at the openings of the pockets, forming arm rests on sills at the windows.

The general dimensions of the closed cars are as follows: Length over end panels, 14 ft. 8 ins.; length over crown pieces, 22 ft. 8 ins.; length over sills, 6 ft. 1 $\frac{1}{2}$ ins., and over posts at belt, 6 ft. 5 ins.; size of side sills, 3 $\frac{3}{4}$ ins. x 5 $\frac{1}{2}$ ins., and of end sills, 3 $\frac{3}{4}$ ins. x 6 $\frac{1}{2}$ ins.; thickness of crown posts, 3 $\frac{3}{4}$ ins., and side posts, 2 ins.

The closed trailer cars are of the same dimensions as the motor cars. The general dimensions of the eight-bench open motor cars are as follows: Length over crown pieces, 24 ft. 10 $\frac{3}{8}$ ins.; from centre of crown posts over crown pieces, 4 ft. 4 ins.; width over sills, 5 ft. 5 $\frac{3}{4}$ ins., and over posts at belt, 6 ft. 4 $\frac{1}{2}$ ins.; sweep of posts, 5 ins.; from center to center of side posts, 2 ft. 10 ins., and between corner posts and side posts, 3 ft. 7 ins.; size of the side sill, 3 $\frac{3}{4}$ ins. x 7 ins., plated on the outside with $\frac{1}{2}$ in. x 7 in. steel. Thickness of corner posts, 3 $\frac{5}{8}$ ins., and of side posts is 2 $\frac{3}{4}$ ins.

The open trailer cars have the same dimensions as the open motor cars. The closed cars are finished inside in cherry of natural color, with decorated birch ceilings; the open cars' interiors are finished in cherry and ash, with birch ceilings. The cars are fitted with Brill patented specialties, as follows: Angle

Indianapolis, has adopted the Knutson trolley retriever, which automatically draws down the trolley pole whenever it leaves the wire and starts on an upward journey. This retriever, as is well known, has a strong spring which draws down the trolley pole with considerable force, as it must act very promptly. It was feared that should the trolley wheel or harp catch above the trolley wire as the retriever drew it down a bad wreck of the overhead line or a pulling out of the trolley pole would result upon reaching a span wire. To preclude any possibility of this a diamond-shaped forging has been hung directly under the trolley harp, and the trolley rope is attached to this forging rather than to the harp, as made plain by the sketch. This makes it impossible for the harp or wheel to catch above the wire when the retriever is drawing the pole down.



SAFETY ATTACHMENT FOR TROLLEY RETRIEVER

PAPERS PRESENTED AT THE SYRACUSE CONVENTION

PHYSICAL EXAMINATION FROM THE PHYSICIAN'S STANDPOINT

BY DR. J. J. MOOREHEAD, OF NEW YORK

From present indications it requires no prophet to predict that the profits of a street railway company will soon cease to be based on the number of passengers carried and the operating expenses, but instead be computed by the number of accidents occurring and the amount that the legal and claim department requires to pay in adjusting the same. Every large city seems to be an epidemic center for the development of the Claimant Bacillus, and like most germs of that sort, many are infected by contact therewith and none become better until they take the Gold Cure dispensed by the treasurer's department. These conditions have made necessary the establishing of a medical examining department; and it is of this that I wish to say a few words that may seem to justify its existence.

In determining the value of what we may call the "physical investigation" of the claimant, the surgeon is called upon to answer three main questions, namely:

First, could the accident as described reasonably cause the effects complained of?

Second, are these effects actually present?

Third, if they are present will they be temporary or permanent?

In confirming or refuting what is claimed, he is guided by visible or objective symptoms and by subjective or invisible symptoms. His task is comparatively easy if all the ills are of the former class, but if to a simple scalp wound are added the symptoms of ringing in ears, dizziness, spots before the eyes, or a host of other subjective signs, then is his labor of a different caliber. This suggests the question as to the advisability of an examination, where the effects of an accident are evident, and where a visit from a surgeon would exaggerate the claimant's already great self-importance and induce him to add to his ills. This query would readily be answered if all claimants were honest, and if objective and subjective symptoms were not closely allied, and if the element of exaggeration were not present in nearly 80 per cent. of the cases we are called upon to diagnose. If a man in a brawl or in falling downstairs receives a battered face and a black eye he will probably return to work next day; but if the same injuries be received in a fall from a car, he immediately goes to bed, and when examined a week later, two physicians are in attendance, his head is swathed in bandages, and a trained nurse is keeping the ice-bags replenished to aid the medical men in their diagnosis of "threatened meningitis following concussion of the brain."

In a general way we can divide all claimants into three classes, to wit: Honest, partly honest and shamblers. The first class is rare enough to demand a special note in the making of a report. The second is the most numerous and the hardest of properly estimating. And the third often demands a searching scrutiny that resolves itself into an effort on the part of the examiner to get the claimant off his guard and thus fail to maintain a symptom hitherto well mimicked.

It may be of interest to cite a few of the commoner complaints and show how readily some of them are disposed of.

The most familiar of all alleged effects from railroad accidents are those under the general caption of "Nervous prostration," "Railroad Spine," or "Neurasthenia." Such a claimant rarely presents greater objective signs than a small discoloration on his back, but what he lacks in outward manifestations he makes up in subjective signs. There is no ill in medical lore they have failed to acquire; they cannot eat and cannot sleep; they have no memory; and, to use their own terms, they are "mental and physical wrecks." On examination they appear generally in good health, and their memory is so apt that the minutest detail connected with the happening and sequence of the accident is readily recalled and they act out precisely how they fell, and all this despite their assertion that memory and muscular power are by-gone things. Of all the cases the surgeon examines, these are the hardest, and his opinion is most guarded concerning them. Frequently they are complicated by asserted paralysis of a limb, and you find your claimant in bed at the time of your call, and you are told that no power exists to rise therefrom. This occurred not long ago in a collision case, and the injured woman was surrounded by the usual sympathizers who cheerfully told her she

was crippled for life. There was a suspicious resistance in the paralyzed leg during the manipulation and it readily remained in the position it was placed, even when suspended above the bedding; suffice it to say that this woman got out of bed and stood alone before the examination ended.

Deafness is frequently consequent upon a blow on the head according to many claimants, but the majority of these cases have been hard of hearing for years. In two recent cases the removal of a piece of ear wax brought about a marked change; another showed a hole in the ear drum that followed the child's recent attack of measles, and of course it had nothing to do with the accident.

Internal injuries are frequently asserted, especially in women, and this term is designed to cover anything from dyspepsia to a ruptured spleen.

Floating kidney comes under this class; and a woman from out of town said her right kidney was displaced six inches owing to a fall as she was about to get on a car. Her physician made the diagnosis for her because she had a bruise on the right side of her abdomen, but he forgot to examine the opposite kidney, which was even more movable; and also neglected to lay the blame on a recent long illness which had caused marked loss of flesh.

Within three months three cases of appendicitis have been traced to car accidents by the attending doctors because the abdomen in each case was slightly bruised. Injury is the rarest of all the causes for such a condition, and in two of the cases which were operated upon, an inspection of the appendix showed that it had been inflamed for years.

Tumors and various enlargements are favorite claims, birthmarks even being foisted on the unsuspecting examiner. This was well shown last spring in the Supreme Court where a very reputable physician supported a veracious plaintiff in her claim that an enlargement on the back of her neck was due to "fatty tumor" following a sprain and bruise of the neck. The examination made a few months previously had disclosed a bony enlargement such as we all have in about the location where a man buttons the back of his collar. This was pointed out to the jury, and each talesman felt his own neck and brought in a verdict for the company. Many times the swelling over the "Adam's Apple" (technically known as Goitre) has been said to follow a bruise in this region, but this is readily proved due to other causes.

Ruptures frequently follow our accidents if all the claims regarding them are to be believed. As against this is the experience of many competent physicians that such effects occur only in those having a tendency thereto, and do not result therefore directly from a fall or a blow. One case is recalled following a collision, in which a large rupture was claimed, but this individual had worn a truss so long that his skin was shiny by the friction produced.

Disabled joints, especially the shoulder, constitute a large share of alleged effects. These individuals will many times forget their part when suddenly asked to remove or replace their clothing, and in so doing widely move the part supposed to be immovable. Not long ago a woman on the witness stand claimed inability to move her right thumb, and she kept up the deception before the judge and jury until she had her attention riveted, and she was then asked to remove the glove from the other hand, and in so doing she moved the alleged stiff thumb.

Fractures are exceedingly common and are frequently hard to diagnose, especially if they are not seen until several weeks after they are received, a plaster of paris cast having meanwhile been employed causing a stiff joint. In such cases we have found the recent installation of an X-ray apparatus of extreme value and predict that certain doctors well known to us will have fewer cases of this sort and more sprains and contusions when they learn that their schemes can be literally seen through. It is our practice to allow the claimant to view the examiner's hand first and then his own, with the double object of showing how plainly the bones are outlined and also relieving him of any fear. With the machine employed as stated, accidental burns never occur and an opinion of the gravity of a case can be instantly formed. Its value was recently shown in a case where the attending surgeons had set a fracture and dislocation about the elbow, and in which they expected a speedy recovery. An examination of a fraction of a minute with the X-ray showed that the fracture had been set poorly, and that the dislocation had not been set at all. There

was still greater swelling about the parts and little handling could be attempted, and the diagnosis was made without removing the bandages. A bad outcome was predicted in our report; and the physicians have recently stated that this man was operated upon in West Virginia because the "dislocation had slipped out of place," as they put it, and another operation is to be attempted within a few days in a New York hospital.

These are some of the more frequent consequences alleged that would result in large damages were they incapable of medical disproof. That many cases are defeated on medical testimony alone is also true, and we have recently had two experiences illustrating this very forcibly.

In one instance paralysis of half the body, with convulsions and loss of memory, was alleged as a result of being struck by a car. The claimant presented a sorry appearance, and there was no question of some of his symptoms. Suspicion, however, was aroused in some way, and it was learned that he had been in a certain hospital prior to the alleged accident. On investigation we soon learned that he was a well-known clinical exhibit and had been used by many professors during the last decade to exhibit the very symptoms he now manifested to the court and jury. When some of these professors appeared in court as our witnesses, he suddenly pleaded illness and left the court and has not been heard of since. His injury was not due to the accident on our lines, but occurred fifteen years ago in the New York Central freight yards, where he fell from a car.

In the other case a verdict of \$7,700 had been rendered for the death of a man six months after the receipt of a compound fracture of the wrist which had practically healed two months before his demise. His doctors claimed that his sudden death was due to an abscess of the brain from the original injury, and they performed an autopsy to prove their contention. We contended that this brain condition was due to a long-standing ear disease, and showed that 80 per cent of such abscesses follow such ear troubles. On appeal, the presiding justice reversed the verdict on the medical testimony alone, and his opinion analyzes the expert testimony with skill that would excel that of many a physician.

So much then for the physician in his effort to present exact conditions medically to the claim agent leading to the adjustment of the case, and in his testimony at the trial of these actions.

But aside from what value he may possess in his detection of the shammer and the exaggerator, there is what might be termed the moral function exerted alike over the claimant or his physician or attorney. The time is not far distant when some method will be demanded to curb the growing tendency to make minor accidents an excuse for the legal blackmail now so universally levied on street railway companies. Let it become known that the company insists on a rigid physical investigation of every case, then it is not too much to predict that many of these cases will fail of their own accord. A claimant will not hesitate to furnish a long list of witnesses to support his version of the occurrence, but he hesitates at submitting his alleged numerous infirmities to a doubting examining surgeon. The verbose attorney's bill of particulars, rich in such phrasing as "Sick, sore and disabled, and has been and will be subject to much pain and suffering for a long time if not permanently," will dwindle into less roundabout terms if he knows a medical examination will disprove his statements; and the member of my own profession who knowingly calls a simple sprain a severe fracture, will be more cautious of his moral and professional standing when he learns that an X-ray is to dispute him and that a plaster of paris splint cannot cloak even so bold an attempt at deception.

It is perhaps too ideal to hope that one day there will be what may be termed a medical jury to pass on cases of the sort we are all so familiar with. Such a jury within a very few moments could verify or nullify the alleged symptoms, and their decision as to the medical merits of a case would make unnecessary the unseemly contentions of so-called experts who usually succeed in baffling rather than aiding a jury of the laity. Much valuable time would be saved to all concerned and the hopeless congestion of the courts would be much relieved and more equable justice dispensed.

There is also another feature of the surgeon's relations to his company, and one that is not always taken at its full value, namely, his knowledge of his own profession and his acquaintance among them. It is our practice to index the various physicians we meet, and in this way we soon learn their bias or fairness. An honest physician with an honest claimant meets the company more than half way, and an amicable adjustment results minus the interference of the ambulance-chasing legal light. A scheming physician may seek to distort and exaggerate his patient's illness prior to the examination, but at the bedside he knows that every statement needs ocular proof. Strange as it may seem, he will not hesitate to stretch his moral fiber, but he balks in the

presence of another doctor when called upon to swear falsely regarding medical axioms.

There is an auxiliary branch of the medical investigation almost as important as the physical examination, namely, the seeking of what we term the hospital record. As soon as possible after an accident one of our staff appears at the hospital and obtains the ambulance or accident ward diagnosis, the disposition of the case, and the attending doctor's name. The latter is then interviewed and from him the exact nature of the injuries learned with their possible outcome. Any statement made by the patient as to how he was injured is also learned, as is also his condition regarding alcoholism. In this manner we are able to obtain information at first hand from trained observers who are generally alert for the maligner. In very many cases, facts obtained from these hospital doctors have won cases that otherwise would have resulted in large verdicts. Incidentally our acquaintance professionally is much enlarged, as in the ten hospitals of our city maintaining ambulances for emergency work there are seventy-eight doctors who are well known to us, twenty-six of whom leave the hospital each year, many of them remaining in the city. A special address book is kept and any of these hospital men can be located, even though some of them are at the present moment in Beirut, Peking, Paris and Honolulu.

That the medical examination has a legitimate place in the investigation of nearly every case we firmly believe, and it is our conviction that its monetary value is equal to that of any other single line of work in the disposition of claims.

PHYSICAL EXAMINATIONS, THE REPORTS OF WHICH ARE PRETTY DRY READING, BUT MOST ESSENTIAL

BY W. A. DIBBS, OF NEW YORK

By the time you get through perusing a few hundred medical reports a month, as we have, you are pretty well acquainted with the human frame and its functions.

We believe it most advisable to get an examination whenever possible, and it invariably means a strong argument in settlement. The claimant will present his case with a plea that he is injured for the remainder of his life, that he is the most maligned one in existence, that he is suffering the tortures of the damned, but as soon as the suggestion is made for an examination he tells you that there is nothing to see or feel. We insist upon an examination more than ever, as our suspicions are certainly aroused. After the examination, when he is told by the surgeon that he is in a healthy condition (and the type is usually pretty healthy) he frequently comes to our own terms, or we might express it charitably and say that his mind has been relieved. Others, despite the fact that nothing is the matter with them, will not admit that there is nothing physically wrong, and many still believe that they are intense sufferers. This has been instilled into their minds by friends and unscrupulous physicians, something with which we are burdened in New York. Then our troubles begin. If it is a case warranting settlement, all arguments and blandishments are of no avail. It means pay a price which you know is not commensurate with the injuries, or stand a suit, with the physician to back up the claimant, and probably get a verdict against you that will make you swear, even if you are a railroad man. I might here cite a few cases of this kind which have come under my observation recently:

A youth fell from a moving car. His physician took charge of the case, acting in an advisory position as well as physical. He presented the claim, contending that the boy was thrown by a sudden start, and had received a dislocation of the shoulder. Our examination, made shortly after the accident, failed to bring out any evidence of dislocation (generally a pretty hard condition of affairs to disprove). Nevertheless our surgeon was positive that the injuries claimed did not exist. The boy resisted the efforts of the surgeon to flex the arm beyond a certain degree. This was a case just as we explained. The boy believed he was permanently injured, and the doctor fathered the thought. All the time previous to the trial (we had refused the claim) the boy had the arm either in a sling or carried partly helpless at his side. On the day of the trial our astute counsel while cross-examining him, asked him how far he could raise his arm. He could not get it beyond a level with his shoulder, but when he asked how far he could raise it before the accident, he forgot himself and his teachings and put the arm far above his head. It is needless to say that the jury gave us a verdict.

A patrol wagon with a number of police officers was hit by a car. All of the cases were disposed of except one. This par-

ticular officer weighed probably 250 pounds, he was short in stature and could hardly walk on account of his fat. He alleged that he was so nervous that he could not sleep, although it took considerable punching to awaken him whenever we called upon him. He had all kinds of backaches and all kinds of headaches. We had him examined, and all we found was fat. We declined to deal with him as his claim was too exorbitant. After he found out his game had no effect he started off on another tack, and began to develop facial paralysis. Whenever he thought someone from the road was near he began to screw up one side of his face, and kept it that way for some time. We demanded another examination, and to our surprise we got it. In making a test our surgeon got him to stick out his tongue, but he forgot himself and stuck it out on the wrong side, and when he found that out it was quickly moved to the other side, but he was too late.

An interesting case came up a few weeks ago. A woman of respectable appearance claimed she was thrown by a sudden start, and that the shock affected certain muscles, which in course of time became powerless, and she was unable to retain urine, and at the same time had bladder hemorrhages. At the call of our doctor she volunteered to show him the discharges of blood, but was unable to do so. Later on, however, she did show him a discharge that had the appearance of blood, but on closer examination it was found to be snuff which she had carefully dropped into the receptacle.

A woman from the South claimed to have injuries she had sustained by falling against the edge of the car seat. On the examination she was found in bed apparently paralyzed from the waist down, and paralysis of different functions. She complained of a girdle sensation about the waist. She was able to withstand sudden and unexpected pricking with needle, even under the toe nails without flinching. An abrasion of the skin over spine some two inches in length was found. There was something about the case that aroused the suspicions of the surgeon. One of the reasons was the fresh appearance of the abrasion, and that the skin about the abrasion was not black and blue. We were to have a test made with a battery, but the woman requested that it be put off for a short while as she could not stand a thorough examination at that time. Arrangements were made to continue the examination the following morning. When he arrived there it was found that she had left on the midnight train. Upon investigation it was found that her husband had used a knife and scraped her skin over the spine, and that he did it just before our physician had arrived there.

Another woman claimed that she had received a fracture of patella or knee-cap. Upon our doctor's examination it was found that the leg was put up in a very pretty cast of plaster. The woman was attended by a presumed trained nurse. At the removal of the plaster for the examination we were unable to find signs that there had ever been any injury. The woman contended that as a result she had become completely paralyzed, and the doctor in attendance was grossly deceived by her. She was able to gain the sympathy and support of a number of charitable women, and also several physicians. She remained in bed for several months, but got tired of the game and left for the West. Later we received a report that she had been arrested for forgery, and seemed then to be in first-class physical condition.

The cases quoted show the paramount importance of an examination, and, of course, the surest way to detect the fraud. An argument might be raised as to what effect morally the examination has on the majority of cases, and from our experience the effect can be easily seen. The injured lose their aggressiveness, and then say: "What will you give me?" and glad that they get something no matter how small. A discourse on this point can be lengthened out, but the fact nevertheless is apparent that the examination does have a material moral effect. Of course there are exceptions.

Now let us take up cases of more serious moment—I mean cases of severe injuries. We are presented with a claim running into big money, if we may apply that term. Presuming that your claimant has a serious fracture which has been reduced by the attending physician and plaster applied, as is frequently done before we are aware of the extent of the trouble. When a claim is presented for adjustment all signs of the fracture are gone. Though the demand is made upon the severity of the injuries, it is advisable to get the examination as soon as possible. The claim will be based upon the length of disability, a fact easily established by the attending M. D.

Now we come to another type, namely: Internal injuries. Most of these are subjective and hard to disprove, but if examined within a short period after they occur something can invariably be noticed. We have had cases of this character which upon the closest medical examination were found to be well-developed

cases of appendicitis (something in a new way of claims), the attorney and the doctor contending that the appendix was injured in an accident, though the disease at the examination was so far developed that it could be plainly seen that it was there before the accident.

Another form that is deceiving is dislocation of shoulder after replacement, though they do sometimes leave a permanent affection. Women with internal trouble brought about by child bearing have endeavored to foist the damages on the road, but a surgeon well versed can without much trouble detect the real cause.

There is still another type that can be touched upon, and that is brain concussion, an injury the consideration of which it is pretty dangerous to delay. It might or might not leave a permanent effect. An early examination is most advisable. Whenever concussion is claimed another examination later on will be advantageous. The surgical examination is almost as imperative for the defense of an action as witnesses, and we have upon a number of occasions won our cases on the medical testimony alone, and we presume others have done the same.

Let us say a few remarks about some of the so-called M.D.'s. How they ever passed an examination in anatomy Heaven only knows. One doctor, when asked if he knew what a fracture was, replied: "Why, certainly, it's a contusion." Some of these fellows, to the detriment of the reputable ones, have a good deal to do with foisting fraudulent claims, declining to allow an examination of patients at first, and advising claimants to hold out for exorbitant sums. After the examination has taken place and they are told that the patient is but slightly hurt, they usually recede from their independent stand and accept the diagnosis of the company's surgeon, who they know is, and has to be, a doctor in all that the term implies. Here, again, the moral effect bears fruit.

We can take up in a few words our experience with the reputable physicians. It is an experience upon which we can look back with a good deal of admiration for the medical profession. M.D.'s of this kind come out straightforward and tell you that the patient is a serious subject or he is not. They never stick to the former or say that there is no chance for a complete recovery, nor do they act as legal advisor, telling their patients that such and such a lawyer might get a lot of golden dollars, but they do advise arbitration and counsel peace. Physicians of this kind are plentiful in New York, and our experience with them has always been of the most pleasant nature.

It probably will not come amiss to explain the system in the claim department of our road showing how the medical records are kept. A form with a duplicate perforator through the center, then file number, date, place of accident and circumstances, attending physician, and whom to communicate with to arrange for examination. They are then separated and entered into a book. One is sent to the company's surgeon, the other filed with the papers.

Upon the return of the surgeon's report the receipt is checked off in the book and the report with the papers. If there is no examination to be had the surgeon endorses his part of the blank and returns to the office with the proper explanation, and that is put away with the papers. A record is also kept stating how many cases this and that M.D. has, and how he is disposed toward the road, and how he appears upon the witness stand.

Claim agents with whom I have had much to do, are very much divided upon the necessity of having immediate attention from the company's surgeon. While such prompt attention may be given to the injured in small towns and villages, or in places in which the accidents are not numerous, it seems to me that as far as the larger cities are concerned it would be impossible, and in many cases undesirable, to have the immediate attendance from the company's physician. In such larger cities there are first, the well appointed ambulances of the various hospitals, and second, the representatives of the school of the First Aid to the Injured, and frequently many passing physicians through whose efforts the suffering of the injured is allayed. In the denser populated portions of the city where the greater number of accidents occur, doctors are to be found in the immediate neighborhood, who, as a rule, reach the scene of the accident within five or ten minutes after its occurrence, making far better time than could the company's physician.

It seems to me that the standing of the company's physician, if sent regularly to the accident, at or about the time of its occurrence, is greatly injured, if not entirely destroyed, if in this way he becomes a portion of the investigating force of the claim department. There is no doubt that their standing in the medical profession would be impaired by the continuance of such a line of conduct.

TRACK CONSTRUCTION AND MAINTENANCE

BY THOMAS WILLIAM WILSON, OF BUFFALO

The close relationship of the terms "Construction" and "Maintenance" does not seem to be fully appreciated. The track upon which all the traffic has to be carried is one of the most essential parts of a railway, and yet the importance of the track and track work in relation to the operation of the railway, and the portion which the maintenance of track bears to the total operating expenses does not seem to be fully recognized by street railway officials. This proportion is usually high and due in great measure to the fact that the majority of street railways were originally built by promoters with regard to immediate cheapness of construction. While this was excusable in many cases because tracks were constructed in advance of the prospective travel, still in too many instances the mistake has been made of adhering to the original types and standards of construction long after they became inadequate to the greatly increased traffic and the heavier equipment. The result of this is seen on the auditor's books, the road having to sustain an undue continual charge for maintenance. If those who originally built street railways had to maintain them they might have been built differently. This rebuilding of old track to take care of increased travel and heavier equipment makes necessary the construction account, of which has been aptly said: "The construction account can never be closed until our railways are built. To attempt it involves a destruction account of fearful magnitude. Under our present system we are perpetually rebuilding our railways, not reaching the life of our works, and thus running capital to waste. A better system will strike at the root of the evil by correcting, not nursing, the defects of our permanent way."

It behooves us, therefore, carefully to review our standards of construction in order to be certain that we are building for the future.

On October 9, 1901, the committee on standards of the American Street Railway Association reported in favor of a T-rail for use in city streets whether paved or unpaved, their recommendation being: "We recommend a T-rail as the most desirable under any conditions."

This is the generally accepted solution of the rail question, the familiar arguments of the T-rail being small resistance to tractive force, ease of installation and the keeping of vehicular traffic away from the tracks. And yet it would seem that we lose sight of the most important point, viz.: the maintenance of the pavement along the gage line side of rail. On Archer avenue, in Chicago, a mile of Trilby girder rail and a mile of T-rail were laid side by side about two years ago in order to convince the municipal authorities that T-rail was the best. The writer inspected this stretch of track lately and found that while the girder rail track was practically as good as new, the paving along the inside of the T-rail had been rutted out badly by the teams, in some places the ruts being 4 ins. deep. That track looks as if it would have to be entirely repaved within a short time, and meanwhile is a constant menace to the wheels of all vehicular traffic, with a consequent liability for accident. Again, the track on North Main street, Buffalo, was relaid four years ago with a semi-groove girder with block stone paving in the tracks. Within a year afterward the paving stone next to the gage had worn down to the lip of the rail but no further. It has remained in the same condition four years and will apparently outlive the rail. If this track had been built of T-rail, repaving would now be in order.

So it would seem that we cannot afford to overlook the fact that the pavement along the T-rail is subjected to much greater wear than along the girder, and may be a source of expensive maintenance on busy streets. As to the question of keeping the vehicular traffic away from the tracks, this might possibly be the case on wide, smoothly paved streets of cities of less than 200,000 population, and where there is very little trucking. But in the narrow, busy thoroughfares of the larger cities, where there is not room enough in the street for the vehicular and car traffic, this would be impossible, and a rail must be installed which will provide for the trucking as well as for the cars, and afford the best protection to the paving adjacent to it.

These were the reasons which probably led up to the adoption of the "Crimmins" or "Trilby" shaped rail (so called on account of its resemblance to a foot when inverted), which has been laid in New York, Chicago, Washington, and many other cities, and finds its highest development to-day in a section weighing 137 lbs. per yard, now being laid in Philadelphia. The extra weight of this rail has nearly all been placed in the lip, solely for the purpose of furnishing a runway for the tires of vehicles and keeping them off the pavement. Another argument against the T-rail is

that nearly all the municipal authorities of our larger Eastern cities, and the public, are against its adoption on account of the rutting, and the city ordinances usually prohibit it. As public carriers, we can scarcely afford to ignore their point of view.

A practical solution of the rail question would seem to be to use the 9-in. Trilby type in the busiest thoroughfares of our larger cities where the trucking is heavy and the traffic congested; the semi-grooved girder in the quieter streets and those districts which by reason of architecture and location have become fixed as resident sections, and the T-rail in the smaller towns and cities and in the suburbs of the large cities.

Besides the shape of the lip of the girder rail, which has already been mentioned, there are two other important points to be carefully considered, viz.: the width of base and the depth of groove. The base of a 9-in. girder should not be less than 6 ins. This makes a firm support when superimposed upon concrete, and lessens the tendency of wide gage, due to tipping. Too little attention is paid to this point by street railway engineers. When the track and all its fillings are new a narrow base does not matter so much, but after eight or ten years of continuous service, with the pavement loosened and the ties rotten, the 6-in. base should do its work well.

The depth of groove should not be less than 1¼-ins. With the use of a concrete roadbed the wear upon the head of the rail is undoubtedly greater than with a flexible roadbed, and every 1-32-in. of increased depth means a longer life for the track, depending of course upon depth of wheel flange and condition of traffic.

Very careful measurements in Buffalo have resulted in determining that the average wear of head for four years on the busiest street has been 1-32-in. per year. The largest tread operating over this track being ¾-in. and the original depth of groove being 1¼-in., a very simple computation gives 16 years as the life of this track. In this connection it will appear strange to the old trackman to speak of the life of the rail being fixed by the wear of the head, rather than the joint, but this is one of the results the welded joint has achieved. To be paradoxical, after the joint is welded it ceases to be a joint.

JOINTS

With the advent of welded joints came a great decrease in maintenance. The cost of welding of joints has been carried on for some eight years, especially in the West, with varying success. The percentage of breakage never seems to have been less than 2½%. The electric weld we are all familiar with, and it seems to be the highest type of joint to-day. The per cent of breaks during the last year has been kept down to the astonishing figure of one-tenth of 1 per cent. The only objection to this joint is in its method of application, a train of 4 cars being necessary, occupying the track and interfering with the regular traffic. Another drawback is, that it is not possible to contract for a small number of joints on account of expense attached to shipping the equipment from place to place. This puts it beyond the reach of all roads which have less than 2000 joints to weld.

Among the best of the mechanical joints is the riveted splice-bars of the Philadelphia Rapid Transit Company. It consists of the regular splice-bar, with rivets substituted for bolts, and the space between the rail and the bar is filled solid with molten zinc.

With the introduction of concrete roadbed came the necessity for a steel tie, as with a track whose life is estimated at from 15 to 20 years, it would hardly be economy to install ties with a life of from 10 to 12 years. These steel ties should be secured to the rail by means of brackets which fit up well under the head of the rail, and which accomplish the same purpose as a brace tie-plate or a tie rod. Old rail can be very readily used as a tie when cut up into proper lengths.

Where wood ties are used on interurban work, they should be white, rock or burr oak, or long leaf southern pine. Cedar, while being long-lived, is too soft, especially with heavy interurban passenger and freight service, and will not hold a spike.

While on the question of ties, it may be of interest to note that the steam and electric railways of the United States are using over 100,000,000 wood cross ties per annum. The prices are constantly advancing, and it is evident that we will be forced to turn to the steel tie as a substitute for wood. As a starter, the entire roadbed of the Pittsburg, Bessemer & Lake Erie Railroad is being equipped with steel ties.

ROADBED AND PAVING

One of the greatest, if not the greatest, source of expense for track maintenance is on account of no ballast, loose track, and consequent failure of pavement. Miles upon miles of track in which the rail was good, the joint perfect, and the tie sound, has been torn up and relaid because the ties had been laid originally in the mud, concrete placed on top of them and around them, in

fact any place but underneath them, and the whole surmounted by a 3-in. veneering of asphalt laid right against the rail. Could anything be more criminal? Such a track will last from three to six years, depending upon traffic, and then suddenly the pavement will all go to pieces.

"Never lay asphalt against a steel rail" has come to be a street railway axiom.

Brick, sandstone, granite, all make a very acceptable pavement, but in order to preserve the pavement it is necessary to have a foundation of concrete, and this means concrete under the rail and ties.

The concrete roadbed consequently, either of the beam or solid type, has come to be a recognized standard, and although some objection is made to this construction on account of the rigidity of the track and the wearing of the rail, yet a railroad can better afford to have the head of the rail wear for a certain period for no maintenance, than to have it wear a little longer time with constant repairs to pavement.

Owing to different prices of material at various places, estimates of cost must necessarily vary with the locality. The following may be of interest, however:

CONSTRUCTION

1. Replacing old 6-in. track in asphalt pavement with new 9-in. 94-lb. girder rail, Portland cement, concrete base, steel ties at 10 ft., welded joints, No. 1 Medina sandstone block paving with grouted joints, tothing and asphalt in 2 ft. strip, including cleaning up street, and allowing salvage on old 6-in. rail. Per foot of single track, about \$4.30.

2. Relaying and welding rail already in street, concrete base, steel ties, pavement, etc., as above, except that there is no salvage. Per foot of single track, \$3.30.

MAINTENANCE

The cost of maintenance of track and roadway of 9 railways, per mile of single track, per year, for 1901, is given in table below. It will be seen that the cost varies from \$215 to \$733 per mile. It is interesting to note that the larger the mileage the higher the cost of maintenance seems to be. Not much can be gleaned, however, from these comparative figures as the conditions are so diverse; for instance, the Brooklyn Heights is mostly on elevated structure, and of course is more costly to maintain. The cost per car mile of maintenance of track and roadway for International Railway Company for 1903 was .008 cent.

COST OF MAINTENANCE PER MILE OF SINGLE TRACK FOR YEAR 1901

Railway Company.	Mileage.	Tracks and		Remarks.
		Roadway.		
Brooklyn Heights R. R. Co..	401	\$733		6 mos. end. Dec. 31
Cleveland Elec. R. R. Co....	...	630		All city
Montreal St. Ry.....	103	469		All city
Rochester Ry. Co.....	100	378		City and suburban
Denver City Tramway.....	144	298		All city
International Ry. Co., 1901..	330	290		City and suburban
International Ry. Co., 1903..	357	258		City and suburban
Milwaukee, 1900	225	250		City and suburban
Scranton Ry. Co.....	76	221		City only
Schenectady Ry.	32	215		City and suburban

As potent a factor as any in the economical construction and maintenance of track is the organization not alone of the track department, but of every individual job undertaken. All work should be carefully laid out and planned beforehand, and the plans rigidly followed. As little initiative as possible should be left to the sub-foreman. Cheap tools, cheap material and cheap foreman are not necessarily economical, but are usually the reverse. And above all, a close watch must be kept on details, with a view to turn aside all the undirected and misdirected tendencies which might lead to extravagance, inefficiency, or whatever in the end might operate depressingly upon dividends, which after all constitute the ultimate aim of our friends the directors.

POWER TRANSMISSION FOR INTERURBAN LINES

BY J. B. STORER, OF SYRACUSE

The successful and efficient transmission and utilization of power is something which has been an object of study for many years, and, while it may seem to be in a very advanced stage, yet there is certainly much room for increased efficiency in transmission, conversion and distribution,—particularly the latter two—before it can be said to have attained anything like perfection in connection with interurban railway lines. It is, of course, the ambition of electrical engineers to perfect their type of equipment

so as to make it advantageous to the great steam railroads to adopt electricity as a motive power, but unless some very radical improvements are made in the present electrical systems it will be a long time before any such change will be seriously considered.

A computation of the series of losses that occur between the steam engine driving an electrical generator in a centrally located power house, and the driven wheels on a motor car is not so apt to make one enthusiastic over the efficiency of that system as it is to bring to one's mind the thought of the extraordinary losses that must occur in a steam locomotive to make such a wasteful electrical system as widely used as it already is. It is safe to say that on an average not over 50 per cent. of the energy delivered to a generator is utilized in actually moving the cars. The balance is consumed in the generator, transformers, transmission line, rotary converters, distributing lines, motors and gears. However great this loss may be, there are, fortunately for the electrical men, other factors besides the mere consumption of coal—labor being the chief one of these—and this gives the electrical outfit such advantages that steam locomotive manufacturers have been forced to make great advances in their own line. The compound locomotive engine as now used on the principal steam railroads is a very different machine from the old simple engines that have made such records as coal consumers. It now becomes imperative that the electrical manufacturers should bring out a corresponding improvement if they are to retain the prestige they have already gained.

In considering the possible improvements that may be made in the electrical system as now used on interurban lines, the separate sources of loss must be considered independently to see where and how they may be decreased. It is safe to say without going into details, that no further improvements can be made in generators, transformers, rotary converters or motors that will sensibly affect their efficiencies. The only thing remaining is to cut down the losses of transmission and distribution. This can be done in two ways: that is, to increase the voltages or increase the size of the conductors. The transmission loss cannot practically, or commercially, be reduced to less than 5 per cent unless the original cost of power be very high. In general it cannot be reduced to much less than 10 per cent—the customary figure for present lines—for too high a voltage brings an increased risk of operation that may more than offset any advantage gained in small losses, and large conductors bring up the first cost too much. This also applies to the distributing system except with regard to the percentage loss, which can seldom be placed at even as low as 10 per cent. The location of sub-stations closer together than is now customary may materially reduce the loss but only at a very considerable increase in cost of attendance, which in general more than offsets the gain. The transmission and distribution losses therefore seem to be at a minimum the same as in the apparatus, and it becomes evident that the desirable increase in efficiency must come, not in the present system, but in some other one that will possess all the advantages now attained, and will reduce waste energy to a minimum by doing away with all unnecessary steps or transformations in the power generated. It remains to be seen what this next improvement will be.

Among the many questions pertaining to power transmission that have been more or less the subjects of discussion, that of the frequency of the system has perhaps attracted more attention than any other. It has been attacked on all sides, but the great majority seem to favor 25 cycles as being the best from an operating standpoint. This is of course due to the better regulation on the transmission line and also to the greater success met with in the manufacture of rotary converters of this frequency. It is a question, however, if this is not due more to the fact that, owing to the choice of 25 cycles at the Niagara plant, rotary converters of this frequency were developed more rapidly and to a greater extent than others. In a measure it became standardized as a strictly railroad frequency, as well as for general systems making use of direct current for lighting purposes through rotary converters. Later experience has shown that for almost all purposes except the strict transmission of the power a higher frequency might better have been selected. Even the transmission drop due to inductance may be so regulated by means of compound-wound rotary converters that no difficulty is experienced in lines operating at as high frequency as 60 cycles. This is due to the high power factor that can be maintained over widely varying loads and without hand regulation. In this respect as well as in efficiency, the rotary converter will always be preferable to motor generators. This applies to both induction and synchronous motors, for although the latter may be adjusted for a high power factor at some one particular load, the power factor changes with every change in load, and unfortunately it changes in the wrong direction. This cannot be overcome on a railway system by hand

regulation of the field rheostat owing to the too rapid fluctuations of load.

The induction motor, while it may have a lower power factor at full or partial loads than can be attained with the synchronous motor, has a much more even effect on the transmission line, and it is one that may be provided for as a certainty. It is, therefore, preferable to the synchronous motor, but as already mentioned, the rotary converter is preferable to either.

The question of frequency for railway circuits is decided under existing conditions not so much by what may be considered as the best for the purpose as by conditions imposed by something that may be quite at variance with what is considered strict railway practice. Most power equipments for new railways, as well as for old roads that are being reconstructed, are installed with a frequency the same as the nearest large water power or steam plants, purely for commercial reasons. This has been made possible only by the success finally attained in the manufacture of rotary converters of high frequencies, which, although it comes at a considerably later date than the success attained with 25-cycle converters, is nevertheless just as marked. There are to-day in New York State large railway systems operating at 25, 40 and 60 cycles, and the representatives of those companies will verify my statements that all are operating equally successfully and satisfactorily.

The long transmission systems for electric railways involve so many considerations of a commercial nature that the electrical engineers having their design and construction in charge must in reality often entirely subserve their own personal preferences from a technical point of view to other conditions. In fact it is incumbent on electrical engineers to make themselves almost as familiar with financial and commercial matters pertaining to railways as they are with strictly technical subjects. This is owing to the necessity of being able to realize, in a measure, the possibilities of the future with reference to consolidations and the consequent necessity of having everything as interchangeable as possible, and to decide how much considerations of this kind should influence the character of any installation. The laying of a few sections of rails between local railway companies to complete a through road is a small matter compared to connecting a number of power houses together through high voltage transmission lines, and operating all as one common system. One is a purely mechanical piece of work, and, once completed, it is done for all time. The other is but started when it seems to be completed.

The necessity which frequently arises in comparatively small railway systems, of putting in a power transmission outfit at a reasonable cost—or, to be more exact, at a small cost—also emphasizes the necessity of having a grasp of strictly commercial conditions, so that a successful outfit may be installed without burdening the company with such a heavy fixed charge that it is unable to operate on a profitable basis. There are many engineers, for example, who profess to believe that a high voltage transmission line built with poles having anything smaller than an 8-in. top, or with wire smaller than No. 3 or No. 4, can never be maintained in successful operation. The difference in cost, however, between a pole line of that type and one with poles having 6-in. tops and with No. 6 wire, is very marked, and would make considerable difference in the interest charge. There is no question but that the latter outfit would be entirely successful if carefully erected, and would be durable, and that it would have no higher percentage of depreciation than the former.

There would certainly be greater reliability of operation on a system with two complete lines of No. 6 wire than with one of No. 3 wire, and the cost would be practically the same. The reliability of the smaller transmission line is illustrated by one in Central New York which has been operating for over five years furnishing light and power. During that time no break has occurred in the twelve miles of line, except when caused by a falling tree, which would have broken any line ever built. On a railway system using both No. 6 and No. 3 wire, I was recently told that less trouble had been experienced with the smaller wire than with the larger. In general too much emphasis is given to making the poles of a certain size top, and too little attention is paid to the size of the pole where it enters the ground and where the greatest strain comes.

It would hardly be fitting to close a paper of this kind and at this time without referring to the new single phase railway system as developed by Mr. Lamme, of the Westinghouse Electric & Manufacturing Company. The main feature of improvement claimed for it is the absence of rotary converters, with a higher distributing voltage and consequent lower loss as well as less cost of installation. The simplicity of the system from a transmission and distribution standpoint will make it attractive. It should enable a single power house to handle with ease a railway 100

miles long, and with the least possible item of labor. The line could readily be sectioned, as in city service, and with high voltage feeders for each section, with transformers connected in as part of the transmission line, we would have a system as simple to operate as an ordinary city railway plant. The transformers could be fused so heavily that nothing less than a continued short circuit would open the incoming and outgoing lines, suitable circuit breaker protection being given in the main power house as in present installations for each feeder circuit. It may be said that this would multiply the number of wires to an objectionable extent, but by using a common return this could largely be obviated, and duplicate pole line construction would render continuity of service almost assured. The main objection to the new system seems to be from commercial considerations rather than from anything electrical. The frequency, about 17 cycles, at which it is proposed to operate is unlike any system in use, and as the motors are also alternating it precludes their use on direct current circuits, except where a double type of control would be adopted for the cars, which would be very cumbersome. Its advantages from an operating point of view, as regards efficiency and items of attendance or labor, must be demonstrated very clearly before its general adoption will render the present commercial objections ineffective.

INTERURBAN TRAIN DESPATCHING

BY E. P. WILCOXEN, OF ROCHESTER

The question of the proper method of despatching trains on interurban lines has no doubt caused the operating department more worry than any other subject, and, although the handling of freight and express has been a little troublesome, it does not touch the vital part of the system as does the despatching of trains. How are we to despatch them in order to protect the public, our employees and ourselves? The solution must naturally be looked for in one of three ways, namely, telegraph, telephone or block signal.

If we adapt the telegraph, we must naturally adopt the steam road system, which requires a larger force of experienced employees, and means increased cost of maintenance. We will have the advantage of almost an uninterrupted service, which it is impossible to get from the telephone on account of atmospheric conditions, also, the benefit of operators and agents paid by ourselves, whom we are able to control and who will give our interests better attention than operators and agents receiving commissions for their services and who devote part of their time to other business.

The electric block signal we can safely say also suffers from atmospheric conditions and mechanical defects, and cannot always be depended upon, so if the telegraph or block system is used, our resources must be such as to stand the increased cost of installation and maintenance, and furthermore other methods must be provided for controlling trains when the electric block is out of order. As in steam railroad practice, an automatic block signal system, in conjunction with an efficient despatching system, would be an ideal situation. The present automatic block signal systems either provide for the operation of the signals and targets through contactors arranged along the trolley wire, which are operated by the travel of the trolley wheel, or through contactors placed along the track and operated by some attachment to the car. The electrical and mechanical difficulties due to the sudden making and breaking of circuits, makes the use of block signals more or less uncertain. Prominent switch and signal builders are endeavoring to produce a system which will use the rails for at least one side of the circuit independent of continuous current running therein, in a manner similar to that by which automatic blocks are now operated on steam railroads. During the last few months experiments have been going on along this line, but the system has not been sufficiently perfected to be put in regular operation. This leaves to the ordinary interurban road the last method of controlling the operation of trains, namely, by the use of the telephone.

In the ordinary practice a telephone system is laid out along the railway, telephones placed in stations, agencies, or sidings, or carried on the cars, and orders from despatcher transmitted verbally by telephone either direct to conductor or motorman, or to agent or operator, and with more or less formality. Train orders thus given vary all the way from an informal conversation between conductor and despatcher, to a verbally transmitted order from despatcher to operator, taken down on proper blanks, repeated, O.K.'d, signed for and completed, strictly according to

steam railroad practice. All railroads endeavor to have the verbally transmitted orders so worded as to remove, as far as possible, chances of misunderstanding, and the length to which each suburban road management goes in obtaining this end depends largely upon personal characteristics and local conditions.

The Rochester & Sodus Bay Division of the Rochester Railway system has been in operation four years, using the telephone system for despatching trains. It is a single-track line, extending from Rochester to Sodus Point, a distance of 40 miles, 13 of which is on private right of way with sidings every mile, a majority of which are used only for freight, and meeting points when trains become late.

Telephones are in agencies at each village, in sub-stations, and on each car, and plugging boxes are placed at every siding. The dispatcher is located at Rochester, the western terminus of the division. Train crews receive written orders issued in triplicate form, the motorman, conductor and dispatcher retaining a copy. Meeting points of regular trains are denoted by heavy-face type on time-tables, which govern all regular trains when on time. The dispatcher keeps a train sheet showing location of trains, which are reported by sub-station attendants at Ontario, 18 miles out, and at Sodus, 31 miles out. Conductors report the arrival and departure of trains at Sodus Point, the eastern terminus of the line.

Standard steam road signals are used with the following exception: No signal is used on the rear end of train during the day, and only one red light at night.

Watches are inspected every three months, and train crews examined twice each year. Train crews report for orders and register at terminal points. They also report at meeting points when the opposing train is late, and when unable to make meeting points on time. Agencies are equipped with red flags and lanterns, which are displayed when train orders are to be given. At sub-stations and agencies the attendant or agent acts as operator, writing the train orders in triplicate form, retaining a copy, and, after repeating to the dispatcher, in turn repeats to the motorman with proper O.K.

On sidings the conductor acts as operator, and after repeating to dispatcher delivers copy to motorman, who repeats it to dispatcher for O.K. Train orders are numbered consecutively each day, commencing at midnight with No. 1. Extra trains clear regular trains at meeting points by three minutes. Trains are run under number displayed on left side of front vestibule, corresponding with same number on official time-table.

Motorman on a train carrying signals, when passing another train, sounds his gong or whistle three times, to call the attention of the motorman on the opposing train to the signal carried. This signal is answered in the same manner by the motorman on the opposing train. Should the motorman carrying the signal fail to get the answer, he immediately stops and calls the attention of the other motorman to the signal carried.

When the telephone service becomes defective and train crews are unable to get the dispatcher, the following rules immediately go into effect:

First class regular trains wait at meeting points until opposing train is 5 minutes late, then proceed with caution until opposing train is met. "Proceed with caution" means that conductor will go forward and flag all curves. We do not give trains going in either direction an absolute right of way, as we have found it safer to require both crews to proceed with caution.

When regular trains proceed after waiting the required 5 minutes, they are not allowed to make up time, but must run at least 5 minutes' late until the opposing train is met. Second class trains wait at meeting points for first class trains 10 minutes, and then proceed in the same manner. Westbound extra trains immediately lose their rights as extra trains, and always follow westbound regular trains as second sections.

We have found this method of car despatching to work very satisfactorily.

STEAM AND ELECTRIC RAILWAY CROSSINGS

BY CHARLES R. BARNES, OF ROCHESTER

The danger caused by railroad operation at grade crossings of streets or highways is directly proportionate to the number of trains operated on railroads and the amount of pedestrian and vehicular traffic on the street or highway.

Before the introduction of street railways every city or village street or country highway had a natural and legitimate amount of travel over it. This travel increased in the same proportion as the population or the business of the section through which the

street or highway was located. This condition was changed by the introduction of the electric railroads. A line of cars operated through a city street usually effects the pedestrian traffic in a section on either side of it, increasing the number of people who pass over the street through which the electric railroad tracks are constructed, and to a like extent reducing the number on the streets in the territory which is tributary to this particular street car line.

For example, if three city streets extend parallel with each other, with a line of street cars operated through the middle one, all of them crossing a steam railroad at grade, there would, almost invariably, be more people cross the steam railroad track on the street through which the electric cars were operated than on either of the others, even though the population were greater on either one of the other two.

This holds good in the case of parallel country highways, and perhaps to a greater degree for the reason that the suburban electric railroad reduces the number of vehicles in use on the highways tributary to it.

The foregoing statements tend to prove that the introduction of the electric road has caused a greater number of people to pass over the grade crossings of steam railroads on the streets or highways, through which they are constructed, than did before, increasing the liability of accidents at these crossings and decreasing it at others. The danger is still further increased from the fact that a large percentage of the people passing over these crossings are in a car, and if an accident occurs more people are thus liable to injury than if the same number crossed the tracks in the usual manner. In addition to the liability of injury to passengers, in an electric car, must be added the possibility of derailment of the steam train and the resulting possible injury to its passengers.

Another feature of the operation of electric cars over steam railroad tracks which must be taken into account when considering the increased danger incident to such operation, is the fact that the passengers in a car cannot exercise their judgment as to the safety of going over the steam tracks at the time, but must depend entirely upon the judgment of the two men operating the car.

Grade crossing accidents are usually the most serious ones which occur on electric roads and in most cases result in loss of life. It is not necessary to use arguments or cite cases to impress on the minds of electric railroad managers the dangers connected with grade crossing operation. They all realize the danger, and have taken precautions to prevent accidents at such crossings on their roads, but in most cases the precautions taken are not sufficient to prevent accidents, and are of such a nature as to give the manager a sense of security which does not really exist. He reads in his morning paper of the Cohoes or the Newark grade crossing disaster, expresses sorrow for the passengers who were killed or injured, sympathizes with the manager of the road and congratulates himself that no such accident can occur at his grade crossing, for all of his motormen bring their cars to a stop and the conductors go ahead and pilot them across the steam tracks. In addition to this, the crossing is equipped with gates, and the steam road company has a man there to operate them at all hours. That manager is sincere and honest in his conviction that his cars are operated over the grade crossing in a safe manner, and if an accident occurs at that point he satisfies his conscience with the statement that he has made the crossing as safe as possible and the accident was one of those, incident to railroad operation, which could not be prevented and which will happen as long as railroads are operated.

The investigation of accidents for a number of years shows that the conditions which led the manager to believe his crossing safe added an element of danger rather than diminished it. The rule referred to is a good one if the instructions in it were properly complied with. This is not done. If this statement is doubted, let any railroad manager go on some road where he is not known and watch the operation over grade crossings. He will find that in most cases the rule is complied with in a perfunctory manner. He will find that the usual custom is for motormen to slow up within a few feet of the crossing, the conductor will run ahead about even with the front end of the car and usually hold a conversation with the motorman until they reach the first rail of the steam track and he will board the car and it will proceed over the crossing. I do not wish to be understood as claiming that this is done in all cases, but my observation convinces me that this is the method in a large majority of cases. Complying with the rule in this manner adds an element of danger to the operation, for the reason that if the conductor remained on the rear end of the car, the motorman, for self-protection, would exercise more care than he does when the responsibility for the safety of his car is placed on the conductor, who does not know the condition existing on the steam track.

The operation of gates at a grade crossing of steam and electric railroads adds an element of danger to operation at that point, for the reason that gates are placed at grade crossings of steam railroads for the purpose of preventing pedestrians and vehicles from going over the steam tracks when a train is approaching the crossing. I know of no case where gates have been placed at crossings for the purpose of preventing an electric car from going on to the steam tracks when a train is approaching. These gates are usually operated by men in the employ of the steam railroad companies who are in no manner responsible for the safety of electric cars in going over the crossing. Accidents have been investigated where motormen have run through the gates, and several accidents have occurred by gatemen raising the gates on double-track roads after a train had passed the crossing in one direction and another approaching in the other, the gateman not seeing the latter one. Where crossings are equipped with gates, motormen and conductors will invariably become so accustomed to their use that they will depend upon their position as an indication of the conditions on the steam track. The most serious accident at grade crossings of steam and electric railroads in this State occurred at a crossing equipped with gates. There were 33 passengers on the electric car, 15 of whom were killed outright and 16 injured. Within the last three months an accident has occurred in this State at a crossing equipped with gates. The crew of the electric car operated it in the manner described, the motorman slowed up approaching the crossing, and the conductor running ahead to the front end of the car. A train was passing in one direction at the time and the gates were lowered for it. As the rear end of this train was going over the crossing the gateman raised the gates, not seeing another train approaching on the opposite track from the other direction. His view of the latter train was obstructed by the train which had previously passed over the crossing. Both the motorman and conductor, when seeing the gates raised, took this as an indication that the crossing was clear for them and proceeded. From where they stood had they looked they could have seen the approaching train 1500 feet away, but they did not do so, depending entirely upon the condition of the gates with the result that their car was completely demolished.

The Board of Railroad Commissioners, acting under the authority conferred upon it by the laws of the State, has caused an examination to be made of every grade crossing of steam and electric railroads in the State, as to the physical conditions at the crossings and the approaches on both roads; the distance a view of the steam tracks can be had from the electric tracks; the number of trains operated on the steam road and the headway on which electric cars are operated over the crossing. The Commission, realizing the liability of accidents at these points, and that the most perfect rules as rigidly enforced as possible were not sufficient protection at these points, even where gates were maintained, have ordered additional protection at these crossings. In cases where the traffic on the steam and electric roads warranted, they have ordered derail switches operated from a tower; in other cases where the traffic was not so great they have ordered derail switches, to be operated by the conductors of electric cars, the levers for operating these switches placed in such a position that the conductor must go onto the steam tracks before they can operate the derail. They have also ordered, where necessary, special work cut crossings, and at all crossings copper troughs placed on the trolley wires.

There are at present 410 crossings of steam and electric railroads in this State, 164 of which are under or over grade, and 246 at grade.

The ideal protection at the crossing of steam and electric tracks consists of derail switches, in the electric tracks, interlocked with home and distance signals on the steam road, arranged so that after a train has reached the home signal the derail cannot be set for an electric car to proceed until after the train has passed the crossing. In the case of a steam road with more than one track, this condition should hold good when a train approaches a crossing on a track over which trains are usually operated in the opposite direction; the home and distant signals should be set at danger before the derail can be set on the straight track, and these interlocked so that the signals cannot be moved to safety until the derail is set at derail; semaphores should be rigidly connected with the derail switch, and both set at danger normally; a metal trough on the trolley wires should extend over the steam tracks a sufficient distance to carry the rear end of the electric car clear of the steam track in case the trolley wheel leaves the wire; a first-class special work cut crossing should be provided and all of the signals and derails operated from a tower located where the towerman can have an unobstructed view of the steam and electric tracks. In addition to the equipment described, safety of operation requires that the derail

and signal on the electric track should not be set for the electric car to proceed, until the conductor has gone ahead to the center of the steam tracks and signalled the towerman to operate them. In addition to insuring the stopping of an electric car, before going over the steam tracks in regular operation, derails are necessary to safe operation on grades descending to steam road crossings, for the purpose of preventing runaway cars from going onto the steam tracks. Several accidents in this State resulting from this cause would have been prevented had crossings been equipped with derails. Metal troughs are ordered by the Railroad Commission to be placed on the trolley wires for the purpose of insuring the supply of power for the operation of cars over steam tracks if the trolley wheel leaves the wire. In this case it is caught by the metal trough, which is in metallic contact with the wire, and the wheel receives current from the trough. This device is necessary for safe operation of electric cars across steam tracks.

I find that managers of electric railroads throughout the State realize the importance of proper protection at grade crossings of steam railroads. There is, however, in some cases, a difference of opinion as to the protection required at these points, but in a majority of cases, the derails properly installed are considered by them the best means of protection, and the orders of the Board of Railroad Commissioners in reference to their installation are being cheerfully complied with.

Considering the large number of grade crossing accidents occurring throughout the country, managers of electric roads in this State are to be congratulated on the comparatively small loss of life and the number of persons injured at grade crossings.

FREIGHT DEVELOPMENT BY INTERURBAN ROADS

BY E. F. SEIXAS, OF ST. CATHERINES, ONT.

The transportation service performed by the railroads includes the movement of freight, the carriage of passengers and the transmission of mail and express matter. Each of these services merits careful consideration. Whether viewed from the standpoint of public benefit or considered with regard to the volume of business done and profits received by the company, the transportation of freight is the most important service performed by the railroad. The income from the passenger business is about one-fifth of the total income and earnings of the railroads in the United States, while the receipts from the freight amount to seven-tenths. Moreover, the social welfare is more dependent upon cheap and unfettered movement of commodities than upon inexpensive and speedy means of travel; however important it may be that the relatively few people who may at any one time desire to take a journey should be able to reach their destination promptly and comfortably, it is of incalculably greater consequence that producers should be able to dispose of the commodities upon the sale of which their livelihood depends, and that consumers should have the power of drawing upon distant, as well as near, sources of supply for the satisfaction of their wants and the gratification of their desires.

The volume of freight transported increases rapidly with the progress of civilization and the diversification of men's wants. The freight business is carried on to enable men to secure what they want, and the more complex their demands, the more goods will be produced and transported. The growing demand for the freight service has furnished a most powerful stimulus to inventors and engineers to lessen the obstacles to the movement of commodities by improving of tracks, cars and locomotives, and making other changes in the railroad mechanism whereby the costs of transportation have been reduced to their present small amount. Whether the endeavor of railroad companies to increase the speed of their passenger trains or their efforts to lessen the cost of freight movement have been the more potent incentive to mechanical improvements, it would be impossible to say, but the results accruing to society from these improvements have come more largely from the greater facilities for the shipment of goods.

So writes Professor E. R. Johnson, in his very excellent review of American Railway Transportation, and with this summary we may for the present dismiss our friends the steam roads. The conditions that have caused such signal success in the passenger business of interurban lines that depend on electric energy for their motive power are to a great extent responsible for the hearty greeting with which the average shipper, be he merchant or farmer, hails the advent of the trolley, and for the great complaisance with which he views the humming, whizzing cars that frighten his team of colts and send clouds of dust into his wife's otherwise immaculate parlor.

The first condition that tells in favor of the interurban line is the frequent service and the frequent stopping places. The second is that the interurban line is more or less of a local affair, and for that reason is more intimately cognizant of local necessities. In the battle between the piston rod and the trolley pole, passenger rates have suffered to a more or less extent, while

freight rates have pretty generally remained where they were. The interurban lines have not found it necessary to inaugurate a rate war to get freight business from the steam roads, for they receive and are justly entitled to their proportion of the business on account of the increased facilities.

The present Niagara, St. Catharines & Toronto Railway was originally a steam road, constructed in 1886, and changed to electricity in 1899 and 1900, the first electric car running July 19, 1900, from Niagara Falls, Ontario, to St. Catharines. Prior to the change in 1900 the road had, through poor management and consequent poor patronage, fallen into the hands of a receiver, and was sold by the courts under the hammer to the present stockholders, who converted it into an electric line and afterward extended it to Port Dalhousie, and establishing communication with Toronto by steamers, which are also owned and operated by the company. A track connection had by the original company been arranged with the Michigan Central Railroad Company at Niagara Falls, Ontario, which has been since maintained, and which affords free interchange of cars to and from all points in Canada and the United States, thus forming a line in competition with the Grand Trunk Railway system in the territory covered by the electric line and its steamers, for which purpose the road was intended. The gross annual freight earnings of the line prior to 1900, or during the operation by steam, was less than \$20,000, and the freight handled was confined to low classes of carloads, such as coal, this being in fact the principal traffic handled. Very little attention was paid to the higher class traffic, such as package merchandise, and it was not until 1901 that any marked increase was shown. This upward tendency was caused by an energetic and persistent endeavor on the part of the management to increase the development of the facilities which were practically dormant, in taking care of higher class traffic and leaving the low class to itself. The methods of handling had to be improved, a system organized, and particular attention paid to the despatch of business taken hold of. There was no attempt made to reduce rates, the traffic being carried on exactly the same conditions as steam lines under all circumstances. It was found that accommodation to patrons had a great deal more effect than any benefits derived from useless rate-cutting could afford. Cars are placed at convenient points for shippers to load, they are picked up at convenient hours, and shipping receipts are given at the counters of the business firms by a responsible man who has the freight train in charge, thus saving the customer the trouble and time of going to the railway station to make shipments. All this tended to increase popularity, and consequently, by increased shipments, revenue, until for the year ending August 31, 1903, we are able to show an earning of 120 per cent greater than in 1900, and an operating expense of 52 per cent as against a previous loss. The package freight must stay with the electric roads, as their methods will, if properly organized, hold it against steam roads, unless congestion is allowed, when the great advantage of quick handling will be lost. The handling of low class freight involves the expense of terminal facilities which in large cities is practically prohibitory, and unless there is assured enough freight to keep a regular competitive service against steam fully alive, it is better that electric roads confine their business to the higher classes of package merchandise. With us it is found also that switching service is a source of revenue, which if facilities are available is remunerative. We have arrangements to switch loaded cars to and from the Grand Trunk Railway, our competitor, and for industries located on our tracks. This service is easily performed and at a very little expense, the distance usually being short and the cargo quickly handled, and it pays because ordinary power is employed at times when we can afford it without detriment to our other interests. There is, in our opinion, ample revenue in the development of freight service for interurban lines provided, as has been done in our experience, that low class traffic is not sought after too closely and only taken care of when it involves the higher classes. No freight can be handled at a profit that pays less than 1 cent per ton per mile, and even at that figure there is not enough revenue to warrant short-haul lines seeking it. To sum up, all that is necessary to make electric lines a factor in freight traffic is to seek high class freight, handle it quickly, and attend promptly to customers' requests.

We have found that working arrangements cannot well be based upon a mileage rate unless a constructive mileage is allowed the smaller line, and it is not practicable to do this in our case (although conditions with other lines may be different and groupings may be obtained from connecting lines), because ours is a lake and rail line, peculiarly situated and breaking bulk, and our connections do not, therefore, favor percentage arrangements. We have worked out almost our entire traffic on an arbitrary

basis, receiving as our proportion on classes one to six under the official freight classification the following figures, viz.:

Class	1	2	3	4	5	6
Cents	8	7	6	5	4	2½

per 100 pounds for our haul, whether long or short, and not participating in any reductions made by connections due to competition from various causes. We therefore submit that interurban lines are in a better position on an arbitrary basis than on a percentage arrangement, although the disadvantage of having no voice in rate making without consent is apparent by reason of nonparticipation in the reduction of rate asked, but this is only a matter of correspondence, we find, and is generally acceded to readily by connections upon representation of facts. The classes shown do not cover the low class or commodity traffic which I have alluded to in the first part of this paper, which are carried only by special arrangement between lines interested and generally calls upon the short lines to reduce their earnings to merely what it costs to handle, hence the assertion that it is better to leave it alone except where it may carry other higher traffic with it, when it cannot profitably be turned down because the manufactured product might be lost, and as this is high class it is profitable. We unfortunately had to take hold of an existing line, with its rates and obligations fixed, and were unable to alter the existing divisions of rates, although we have from time to time endeavored to do so. Initial errors are costly, and upon interchange being arranged care should be taken to have all traffic arrangements thoroughly arranged by competent men, fully conversant with such subjects. The earnings per ton per mile should be fixed as high as possible, and never allowed to be less than what steam lines earn. Short mileage allows fair revenue such as our earnings, being not less than 25 per cent minimum of through rates, and upon extension of line minimums could be increased correspondingly. Conditions of traffic in Canada differ, however, from the United States in many respects. For instance, we have in large centers cartage to perform which is forced upon us by an old existing arrangement made by the Grand Trunk Railway when it was practically the only line in Canada. It was inaugurated by that line to take care of friends. This is a burden, because the expense is not covered by extra charge made above freight rates, part being absorbed in the rate. Another factor of expense in handling is the freight car equipment, which costs interurban lines a per diem rate of 20 cents for every calendar day if foreign lines permit the use of cars. No line should be dependent upon equipment belonging to others, nor should they undertake to do more than deliver on cars at convenient points, unless the circumstances are very exceptional, as every transfer or movement necessarily costs money and increases the operating expenses materially. Rates should be maintained, and although steam roads are liable to cut with a view of forcing the business from electric roads, the public soon finds that the real object is to force the electric road out of the business and enable the steam line again to put up its rates with all the old disadvantages of slow time and poor service. Another commanding advantage to interurban lines is that their business is done on main roads in a number of cases where there are no terminal expenses, unless they endeavor to enter into active competition with steam lines, when terminals must be provided.

The handling of fruit is an important item in our season's business, Toronto being the central market. To handle our heavy freight traffic with the quickest despatch at a minimum cost has brought us to a point of efficiency whereby we find it necessary to allow our boats only 30 minutes at terminal points to load and unload from five to seven carloads of freight. To meet the requirements of our traffic we built a number of 4-wheeler platform trucks, the platform of which is similar to express trucks seen on steam lines, and capable of carrying 2 tons. On these we load all merchandise and package freight, ready to run aboard the boat on her arrival. The incoming freight is received from the forward gangway, and the outgoing freight is run on board over the after gangway. To handle our fruit traffic with despatch we have erected at points along the line fruit platforms, on which we keep a supply of these trucks. The farmer drives to this platform, loads his fruit on the trucks, and this is picked up by our fruit-train, which consists of flat cars the same height as the platforms, and run to make connections with each boat. This train carries three men, who run the loaded trucks from the platform on the cars. At Port Dalhousie they are run directly from the cars on the boat. This prevents handling, which is very damaging to the fruit, and also permits the fruit grower to use a cheaper grade of baskets, thereby effecting a great saving for him.

On the whole, therefore, freight business of interurban lines will pay if confined to the higher class of traffic, and if particular attention is paid to despatch and accommodation to the public.

ANNUAL REPORT OF THE INTERURBAN STREET RAILWAY COMPANY OF NEW YORK

The Interurban Street Railway Company, of New York, published on Oct. 7 its annual report for the year ending June 30, 1903. It occupies twenty-nine large pages, and is probably the most complete report of any street railway company which has ever been issued. It is accompanied by a map of the owned and leased lines of the company, showing by different colors those operated by electrical and those operated by animal power. It is understood that the company will issue similar reports each year.

The accounts of the company, as shown in the report, have been audited by Haskins & Sells, certified public accountants, whose certificate is appended thereto.

The gross earnings from operation of the entire system for the year are shown to have been \$21,549,545.95, an increase of \$618,377.43 over 1902. This increase was considerably less than the normal increase, because of a number of adverse conditions, the most important of which was the subway construction upon Fourth Avenue, Forty-Second Street, Lenox Avenue and upper Broadway, which necessitated the partial suspension of operation upon certain lines and seriously interfered with traffic upon many others. The operation of several other important lines was practically suspended for a considerable part of the year by the work of installing the underground electric system upon those lines. The operating expenses of the year were adversely affected by the same conditions, as well as by a substantial increase in wages, the abnormally high prices for fuel, due to the coal strike, and the high prices for materials and supplies, including feed for upward of 4700 horses which the company was compelled to use.

The fixed charges were increased by \$431,444.44 for interest upon the \$11,000,000 of Metropolitan Street Railway Company 4 per cent refunding bonds, which were issued pursuant to the Interurban-Metropolitan lease as part consideration for the sum of \$23,000,000 in cash, payable by the Interurban Company thereunder. While the increase in earnings for the year was not sufficient to overcome this additional fixed charges, it is expected that it will be largely exceeded by the increase in the net earnings, which will follow the completion of the extensions and improvements now in progress, which the issue of the \$11,000,000 of refunding bonds made possible.

Among the current improvements mentioned in the report reference is made to the new Kingsbridge power plant. This station is intended to generate high-tension current for transmission to the sub-stations in the upper part of Manhattan Island and in the borough of the Bronx and Westchester County. It is expected before the close of the present fiscal year that all the current required for the operation of all the lines in the boroughs of Manhattan and the Bronx, and in Westchester County, will be supplied from this power station and the Metropolitan power station at Ninety-Sixth Street and First Avenue, with the result of very materially reducing the aggregate cost of producing current. These two power stations will have together a maximum generating capacity of 116,000 hp. which is sufficient to provide for the growth of the business for several years to come.

The income account of the Metropolitan lines, including the Metropolitan, Thirty-Fourth Street Crosstown, Fulton Street, Twenty-Eighth and Twenty-Ninth Streets Crosstown, Central Crosstown and Mount Vernon lines, was as follows:

Gross earnings from operation	\$16,178,563.57
Less operating expenses—	
Maintenance	\$1,282,735.97
Transportation	4,968,118.25
General (including damages and legal expenses)	1,555,464.27—
	7,806,318.49
Net earnings from operation	\$8,372,245.08
Income from other sources	248,599.06
Gros income from all sources.....	\$8,620,844.14
Deductions from income—	
Rentals of leased lines, including interest upon funded debt of companies leased or controlled.*\$3,715,964.34	
Interest on \$11,000,000 Metropolitan Street Railway Company 4 per cent refunding bonds, issued under Metropolitan-Interurban lease....	431,444.44
Proportion of net income of Central Crosstown Railroad Company applicable to 1006 shares of stock (out of 6000) not owned by Interurban Company	11,305.06
†Taxes	952,791.00—
	5,111,504.84
Surplus	\$3,509,339.30

* Excluding interest and dividends upon stocks and bonds of constituent companies owned or controlled by Interurban Company. † Franchise taxes on appeal to United States Supreme Court not included.

Surplus available for guaranteed dividend of 7 per cent upon capital stock, Metropolitan Street Railway Company	\$3,509,339.30
Balance of guaranteed dividend paid by Interurban Street Railway Company	130,452.45—
	\$3,639,791.75

The income account of the Third Avenue lines, including Third Avenue, Forty-Second Street-Manhattanville, and St. Nicholas Avenue, Dry Dock-East Broadway and Battery, Kingsbridge, Union, Westchester Electric, Southern Boulevard, Yonkers, Tarrytown-White Plains and Mamaroneck lines, is as follows:

Gross earnings from operation	\$5,370,982.38
Less operating expenses:	
Maintenance	\$626,459.32
Transportation	2,229,144.34
General (including damages and legal expenses)	727,187.63
	3,582,791.29
Net earnings from operation	\$1,788,191.09
Income from other sources	324,809.23
Gross income from all sources	\$2,113,000.32
Deductions from income:	
Interest on funded debt	\$2,027,000.00
*Taxes	227,684.58
	2,254,684.58
Deficit for the year ended June 30, 1903.....	\$141,684.26

* Franchise taxes on appeal to United States Supreme Court not included.

These two accounts combined cover the operations of the entire Metropolitan Street Railway system.

The consolidated balance sheet of the Interurban Street Railway Company follows:

	ASSETS		
	Total	Metropolitan Lines	Third Avenue Lines
Construction, equipment, leases and franchises	\$141,239,200.51	\$67,759,212.93	\$73,479,987.58
Additions and betterments—leased lines	21,376,239.38	21,376,239.38	.....
Investments	4,125,368.58	20,380,268.58	1,500.00
Materials and supplies	1,034,144.03	787,200.96	246,943.07
Current assets—			
Cash	\$2,238,579.87	\$1,861,567.28	\$377,012.59
Cash—on deposit to pay coupons	995,390.01	145,890.00	849,500.01
Bills receivable	199,586.61	110,861.06	88,725.55
Accounts receivable	440,197.95	260,859.53	179,338.42
Metropolitan Securities Company subscription to Interurban Street Railway Company's securities	10,202,000.00	10,202,000.00	.....
Total	\$14,075,754.44	\$12,581,177.87	\$1,494,576.57
Due from companies in the system—Third Avenue lines.....	.....	1,292,567.59	.....
Dividends accrued on stocks owned	13,893.75	13,893.75	.....
Prepaid accounts—			
Insurance, track rentals, etc.....	286,153.27	219,895.52	66,257.75
Total assets	\$182,150,753.96	\$124,410,456.58	\$75,289,264.97
	LIABILITIES		
	Total	Metropolitan Lines	Third Avenue Lines
Capital stock	\$67,582,100.00	\$59,403,100.00	\$23,754,400.00
Funded debt	88,007,000.00	39,978,000.00	48,800,000.00
Interurban Street Railway Company ten-year notes.....	3,465,000.00	3,465,000.00	.....
Real estate mortgages	950,000.00	950,000.00	.....
Metropolitan Securities Company—Securities due it under subscription	12,132,500.00	12,132,500.00	.....
Current liabilities—			
Coupons due and unpaid.....	\$995,382.50	\$145,890.00	\$849,492.50
Bonds due and unpaid	6,000.00	6,000.00	.....
Accounts payable	2,492,309.29	1,769,200.72	723,108.57
Employees' deposits	25,137.51	12,692.59	12,444.92
Unclaimed wages	660.42	.....	660.42
Total	\$3,519,489.72	\$1,933,783.31	\$1,585,706.41
Due to companies in the system—			
Metropolitan lines .....	.....	.....	1,292,567.59
Accrued liabilities—			
Interest and rentals	\$851,199.95	\$741,158.29	\$110,041.66
Taxes	1,073,676.97	805,115.05	268,561.92
Wages, etc.	56,284.31	43,718.85	12,565.46
Totals	\$1,981,161.23	\$1,589,992.19	\$391,169.04
Reserve for controlled companies. ....	.....	534,578.07	.....
Profit and loss—surplus	4,423,503.01	4,423,503.01	534,578.07
Total liabilities	\$182,150,753.96	\$124,410,456.58	\$75,289,264.97

The discrepancies in some of the items between the sum of the "Metropolitan" and the "Third Avenue" figures and the "total" column are due to certain eliminations made for the purpose of presenting the net assets and liabilities of the Metropolitan and the Third Avenue lines combined.

In addition, the report shows a detailed schedule of the funded debt of all the lines, miles of track owned, passengers carried, schedule of real estate owned, comprising some sixty different pieces; general balance sheets and income and profit and loss statements for all the sub-companies.

MUNICIPAL OWNERSHIP DEFEATED IN SAN FRANCISCO

The proposition to issue bonds for \$710,000 to secure funds wherewith to take over the Geary Street, Park & Ocean Railroad, of San Francisco, has been defeated by the people of the city, who voted against the plan Thursday, Oct. 8. The company's franchise elapses in a short time, and the suggestion that the city buy and operate the line, seemed to meet with great favor. The vote on the question, however, was not as heavy as had been anticipated. The vote in favor was 14,481, and against 10,745. As a two-thirds majority was essential, the measure was defeated by over 6000 votes. The line is a 2-mile cable road, with double tracks, and its own power-house. Besides being a short line, it is greatly handicapped by having no franchise for the few blocks from its terminus at Newspaper Corner to the ferry and on the other end lacks 1/2 mile of reaching the beach. It is thus a "middle" line and transfers to the ferry. The plan of the city to take over the line included the installation of electricity as motive power. The details of the proportionment of the \$710,000, as worked out by the city, follows:

Conversion of present cable road to underground electric road, conduit system, Market Street to Fifth Avenue (3.333 miles)	\$60,620
New road on Point Lobos Avenue from Fifth Avenue to Fulton Street, including bituminous pavement (0.818 miles)	115,150
Removal of pipes, conduits and other obstructions.....	25,000
Power-house, three-story brick building office and car house, cooling tanks and oil reservoirs	94,000
Thirty double-truck cars 32 ft. long, each supplied with two 35-hp motors.....	133,500
Conductor cable, lead-covered ducts, etc.....	90,000
Real estate	35,000
Total	\$646,700
Engineering and contingencies add about 10 per cent....	63,230
Total estimated cost	710,000

The bonds were to be forty-year serials, carrying 3 1/2 per cent interest.

The estimate of the surplus available for the betterment of the service rendered was placed at \$17,825 a year.

BROOKLYN COMPANY ADOPTS MERIT SYSTEM

Another large company has been added to those which have adopted the merit system of discipline. This is the Brooklyn Rapid Transit Company, and the announcement was made Oct. 1 in a formal notice from the company to its officers and employees. The new system became effective Oct. 15, when all suspensions from duty with loss of pay were abandoned.

To place all on an equal basis each employee began the new system with a clean record. The official circular, which fully explains the system as it has been worked out, follows:

**THE BROOKLYN HEIGHTS RAILROAD COMPANY,
OFFICE OF GENERAL SUPERINTENDENT**

TO OFFICERS AND EMPLOYEES.—Commencing Oct. 15, 1903, all punishment of conductors, guards, switchmen, flagmen, engineers, motormen and firemen in train service by suspension from duty with loss of pay will be abandoned, and thereafter discipline for neglect of duty, violation of rules and bad conduct shall be by reprimand, demerit marks or dismissal from the service.

On that date, every employee above-named starts with a clear record, except that when subsequent records show that past offenses are being repeated, the persons concerned will be dismissed from the service or double the demerit marks entered against them.

It will be understood that disloyalty, intemperance, insubordination, immorality, willful or gross carelessness, incompetence, dishonesty, false statements or concealing facts concerning any matter under investigation will be dischargeable offenses.

A complete record of each employee will be kept and all discipline

imposed will be shown thereon. Credit will be given for excellent conduct, deeds of heroism, or extraordinary service rendered, and these credits will receive due consideration in connection with any charges which may be made against such employee.

For every three (3) consecutive months of service free from demerit marks or reprimand, five (5) marks will be deducted from any that may have been previously entered against an employee's record. When sixty (60) marks shall have been entered against the record of an employee his services will be dispensed with.

On Jan. 1, of each year, the names of employees who have at that time completed a year with a clear record will be posted.

In the promotion of employees, their previous record will always be considered.

Record bulletins of an educational nature will be posted periodically, giving a brief account of cases where employees have been disciplined, stating what action was taken in each case, but will not ordinarily give the name of the employee nor any information that would identify him.

Each employee will be notified in writing of any action concerning him, and will have an opportunity to appeal from any decision as to the number of demerit marks, but such appeal must be made to the division superintendent within ten days after receipt of notice.

The objects of this system are:

First—To continue employees in the service without interruption, loss of wages and consequent suffering to those dependent upon their earnings for support.

Second—To obtain greater efficiency in the safe and careful operation of the company's service by encouragement to faithful and intelligent performance of duty.

This system is introduced in the belief that it will be beneficial to employees, and that it will meet with their hearty co-operation.

D. S. SMITH,
General Superintendent.

Approved:

J. F. CALDERWOOD,
Vice-President and General Manager.

October 1, 1903.

NEW YORK ELEVATED MEN VOTING ON QUESTION OF A STRIKE

A committee of the Brotherhood of Locomotive Engineers, representing the motormen of the Interborough Rapid Transit Company, which operates all the local elevated lines, called on Superintendent Hedley, of the company, last week to protest against the increase in the frequency of the tests carried on by the company for the purpose of discovering physical defects in its employees. Mr. Hedley said the examinations were for the safety of the public, and that they must go on. On Monday, Oct. 12, the committee appealed to General Manager Bryan, who consented to meet the men in conference. On Tuesday another meeting was had with Mr. Bryan, and on Wednesday the representatives of the committee again met Mr. Bryan. At this last meeting a flat refusal was made by the company to stop the physical examinations of the men, and the committee was told that this was final. A report of this action was immediately made to the joint executive committee of the employees, and it was decided to call for a general vote on the question of the advisability of declaring a strike. As this paper goes to press the vote is being taken.

OFFICIAL REPORT ON THE NEW BRIDGE TRAFFIC SCHEME IN NEW YORK

Engineer Archibald McLean, in charge of the Brooklyn Bridge, has made his report to Commissioner Lindenthal on the operations of the Poulson plan at the test which took place last week at the Manhattan terminal of the Brooklyn Bridge, and which was noted in detail in the STREET RAILWAY JOURNAL of Oct. 10. Mr. McLean does not appear to be very enthusiastic over the Poulson plan, and, in fact, concludes his report to Bridge Commissioner Lindenthal with the statement that in his judgment there is nothing to be learned from further tests of the Poulson plan. No expression of views on the plan has been made by Commissioner Lindenthal, but an official of the department says that if Mr. Poulson insists on further tests, the Bridge Commissioner will very likely accommodate him, unless there is objection from the public. This official said the Bridge Commissioner was anxious to show Mr. Poulson and the latter's friends in Brooklyn, particularly the Manufacturers' Association, that he is not prejudiced against the Poulson plan, and that every opportunity would be given the inventor to demonstrate the practicability of the scheme.

FINANCIAL INTELLIGENCE

WALL STREET, Oct. 14, 1903.

The Money Market

The money market continues to occupy what may be described as a fairly comfortable position. Nobody can say that funds are easy and abundant so long as it is known that the railroads and other corporations which need banking capital to help them in their business are still being held rigidly at arms length. But for all the necessary requirements of the season—and these include commercial borrowings and currency withdrawn to move the crops—bank reserves seem likely to be quite sufficient. The crop-moving demands, to be sure, have not yet reached the volume they will attain later on. The Treasury's position as a creditor in the market is, moreover, artificial and temporary. Bank surpluses cannot long keep from beginning the descending movement which always takes place in the autumn season. Still, with all this, the present surplus of the New York banks is \$16,500,000, against \$1,527,000 in 1902, and is, in fact, exceptionally high for this time of year. This circumstance is assurance enough that if the banks reserve their lendable balances only for the most necessary borrowings, the money market will get along without any trouble. The disposition to shade rates on commercial paper—which has been one of the most notable incidents of the past week—doubtless reflects the slowing down of general trade, and the consequent belief that the demand for mercantile discounts will fall off, as compared with preceding years. Something of the same explanation probably accounts also for the easier tendency now visible in time money rates. Meanwhile the extraordinary delay in the currency withdrawals by the interior, and the disbursements of the Treasury on bond redemption, and for other unusual purposes, are holding local bank reserves stationary. In the absence of any speculative demand, call money rules at nominal figures on the stock exchange. The prevailing rate is $2\frac{1}{4}$ per cent to $2\frac{1}{2}$ per cent. Sterling exchange, though lower on the week, is still well removed from the gold import point, and a movement of gold from Europe this season still appears unlikely. Sixty-day money is quoted at $4\frac{1}{2}$ per cent, and money for the three to six months at $4\frac{3}{4}$ per cent to 5 per cent.

The Stock Market

Renewed weakness has appeared in the stock market this week, but it is of a different sort, and evidently results from different causes from the weakness of the summer's market. On previous occasions forced unloading of securities by wealthy speculators and promoters has been the leading feature. It has been so urgent and so indiscriminate that all classes of securities suffered with almost equal severity. During the past week, while some of the selling is attributable to embarrassed capitalists the principal liquidation has undoubtedly come from a multitude of small investors alarmed over the recent disturbing developments in some of the industrial companies. This liquidation has converged almost wholly upon the industrial shares; the railroads, while under pressure at times, have shown, on the whole, a decided resistance to the decline, and their whole behavior has suggested that real selling in these stocks has pretty well run its course. Two circumstances of the last fortnight are particularly responsible for the prevailing distrust felt toward the industrial quarter of the market. The first of these was the reduction of the Steel common dividend, the second the unsavory record of the Shipbuilding Trust revealed at the hearing of the companies' affairs a week ago. Undoubtedly the scandalous revelations made in this testimony marked the case as an extreme one, and Wall Street has been altogether too ready to assume that the same disreputable methods of financing have been employed in other industrial consolidations of the same sort. It is also pointed out with perfect truth that the recent disclosures in the Shipbuilding company revealed little that was not known before. Yet, with all this the episode, combined with the action of the Steel directors, has greatly intensified the feeling of suspicion against all industrial combinations which came into existence during the inflation period of the last few years. The decrease in the Steel Corporation's earnings has, moreover, called attention to the slackening of general business. Reaction has gone farther, probably, in the steel industry than anywhere else, but the fear is certainly not unreasonable that a downward movement once it becomes well defined in the steel trade, will not be long in spread-

ing to other industries. All the securities of the steel manufacturing and steel-using companies have followed this week the example of the United States Steel Corporation stocks, and many of them have established new low records. At the present writing this liquidation is still in progress, and while a more hopeful sentiment prevails as to the immediate future of the railroad stocks, nobody expects any decided improvement until the market for the industrial issues is proved to have finally reached its bottom.

The local traction stocks have been less prominent in this week's dealings than in those of the previous week's. They have sympathized with the firmness of the railroad shares rather than with the weakness of the industrials. Manhattan Elevated has, as usual, displayed the best resistance of the group, but Brooklyn Rapid Transit has also disclosed a considerably better support than has been extended to the stock for some time past. The annual report of the Interurban Company, submitted during the week, has come in for a great deal of criticism, both good and bad. On the face of things the figures apparently show that the 7 per cent Metropolitan guarantee has been very nearly earned. The stock has responded very little to the report, either one way or the other.

Philadelphia

Weakness has continued in several quarters of the Philadelphia market, but it has been by no means as general as on the two previous weeks. Shares of the Philadelphia Company have had another sharp drop, the common selling down from $37\frac{1}{2}$ to 35, and the preferred from $43\frac{3}{4}$ to 42, both of which represent the lowest prices on record. This decline is associated with the speculative troubles in Pittsburg, where the Philadelphia Company stocks are largely held. They have apparently been sold merely in consequence of the general depression, and not because there was anything wrong with the company's affairs. For like reasons United Traction of Pittsburg preferred fell two points to $48\frac{1}{2}$, although the sales of this stock were comparatively light. The home traction shares have held generally steady. Philadelphia Traction lost a half a point to $93\frac{1}{2}$, and Philadelphia Rapid Transit dropped from $12\frac{1}{2}$ to $11\frac{7}{8}$. Union Traction sold down from $42\frac{3}{4}$ to $42\frac{1}{4}$, but rallied to $42\frac{1}{2}$. Good investment buying was observed in this issue. The only other sale of the week was a single one in Consolidated Traction of New Jersey at 60.

Chicago

The street railway people and the Chicago city officials are getting together on franchise matters, but so far there have been no important developments for or against either party. It is said that a tentative franchise has been drawn up and is satisfactory to the City Railway, with the exception of the compensation clause. In well-informed quarters it is believed that this franchise, if accepted by the City Railway, will also be adopted by the Union Traction. At the best, however, the franchise controversy seems likely to be long-drawn out, and will not be settled without some concessions on the part of all concerned. As far as can be learned the city has shown no disposition to recede from its requirement for a limited twenty-year extension with heavy compensation in the bargain. Judge Grosscup has issued an injunction restraining the minority stockholders of the North and West Side lines from interfering in any way with the Union Traction reorganization. This injunction remains in force until terminated by a higher court. A dividend of 2 per cent has been ordered on North Chicago stock, payable Oct. 15. This is at the reduced rate authorized a few weeks ago. Trading in the Chicago securities has been very light, and of small consequence during the week. Metropolitan common sold down from 18 to 17, and back to $17\frac{3}{4}$. The preferred rose from 54 to 55, then dropped to 54 again. The only other sales comprised Northwestern common at 17, Lake Street at $4\frac{1}{2}$, South Side at 94, City Railway at 175, and Union Traction common at $4\frac{1}{2}$.

Other Traction Securities

The Boston traction specialties have all steadied down considerably after the extreme depression of ten days ago. Liquidation in this group seems to be over for the present at least. Massachusetts Electric common fell rather sharply from $20\frac{1}{2}$ to $18\frac{3}{4}$, rallied to $19\frac{1}{2}$, and sagged off to 19 again, but selling of the stock was very light. Massachusetts preferred, on the other hand, held steady dur-

ing the week at 77½. Boston Elevated rose sharply from 137 to 138, but dropped just as abruptly again to 136½. West End common was exceptionally strong at an advance to 91, while the preferred sold at 109 and 108. In Baltimore the United Railways issues have again been under some pressure, but more particularly in the stock and in the income bonds than in the first mortgage 4s. The stock declined from 9½ to 9 and the income bonds from 59¾ to 58¾, the latter being a new low record price. On the other hand, the general 4s held steady around 90. Other Baltimore sales for the week include Lexington Railway shares at 40½, the 5 per cent bonds at 100, Atlanta Street Railway 5s at 103, City and Suburban, of Washington, 5s at 93, Charleston Street Railway 5s at 104½, and Anacostia & Potomac 5s from 91¾ to 91. On the New York curb Interborough Rapid Transit showed continued weakness, dropping from 82¾ to 81. New Orleans Railway common stock sold at 9¼, the lowest of the season. Other sales comprised Brooklyn Rapid Transit 4s at 77½, Washington Traction 4s at 71, and St. Louis Transit at 15.

Cincinnati Street Railway featured in the trading at Cincinnati last week. Sales numbered 1250 shares, and prices ranged from 128¾ to 130. Detroit United opened the week at 66 and gradually declined to 61½ at the close of the week; sales numbered 202 shares. One small lot of Toledo Railway & Light sold at 20, and Cincinnati, Dayton & Toledo Traction sold at 28, while several lots of the bonds of this road sold at 81½. Columbus, Delaware & Marion, Mansfield & Zanesville bonds all sold at the old price, 101.

At Cleveland there was considerable bidding for Cleveland Electric Railway stock. It opened the week at a very low figure, 63, and advanced to 65¼. Sales numbered 285 shares. Northern Ohio Traction & Light became active towards the close of the week, and 180 shares were sold at 15¼ to 15¾. It has been inactive at 15 bid, and 16 asked for some time. On Monday two lots of Lake Shore Electric common sold at 5, a drop of five points from the lowest previous sale. Northern Ohio Traction became quite active again, and 400 shares sold at 15, a drop of three-eighths from last sales.

Security Quotations

The following table shows the present bid quotations for the leading traction stocks, and the active bonds, as compared with last week:

	Closing Bid	
	Oct. 6	Oct. 13
American Railways	42	41
Aurora, Elgin & Chicago	a17	—
Boston Elevated	135	136½
Brooklyn Rapid Transit	33½	31¾
Chicago City	170	170
Chicago Union Traction (common)	4	4
Chicago Union Traction (preferred)	30	30
Cleveland Electric	60	65½
Consolidated Traction of New Jersey	59	59
Consolidated Traction of New Jersey 5s.....	104¼	103
Detroit United	64	55
Elgin, Aurora & Southern	a42	a56
Lake Shore Electric	a7	a5
Lake Street Elevated	4¼	4
Manhattan Railway	130½	130
Massachusetts Electric Cos. (common)	20	18
Massachusetts Electric Cos. (preferred)	77½	77½
Metropolitan Elevated, Chicago (common)	18	17
Metropolitan Elevated, Chicago (preferred)	53	53
Metropolitan Street	105	103
New Orleans (common)	9¾	7
New Orleans Railways (preferred).....	30	a30½
North American	71	72
Northern Ohio Traction & Light	15½	13
Philadelphia Rapid Transit	12	11¾
Philadelphia Traction	94	93½
St. Louis Transit (common)	15¼	13¼
South Side Elevated (Chicago)	90	91
Syracuse Rapid Transit	—	a30
Syracuse Rapid Transit (preferred)	—	73¾
Third Avenue	105	100
Toledo Railway & Light	17¼	a20
Twin City, Minneapolis (common)	86	80½
Union Traction (Philadelphia)	42½	42¼
United Railways, St. Louis (preferred)	62	61

a Asked. b Last sale. * Ex-dividend. † \$10 paid.

Iron and Steel

Next to the cutting of the Steel dividend, interest in the iron situation has centered in the concerted action undertaken to curtail the production of pig iron. A leading trade authority esti-

mates that the product for the last quarter of the year will be reduced by 825,000 tons. Both buyers and sellers are waiting to see how this vigorous treatment of the situation will affect the market. Little business is being done at present, but it is expected that if the makers succeed by lowering output, in working off accumulated stocks, buyers will be found at current prices in considerable quantity. Nothing new has happened in the steel situation. Less is heard now, however, about shading of steel billet prices below the official quotations. This is rather a favorable sign. Quotations are as follows: Bessemer pig iron \$16.35 a ton, Bessemer steel \$27, steel rails \$28.

Metals

Quotations for the leading metals are as follows: Copper 13¼ cents, tin 25 15-16 cents, lead 4½ cents, and spelter 6 cents.

CHICAGO TRACTION MATTERS

The sub-committee on franchises of the local transportation committee of the Chicago City Council has been holding numerous sessions with the officers of the Chicago City Railway Company the last two weeks. The Chicago City Railway Company has submitted figures on the amount it proposes to spend in changing its cable lines to electric traction and improving the entire property so as to bring it up to date in every particular. The committee also has prepared figures on the amount it believes will be necessary to expend on their work. The company contemplates an immediate investment of about \$17,000,000 in improvements, but the sub-committee and the representatives of the company have been unable to agree on the compensation to be paid the city. Some time ago, when franchise matters were first considered, it was commonly the talk in Chicago that 20 per cent of the gross receipts should be turned over to the city. Others favored 4-cent fares in place of 20 per cent compensation to the city. The company, however, now maintains that with the investment which it is necessary to make and the limitation of the franchise to twenty years, 20 per cent, or even 10 per cent, would be excessive, and would not admit of a proper return on the investment and provide for depreciation.

The fact that the agreement will probably provide that the city can take over the property at the end of twenty years at an appraised valuation will make it necessary to provide more than is ordinarily done for depreciation. Under the present law all franchises must expire at the end of twenty years. At the end of that time all physical property of the company can be purchased by the city at an appraised valuation. The stockholders who invest their money to-day in new securities, as well as stockholders having money already invested, should therefore be paid back the full face value of their capital stock at the expiration of the franchise. To pay back these stockholders and to retire any bonds which may be issued the company will have at the end of twenty years only the amount which it can obtain by an appraised valuation of the physical property plus whatever sinking fund may have been established. The property, taken as a whole, must earn enough to return all the original investment at the expiration of the franchise. This means that not only ordinary depreciation must be taken care of, and that the physical condition of the property must be kept up, but that depreciation due to improvements in the art must be considered as well. While the appraised valuation may in theory give a return to the stockholders of nearly all they put into the property originally, in practice it never does, and the only safe course for the company would be to figure on getting only scrap value for its physical property at the end of the grant.

The question of compensation may ultimately be left to the entire body of the Council to decide. It is at least certain that the sub-committee on franchises will not decide it, but will leave it for the entire committee on local transportation to pass upon before reporting an ordinance to the Council.

Among the provisions of the ordinance proposed are these: that all rails hereafter laid in streets paved with asphalt, granite, brick or wooden blocks, shall be grooved rails, and that wherever a street occupied by rails of a different type shall be newly paved with any of the aforesaid materials, the company shall replace its girder-rails with grooved rails. All cars must have center aisles and be without running footboards along the sides.

Chicago Union Traction matters have made little progress. Another formal application for permits to substitute the trolley for the cable on certain lines has been filed. Judge Grosscup has heard the testimony of John Spry, who acted as middleman in the attempt of the minority stockholders last summer to secure \$100,000 to stop blocking a reorganization plan approved by the majority. Mr. Spry's testimony only served to bring out details as to the way the offer came to be made.

Attorney Levy Mayer, who represents the minority stockholders, has announced that he will file in the State Courts a supplemental bill attacking the right of the North and West Chicago Street Railroad Companies to enter into the reorganization leases. He did this in spite of the fact that Judge Grosscup, who has charge of the Chicago Union Traction Company, announced that he would consider it as an interference with his court.

Mayor Harrison has refused absolutely to grant any permits to put trolley wires over the present cable lines. The city authorities profess to believe that there is an attempt on the part of the Union Traction Company in asking these permits to secure rights which could be construed as permanent grants under the ninety-nine-year act, and then, having secured these grants, the company would make a fight on the ninety-nine-year act. Judge Grosscup, in reply to Mayor Harrison's charges that there is a trap in connection with these permits, has announced that there is nothing of the kind, and the permits were applied for by the receivers under the direction of the court.

Among other things, the Judge says: "This talk about a possible trap is nonsensical, because when two parties are trying to make an agreement, one cannot waive rights which he did not intend to waive. The city officials may make any reservation they desire in these permits, and thus pave the way for giving the public better transportation facilities."

REORGANIZATION OF THE WORCESTER SUBURBAN COMPANIES

A plan of reorganization of the Worcester & Southbridge Street Railway Company and the Worcester, Rochdale & Charlton Depot Street Railway Company, of Worcester, Mass., now in the hands of receivers, has been prepared by a committee of the stockholders at the request of the receivers. The plan contemplates the purchase of the property at the amusement park at Pinehurst, if it can be bought for \$24,000. It is not considered advisable to do anything with the Overlook Hotel property in Charlton. Both these latter properties were concerned in the failure of the street railways, and were placed in the hands of a receiver. The Southbridge & Sturbridge Street Railway, of which the report speaks, has been under the same control as the roads now under a receivership.

It is proposed by the stockholders to unite under a single management the Worcester & Southbridge, the Worcester & Rochdale Railways, the Pinehurst property, and the Southbridge & Sturbridge Street Railway Company, which now has a capital stock of \$60,000, bonds \$60,000 and floating debts of \$26,000, these three railways forming a continuous line of about 30 miles, and extending substantially from the City Hall in Worcester to Fiskdale mills in Southbridge, while the Pinehurst property, being conveniently located along this railway, will always be to its benefit in the matter of passenger traffic. To do this will require about \$131,000 in cash.

The stockholders propose to form a securities company with a capital stock of say \$850,000, of which, say, \$250,000 shall be 4 per cent non-cumulative, no voting power preferred stock, which shall be preferred as to dividends and division of assets up to par. The balance, \$600,000, shall be common stock. Of this, \$40,000 stock will be given to stockholders of the Rochdale road at par in exchange for the stock of that road; \$400,000 stock will be given to the stockholders of the Worcester & Southbridge road in exchange for \$500,000 stock, thereby reducing that company's stock by 1000 shares; \$60,000 stock will be given to stockholders of the Southbridge & Sturbridge road at par in exchange for the stock of that company; 1000 shares, which have already been underwritten, will be issued for cash. The company will thereby be provided with \$100,000 in cash to pay on account of the \$131,000 specified above. The remainder will be provided from sale of rails, accounts payable and cash on hand, which will leave a balance sufficient to provide also for the expenses of receivership, etc.

The securities company will hold a majority of the stock of the three companies, subject to underlying bonds of \$500,000 of the Worcester & Southbridge Street Railway, \$60,000 of the Southbridge & Sturbridge Street Railway and \$40,000 of the Worcester, Rochdale & Charlton Depot Street Railway, a total of \$600,000, with interest of \$27,300. A joint note of the three railway companies to an amount equal to the outstanding indebtedness of the Worcester & Southbridge Street Railway Company will be given to the securities company. The indebtedness is given as approximately \$930,000.

The securities company will issue twenty-year first mortgage collateral bonds, subject to call, to an amount equal to 75 per cent of the outstanding debts represented by said notes; said bonds to bear interest at the rate of 3 per cent for the first two years, 4 per cent for the next two years, and 5 per cent thereafter.

Said bonds will be secured by a mortgage to a trustee of the notes of the three railway companies as above specified, together with a controlling interest in the stock of the three railway companies and the Pinehurst property.

It is proposed to exchange the outstanding indebtedness of the Worcester & Southbridge Company for collateral bonds of the securities company to an amount equal to 75 per cent of the face value of such debts, and 25 per cent par value in the preferred stock of the securities company.

The estimated earning capacity of the properties it is proposed to unite is \$36,380, of which \$22,500 would be required for the payment of interest. The \$13,880 surplus is sufficient to pay 4 per cent on the preferred stock. The stockholders suggest that the prospective freight and express business to be carried on will add to the estimated earnings.

The report is signed by George W. Wells, Fred. Thayer, Calvin D. Paige, Samuel H. Colton and Edward S. Parker, all prominently identified with the affairs of the roads.

The receivers, John A. Hall and Charles M. Thayer, are proceeding with an examination of the affairs of the road. There has been talk of forged signatures of bonds. No definite action has been taken resulting from this.

EXCURSION AND MEETING OF THE ENGINEERS' CLUB OF PHILADELPHIA

Upon invitation, a large party, made up of members of the Engineers' Club, of Philadelphia, visited the works of the J. G. Brill Company, in that city, on the afternoon of Oct. 3. The representatives of the club were "personally conducted" through the plant by W. H. Heulings, Jr., who was subjected to a heavy fire of questions in every department. On completion of the inspection refreshments were served in the office of the company, and the visitors departed with a great deal of information as to the methods of manufacture and details of construction of all classes of trolley cars, including trucks.

At the regular meeting of the club, held the same evening, Mr. Heulings read a paper on the "Development of the Brill System of Trucks for Electric Motor Cars." During the Centennial Exposition several types of steam motor cars were put in use on the streets of Philadelphia. John A. Brill saw at that time that if cars were to be self-propelled, the motors would require a frame-work separate from that of the car body. The frame-work of the cars is required to be as light as possible, and would therefore be unable to withstand the vibrations and strainings of the motors. Before 1887 some cars had been built with the motors set upon the front platform or hung from the body, but the racking and straining very quickly shook the cars to pieces. The truck was the starting point of the mechanical success of electric motor-driven street cars. Mr. Heulings traced the successive development of the Brill system of truck, and stated that the right method of motor support was adopted for the first type of truck, and that this method of support is now in universal use. In the earlier forms of trucks the use of coil springs resulted in a bounding motion or oscillation of the car-body. It was discovered that this oscillation was caused by a rhythmic motion in the springs produced by the rail-joints, and the difficulty was obviated by introducing, in connection with the coils, slower acting elliptical springs. Later on the full elliptical springs were superseded by semi-elliptics which were slower acting. The correct principle in all truck building is to have the frame support the car body as nearly as possible over the points where they are themselves supported. The use of longer car bodies necessitated pivotal trucks, and the maximum-traction truck, consisting of a pair of ordinary-size driving wheels and a pair of pony wheels, was devised. In this truck the weight is eccentrically distributed so that the large wheels carry nearly all of the load, the pony wheels bearing just enough to enable them to guide on the track. A large part of the paper was devoted to the manufacture of the solid forged side frames, and the lantern slides generally referred to this part of the subject.

In the discussion which followed the paper it was stated that the large cars used in this city weigh about 32,000 lbs., while the heaviest car manufactured at this time is used on interurban railways, such as those of Detroit, and weighs about 86,000 lbs. An interurban car with 36-in. diameter wheels and solid forged truck recently made 10 miles in eight minutes' running. In answer to an inquiry, Mr. Heulings stated that they had found the best brake-shoe to be one of soft, gray iron with pieces of wrought iron let into the face.

After passing a vote of thanks to Mr. Heulings for his paper, and to the Brill Company for the courtesy shown the club in the tour of inspection, the meeting adjourned.

LABOR MATTERS ON THE CHICAGO CITY RAILWAY

The agreement between the union employees of the Chicago City Railway Company and that company expired on Oct. 1. Immediately following its expiration a committee of the union waited upon Robert McCulloch, general manager, presenting another agreement which they wish the company to sign. At the meeting between Mr. McCulloch and the committee the demands made in the agreement were firmly refused, mainly because the agreement proposed by the union provided only for the employment of union men, and practically took the management of the road out of the company's hands. The company has been very fair in its treatment of its men, and positions on the Chicago City Railway are recognized as very desirable. When an increase in wages was asked about eighteen months ago, the company granted as much increase as seemed possible under the circumstances; but the union refused to accept the company's offer, and stood out for the increase they originally asked. The whole matter was submitted to arbitration, and the proposition of the company was practically adopted in full by the arbitrators. The company has lived up to this agreement in good faith, but it is to be regretted that during the time the agreement has been in force, an unwarranted proportion of the general manager's time has been taken up in listening to complaints from committees of the union. In order that all the employees might understand the demands of the union and the position taken by the company (since only 100 men out of 2000 attended the meeting at which the demand was voted on), the company had printed and placed in the hands of every employee a pamphlet giving the demands of the organization, the company's answer, and the company's proposition.

The following is the contract proposed by the Amalgamated Association:

First.—The Company agrees to pay the following wage scale:

Electric men, sixty (60) days or more in the train service, to receive twenty-eight cents (28c.) per hour.

Electric men, less than sixty (60) days in the train service, to receive twenty-three cents (23c.) per hour.

All electric night car crews to receive the sum of two dollars and sixty-five cents (\$2.65) per night.

Gripmen and motormen operating mail cars to receive the same rate of wages as regular gripmen and motormen.

No train runs on the cable lines shall be paid less than two dollars and eighty cents (\$2.80) per day.

No trailer runs on the cable lines shall be paid less than two dollars and forty-nine cents (\$2.49) per day.

Supply and cinder car motormen to receive twenty-eight cents (28c.) per hour.

Supply and cinder car conductors to receive twenty cents (20c.) per hour.

Where men are required to work on snowplows or sweepers, or make extra trips after completion of day's work, they shall be paid at the rate of time and one-half. Time to be computed from reporting time until relieved from duty.

On cable and electric lines, it is agreed that there shall be no reduction in pay on account of blockades or loss of trips caused by any tie-up, and employees shall be allowed full pay that their runs call for under normal conditions.

This clause also to apply in cases where a trip is prevented being made by absence of one of the crew, or the company's inability to supply cars, or for other cause which prevents regular trips being made.

The work day of all motor repairers, car repairers, grip repairers, inspectors and dopers shall be nine (9) hours, excepting Sundays and holidays, which shall be eight (8) hours, for which they shall receive the present ten (10) hour pay.

New men employed as car repairers, motor repairers, grip repairers, inspectors and dopers shall be paid one dollar and ninety-two cents (\$1.92) per day for the first year; after one (1) year they shall receive the regular wage scale.

All car pushers, car cleaners, car couplers, lampmen, flagmen, gas clerks and towboys shall receive ten per cent (10%) over and above the present wage scale.

All members in the barn and mechanical service shall be paid at the rate of time and one-half for overtime.

Second.—In the matter of time-table schedules, the Company agrees as follows:

Excepting Sundays and holidays the work day of train service men shall be not less than ten (10) nor more than eleven (11) hours.

All Sunday runs to be straight.

All day runs to be ten (10) hours straight.

All day trippers to be completed inside of twelve (12) consecutive hours.

All common trippers to be completed inside of fifteen (15) consecutive hours.

All runs scheduled for less than ten (10) hours, excepting Sundays and holidays, to be paid for ten (10) hours.

No less than one-fourth of the runs on each line to be day cars.

No less than one-fourth of the runs on each line to be day trippers.

All night car runs to commence at midnight and finish not later than 6:30 a. m.

All runs classed as day trippers shall finish work not later than 8:00 p. m.

Trailer conductors on Cottage Grove avenue shall not be compelled to report Sundays as extra men.

Trainmen shall be allowed at least twenty-five minutes for meals.

Third.—Any grievances that may arise in the future that cannot be amicably adjusted between the properly accredited officers of the Company and the properly accredited officers of the Association shall be submitted to a temporary board of arbitration, to be selected in the following manner:

One arbitrator shall be chosen by the Company, and one by the representatives of the Association. The two arbitrators so chosen shall meet daily to select the third, and said three arbitrators so chosen shall then likewise meet daily for the purpose of adjusting said grievances, and the decision of a majority of said board submitted in writing to the railroad company and the Association shall be binding upon both parties.

In the event of the failure of either party to appoint their arbitrator within six (6) days after arbitration is decided upon, the party so failing shall forfeit its case.

Fourth.—All employees in the train and car house service to be members of the Association in good standing, and where new employees are hired in the future they shall be on probation for a period of 45 days. At the expiration of that time, if satisfactory to the parties hereto, they shall become members of the Association.

Fifth.—The properly accredited officers of the Company agree to meet and treat with the properly accredited officers and committees of this organization on all questions and grievances that may arise in the future.

Sixth.—The Company agrees that any member of this organization who has been unjustly suspended or discharged shall, upon reinstatement, be reimbursed for all time lost.

Seventh.—The Company agrees that officers and members of this organization shall be granted leave of absence on organization business when so requested.

Eighth.—The Company agrees that any member of this organization who now holds office, or who shall be elected to any office of said Association which requires his absence from the Company shall, upon his retirement from said office, be placed in his former position.

Ninth.—The Company agrees to maintain an adequate extra list in the train service at all times.

Tenth.—Members of this Association who are employed in the general shops shall be protected under this agreement.

Eleventh.—The Company shall place in the office at each car house of the respective lines an open book, in which the man can register the particular day or days on which they want to get off, and the men who register first for any particular day or days shall have first privilege; provided, however, that the executive board members and others having business to do for the Association shall be entitled to get off in preference to others. Said book shall be dated seven days ahead.

Twelfth.—All car repairers, motor repairers, grip repairers, inspectors, dopers, car pushers and car cleaners shall have the right to be absent from duty every other Sunday.

Thirteenth.—The Company agrees that any member of this organization who receives injury while in the performance of his duties shall receive free medical attendance and be paid for all time lost.

Fourteenth.—A suitable seat or rest shall be provided for motormen.

Fifteenth.—This agreement to be binding and in force beginning this _____ day of _____, 1903, up to and including the 31st day of May, 1905.

The company's reply to the foregoing propositions was as follows:

Gentlemen: The Chicago City Railway Company, in accordance with agreement, hereby makes answer to your proposition which was submitted on Thursday, September 24, 1903.

First.—The first clause in your proposition, consisting of 15 paragraphs, relates exclusively to an increase in wages.

This question was adjudicated a year ago by a board of arbitration which awarded substantial advances.

Manufacturing and steam transportation companies, and business concerns generally, have provided for increases in wages by advancing their rates and the prices of their commodities; the rate at which this Company must sell its product is fixed and it can make no such provision, but must provide for increase in expense solely through increase in business. All its increase in business has been more than absorbed by the increase in wages awarded a year ago, and there is nothing in the financial affairs or condition of the Company to justify or warrant or allow a further increase in wages.

Second.—The second clause of 12 paragraphs provides for an arrangement of time-tables considering only the convenience of the men operating the cars.

Whilst the Company desires to make its work as agreeable as possible to its employees, it has assumed and owes a higher duty to the public—that of operating its cars as will best provide transportation at such time and in such manner as their going and coming shall require—and it cannot enter into any agreement that would hamper or restrict it in the performance of this duty, or which would at any time hinder it in holding the convenience and accommodation of the traveling public as a sole guidance in time-table arrangement.

During the past year time-tables were made for several lines in compliance with findings of arbitrators whose conclusions were the result of your suggestions. When these tables were posted for use the men in interest invariably petitioned for the retention of the old tables, showing conclusively that the present plan on which the tables are arranged is as satisfactory as any that can be devised.

Third.—The third clause of 3 paragraphs provides for arbitration, to which the Company assents, except that it will not assume responsibility for the required daily meetings of either the two first arbitrators, or the three.

When the arbitrators are selected, they claim and exercise the right to regulate their own meetings.

Past experiences have demonstrated that the Company and its one representative on the board have always been ready for daily meetings, the delays and continuances having invariably been in deference to your representative. It is suggested that the word "daily," which is used twice, be stricken out, and the clause is acceptable to the Company.

Fourth.—The fourth clause gives your Association complete and absolute control of the selection, employment, retention in service, and discipline of all employees.

Under prevailing laws and customs, the Company is responsible and liable to the public for the acts of its employees whilst on duty, and, precedent to any discussion of this clause, your Association must give the Company ample and acceptable security that it can and will assume and take care of said responsibility and liability of the Company to the public, since it proposes to assume the absolute control of the selection, employment, retention in service and discipline of all employees.

Fifth.—To the fifth clause the Company makes no objection.

Sixth.—As to the sixth clause, the Company will not unjustly suspend or discharge any man.

Seventh.—The seventh clause provides for leave of absence without restriction or limitation, for all of your members.

Men are employed for the performance of specific duties, and the performance of these duties must have precedence over all personal or Association engagements.

There will be no objection to granting such leaves of absence as do not cripple the Company in its service to the public.

Eighth.—The Company assents to the eighth clause, provided the member in his absence from the Company's service is not guilty of acts which disqualify him for said service.

Ninth.—The Company endeavors at all times to maintain an adequate extra list.

Tenth.—The tenth clause is vague and indefinite and cannot be intelligently answered.

Eleventh.—Your request that men who apply first shall have first privilege of lay-off, is fair and satisfactory to the Company, but the Company cannot otherwise discriminate, and members of your executive board must arrange with their fellow-workmen for a waiver of claim for precedence, when they do not hold such precedence by reason of priority of application.

Twelfth.—The requirement of this clause is already a custom, and there is no objection to its continuance under the same conditions now prevailing.

Thirteenth.—The Company will not undertake so extensive an insurance scheme as the thirteenth clause provides for.

Fourteenth.—The Company will take pleasure in surrounding the performance of duty with all the comforts possible, but to seat the motorman would be to place him in a position where his opportunity to observe danger and his promptness of action to

avert it, would both be greatly impaired, and doing so would be almost criminal, unless we approach much nearer to immunity from accident and collision than is indicated by past or present happenings.

The contract proposed by the company was as follows:

First.—That the Chicago City Railway Company makes no opposition to its employees being members of the Amalgamated Association of Street and Electric Railway Employees of America, and that there shall be no discrimination or distinction on either side for or against men who belong to the union, or men who do not choose to belong to it, but all employees are at liberty to exercise their pleasure in the matter.

Second.—The general plan of operation of cars, hours of work and rates of wages now prevailing shall be continued through the term of this agreement.

Third.—The Company will meet and treat with the committees of the organization on all questions or grievances not herein provided for that may arise during the term of this agreement.

Fourth.—It is mutually agreed that all questions at issue between the Company and the Association, which cannot be settled through action under the preceding section, shall be referred to a board of arbitration composed of three persons to be selected as follows: The Company shall select one, the Association one, and the two thus chosen shall select a third, and the findings of said board on all questions submitted to them by either or both parties, when reported in writing, shall be binding on both parties, and, pending the appointment of the board of arbitration, and their decision on any matter submitted to them, there shall be no cessation of work, no disturbance of existing conditions, and no strike. Each board of arbitration, appointed as above, having made final reports, shall cease to exist.

Fifth.—This agreement shall be binding on both parties and continue in force to the 1st day of January, 1905.

At a meeting held October 10, members of the union voted to again present their demands to the management of the company. In case the demands are refused, the matter of a strike will be submitted to a vote of all the employees who are members of the union.

On October 12 a committee of the union, headed by Organizer Pratt, again presented the demands to the management, and of course were firmly refused, as the company took a firm stand on the main points at issue, viz.: the right to hire either union or non-union men and the right to manage its men rather than turn their management and discipline over to the union.

NEW ROAD IN INDIANA

The Indiana & Northern Traction Company has recently been organized, with \$500,000 of 5 per cent gold bonds and \$500,000 of common stock, to construct a line about 20 miles in length between Marion and Wabash, Ind. The officers of the company are: President, Jilson J. Coleman, of New York; vice-president, R. E. Breed, of Marion; secretary and treasurer, Edward Hunt, of Trenton, N. J.; chief engineer and general manager, Henry F. Coleman, of Philadelphia. The directors are the president, vice-president, general manager, John C. Calhoun, of New York, and Hon. Frederick S. Ketchenbach, of Trenton. The Trenton Trust & Safe Deposit Company is the trustee of the mortgage. The financial arrangements of the road have been entirely completed and the contract has been let to J. G. White & Company, of New York. The grading contracts have been sublet, work has been commenced, and it is expected that the grading will be completed by December 20. Track laying will be begun as soon as the spring opens and it is expected that the road will be in operation by June 20, 1904. The line will be built for high speed and constructed entirely over its own private right of way, on steam railroad methods. A speed of 50 miles an hour is expected.

The Blue Island, Riverdale & Hammond Street Railway Company, with offices in Chicago, Ill., and Oklahoma City, Okla., has been chartered in Guthrie, Okla. The purpose of the corporation is to construct a line of street railway from West Pullman, Cook County, Ill., south through Harvey, Phoenix, South Holland, Calumet, Thornton, Chicago Heights, Steger, Crete, thence in a westerly direction to Joliet, Ill. A cross line from Blue Island easterly through Calumet, Riverdale, Dalton, thence in a north-easterly direction through Thornton, West Hammond, and a line from Tinley Park in an easterly direction through Hammond to Thornton and Lansing. The estimated length of the road is 60 miles and estimated cost \$1,500,000. The capital stock is \$15,000,000. The incorporators are W. R. Owen, A. W. Miller, J. F. Noel, T. J. Owen, W. S. McCaul, Frank E. White, of Chicago, W. F. Harn, W. F. McMecham and John Treadgil, of Oklahoma City.

INTERURBAN STATION AT CLEVELAND

After several months of discussion, it is announced that arrangements have been completed between the City Council and the electric railways for the erection on the Public Square of a waiting room for interurban passengers. The plan was proposed by the Cleveland Electric Railway, and provides that that company shall pay two-sevenths and the five interurban companies one-seventh each, toward the cost of construction. The city furnishes the land and is to maintain the building. It will be located on the southwest corner of the square, and will be of ornate design with a wide roof, which will extend over the cars so as to shelter the passengers. The waiting room will be a large apartment with toilet rooms accessory.

SAN FRANCISCO ARBITRATION COMMISSION HOLDS SESSION IN NEW YORK

The commission sitting in the arbitration proceedings between the United Railways of San Francisco and its employees embraced in Division 205 of the Amalgamated Association of Street Railway Employees, held a brief session in New York on Monday, October 12, and after fixing the time for the filing of written argument adjourned until Tuesday, October 20. The commission is composed of Patrick Calhoun, of New York, nominated by the company; W. D. Mahon, of Detroit, international president of the Amalgamated Association of Street Railway Employees of America, named by the employees, and Oscar Straus, of New York, formerly United States Minister to Turkey, selected by both. The question to be arbitrated is that of wages, the employees asking a wage scale of 33 1-3 cents per hour for a 9-hour day. Testimony covering an exhaustive inquiry into the cost of living in San Francisco and elsewhere, wages of street railway employees in other cities and wages of other trades in San Francisco has been taken before a commissioner in San Francisco. Congressman E. J. Livernash, of California, appeared for the employees and A. A. Moore for the company.

ORDER FOR REGISTERS IN ST. LOUIS

The Security Register Company, of St. Louis, Mo., has just closed an order for 1000 registers with the St. Louis Transit Company, to be used on the new cars which the St. Louis company is having built for the World's Fair traffic. The order was the result of a competitive test conducted by the St. Louis Transit Company of several different types of registers, and it is probably the largest single order which has ever been given for registers. It was closed by Jilson J. Coleman, of New York, for the Security Register Company.

TOM JOHNSON'S POLITICAL METHODS

An Ohio newspaper writer, who is evidently untouched by the serio-comic campaign now being waged in that State, makes some very interesting comments on the situation, which will be appreciated by street railway men:

"Away off to the southeast somewhere a machine is going chug-chug and a man is going puff-puff. The combination is that of Tom Loftin Johnson and his "Red Devil" automobile. Machine and man are making a hard time of it in spectacular campaign. Being a spectacular man, Johnson draws the attention particularly of the world outside of Ohio. Within the State he is a twice-told tale. The curiosity to see him is not as great as it was last year.

"The crowds that turn out to hear him are large—very large. W. S. Cappeller, who managed Senator Foraker's two successful gubernatorial campaigns, while talking about the large crowds Johnson is calling forth, remarked:

"Johnson is not a man of facts, but of fads. He preaches home rule and meddles everywhere. He advocates a single tax, but has to be sued in the Cleveland County courts for the taxes he tried to dodge. He advocates a 3-cent fare for street cars, but when he controlled two-thirds of the mileage in Cleveland eleven tickets for half a dollar were considered by him as cheap fare. On his Johnstown, Pa., line the fare was 5 cents straight."

Do you ever stop to think what a string of people would be walking into the office to report you if you were a street car conductor?—Atchison Globe.

NEW LAKE SHORE SCHEDULE

The Lake Shore Electric Railway has announced a new winter schedule. For some weeks past cars have been operated out of Cleveland on half-hourly headway, one car running through to Toledo, and the next going to Sandusky. For the winter there will be half-hourly headway to Lorain, and the cars on the even hour will run through to Sandusky. These cars will be met at Ceylon Junction by cars for Toledo, making it necessary for Toledo passengers to change. The plan will keep down the mileage of the cars, and will obviate the long run of 119 miles. To provide a better service for through traffic the company has announced three limited cars, which will run through from Cleveland to Toledo, making stops only in the larger towns. These cars will leave Cleveland at 7:30 a. m., 1:30 p. m., and 6:30 p. m. They will make the run in four hours and forty-five minutes, whereas the regular cars take six hours. The company has abandoned the freight business on the Toledo end of the system, and the service of the Electric Package Company has been extended through to Toledo. The new express cars have a schedule of seven hours, and stop in all towns to load and unload goods.

IMPORTANT PROJECT FOR CINCINNATI

Application for a charter has been made for a company to be known as the Cincinnati Rapid Transit Railroad Company. The project embraces an elevated railroad and subway from the neighborhood of Fountain Square, in the heart of Cincinnati, to Walnut Hills, and connecting with Avondale, Norwood and other suburbs. The application for a charter is made under the steam railroad laws, and it is desired to haul freight trains as well as passenger, and to use electricity as motive power. The company will build on a private right of way, some of which it expects to have to condemn. Three routes to Norwood are under consideration, and it is quite probable that entrance to the heart of the city will be made by subway. One of the chief aims of the company will be to bring into the city a number of the interurban roads which now enter over the surface lines, incurring great loss of time. The promoters of the project are men of prominence in Cincinnati, among them being: M. E. Ingalls, president of the Big Four Railroad and the Merchants' National Bank; J. G. Schmidlapp, president of the Union Savings Bank and Trust Company; August Herrmann, president of the Board of Waterworks Commissioners; Henry Burkhold, of the Franklin National Bank; William H. Alms, of Alms & Doepke Company; Casper H. Rowe, vice-president of the Market National Bank; A. V. Voorheis, vice-president of the Union Savings Bank and Trust Company, and the German National Bank. W. E. Baker, of New York, is preparing plans for a report on the proposition.

CHATTANOOGA RAILWAY PARK

The Chattanooga Electric Railway Company, which controls Olympia Park, Chattanooga, Tenn., is now preparing plans for extensive improvements of that pleasure ground. When the alterations are completed Chattanooga will have, through the liberality of the railway company, one of the finest parks in the South.

The park is only two years old, but has already attained great popularity. The theater opened last year was used to present popular plays and high-class variety at reasonable figures, and was so liberally patronized that the coming season will find the seating capacity doubled and the stage enlarged.

The ground, though purchased at a high figure, required considerable attention, and has been beautified by the cultivation of blue grass and flowers. One of the most popular features is a fine race track, the use of which the company has always permitted for nothing. The park gates are always open to the public, and numerous regular policemen are on hand to protect women and children in case of need.

One of the changes contemplates the construction inside the race track of a large lake for boating and swimming. A skating rink is to be built around the present dancing pavilion, and a roller-coaster will also be installed.

Negotiations are pending for the establishment of a new baseball park inside of the main park. The Chattanooga Electric Railway Company states that if Chattanooga is represented next year by a team in the Southern Baseball League a park will be built free of charge.

Owing to the great initial expenses incurred in creating this park, the profits have been quite small. There is little doubt, however, that they will not only increase in future, but that the good will of the Chattanooga public will prove of even greater benefit to the company.

CHANGES IN THE CINCINNATI, DAYTON & TOLEDO TRACTION COMPANY

At a meeting of the stockholders of the Cincinnati, Dayton & Toledo Traction Company, held last month, it transpired that control of the property had passed from the Mandelbaum syndicate to interests identified with the Cincinnati Traction Company, and displacements were made both in the officers and directors, so that the new interests might be well represented. Conferences were held between the two interests before the meeting, and the following ticket of directors was finally named and elected: George B. Cox, W. Kesley Schoepf, J. Benson Foraker, Jr., C. C. Richardson, Claude Ashbrook and Louis A. Ireton, of Cincinnati; M. J. Mandelbaum and H. C. Lang, of Cleveland; W. C. Sheppard, of Hamilton. Immediately after the stockholders' meeting the directors met and organized by electing the following officers: George B. Cox, president; W. Kesley Schoepf, first vice-president; C. C. Richardson, second vice-president; J. Benson Foraker, Jr., secretary and treasurer; F. C. Williams, assistant secretary and assistant treasurer. F. J. J. Sloat, the present general manager of the road, was re-elected to the same position. His salary was raised, and the new board complimented him on the showing he had made in the operation of the property. W. J. Boyer was re-elected auditor. The operating office of the company will be continued at Hamilton, but the general headquarters of the company will be changed from Cleveland to Cincinnati. The directors organized an executive committee consisting of W. Kesley Schoepf and C. C. Richardson. Mr. Schoepf was made chairman of this committee.

EXTENSIONS TO SOUTH AMERICAN AND EUROPEAN ROADS

Considerable extensions are to be made to South American and European electric traction systems whose initial power-house and rolling-stock equipment is largely of United States manufacture. One of the roads referred to is operated by La Capital Tramways Company, Ltd., a British capitalized concern in Buenos Aires, Argentine Republic. The head offices of the company are in London. The purchasing agent, Hugh R. Parrish, is located in New York, in the Havemeyer Building.

The Lisbon Electric Tramway Company, Ltd., which operates the only electric traction system in Portugal, is also about to construct additional lines. The company is controlled by the London financial house of Werner, Beit & Company. W. J. Clark, one of the Werner-Beit electrical experts, is now general manager of the road, W. B. Rommel having resigned. The American purchasing agent is the Elmer P. Morris Company, of New York.

INDIANAPOLIS AS AN INTERURBAN CENTER

The Indianapolis "News" calls attention to the growth of Indianapolis as an interurban center in a way that is very convincing:

"At this time 117 interurban passenger trains, operating on regular schedules, are coming into Indianapolis daily, and 117 are going out of the city. Within ten days at the most 18 trains in and another 18 trains out, daily, will be added by opening the Lebanon-Frankfort line, and opening service on the part of the new Noblesville-Tipton-Logansport-Peru line in October or November will add another 18 trains or 20 trains each way. It is safe to predict that before the year is completed there will be 155 cars coming into and 155 going out of Indianapolis on regular daily schedules. When this number is attained it will remain practically stationary, at least until next spring, when Charles L. Henry will open the Indianapolis-Cincinnati line as far as Rushville, and another 18 trains or 20 trains will be added. The Union Traction Company may also increase the number by adding a number of limited trains. Besides these regular trains the Greenfield line and several others operate half-hour cars on Saturdays and Sundays. Freight cars are not included in the count. The number of cars operated in and out of Indianapolis daily by the different roads is: The Union Traction, 26 in 26 out; Indianapolis & Eastern (Greenfield line), 18 in 18 out; Indianapolis, Greenwood & Franklin, 18 in 18 out; Indianapolis & Martinsville Rapid Transit, 19 in 19 out; Indianapolis & Plainfield, 18 in 18 out; Indianapolis, Shelbyville & Southeastern, 18 in 18 out. These six companies operate 281 miles of road running out of Indianapolis, while their connections—such as the Indianapolis & Eastern's connection at Dublin into Richmond, Dayton and Columbus (Ohio), and the Union Traction's connections—would increase the mileage several hundred miles.

HOLD-UP MEN SHOT AT AURORA

Three masked men held up a Riverview Park car southwest of Aurora, Ill., on the lines of the Elgin, Aurora & Southern Traction Company, the evening of Oct. 8. No one was on the car but the motorman and conductor, and only \$7 was obtained. The bandits were later discovered by police officers on an Aurora, Elgin & Chicago car, which was just leaving Aurora for Chicago. A battle ensued between the officers and the three bandits, which resulted in one of the latter being killed and the others wounded. It is thought that the bandits intended to hold up the Yorkville interurban car, which is usually crowded, instead of the local car, which had only the conductor and motorman.

REPORT OF THE CAMP BAY COMPANY

The report of the directors for the period ended December 31 last states that the final section of the Camps Bay Tramway Company, Limited (namely, the Kloof line), extending from the terminus of the Cape Town Tramway Company's system in Burnside road down to Camps Bay, was opened on November 10, 1902, thus completing the tramway system as originally designed. The total length of track now in operation is about 9½ miles, and while the directors look forward to a permanent increase in the traffic and receipts as the development in both the Oranjezicht Estates and the Cape Marine Suburbs proceeds, they have thought it advisable, during such period of development, to grant to the Cape Electric Tramways, Ltd., a lease of this company's tramways for three years from January 1, 1903, on mutually advantageous terms. The profit and loss account shows a credit balance of £873.

THE ELECTRIC RAILWAY IN GERMANY

According to United States Consul Harris, at Mannheim, Germany, recently published figures place the total number of miles of electric car lines in Germany at 2117. "Considering the area and population of the Empire," the Consul says, "these figures show a comparatively slow development of this branch of railway building—this, too, in spite of the fact that in electric lighting and in other applications of electricity Germany has taken advanced rank. The cause of this backwardness, says Mr. Harris, "is to be sought mainly in the fact of State ownership of the larger part of the existing steam railways and the unwillingness on the part of city and other authorities to grant charters to private companies. Local and suburban travel is heavy, but is as yet carried mainly by steam railway lines, often of cheap construction."

The Grand Duchy of Baden, a small part of the Empire, has an area slightly larger than that of the State of Connecticut, with a population somewhat more than twice as great. In 1900 it had five cities of upward of 40,000 population, namely, Mannheim, Karlsruhe, Freiburg, Pforzheim, and Heidelberg. There were in 1900 fourteen cities of upward of 10,000 population. The State includes a thickly settled portion of the Rhine Valley about 160 miles long, with an average width of 10 miles, which would seem to be a specially good field for electric railway lines. And yet at present electric lines are in operation only in or near the following cities:

	Length of line. Miles.
Mannheim (including Ludwigshafen extension).....	25
Carlsruhe (including line to Durlach).....	9
Heidelberg (including Heidelberg-Wiesloch line)....	11½
Freiburg	8

In each case the same track is used in part by the cars of several lines. Thus the total track length of the Mannheim city and suburban lines is 14 miles.

The city of Kehl, Baden, is connected with Strassburg by a branch of the Strassburg city lines, but does not operate an independent line. Of the above lines, each belongs to the respective city except in the case of the Heidelberg city lines, which are operated by a private corporation, the city being the owner of three-quarters of the capital stock.

The fare charged varies with the distance, long rides and transfers on a single fare not being permitted to the extent they are in the United States. The fare for ordinary distances is 10 pfennigs (2½ cents), tickets good for twenty-five rides being sold for 2 marks (48 cents).

Of the lines now in operation in Baden only two can be said to be interurban lines—a line of about 9 miles from Heidelberg to Wiesloch and a somewhat shorter line from Karlsruhe to Durlach.

NEW PUBLICATIONS

Engineering Preliminaries for an Interurban Electric Railway. By Ernest Gonzenbach; 71 pages, illustrated. Price, \$1. Published by the McGraw Publishing Company, New York.

This is not a general treatise on electric railroad engineering, but is based upon a specific case, and relates the measures taken and the reasons which influenced the adoption of the plans described. The work should command the attention of engineers and investors who may be interested in similar projects, for while the conditions confronting them will doubtless vary in some particulars, the general line of investigation pursued by the author as a preliminary to his report on the enterprise he describes will serve as a guide or suggestion for the general line of inquiry to be followed.

A number of practical features of construction and equipment are discussed, including the relative merits of the overhead trolley and third rail, and the reasons why the latter is growing in favor are clearly pointed out. The necessity for securing a private right of way is emphasized, especially where it is proposed to operate at high speed, and in competition with steam lines. In road-bed and track, Mr. Gonzenbach is conservative, and he looks with disfavor upon the tendency to follow steam roads in determining the weight of rail to be laid, as he points out that the conditions of service differ materially. In the selection of rolling stock and electrical equipment for cars many valuable suggestions are offered that have a general application. The advantages of establishing car shops early in the work are enumerated by the author, and these views are now being accepted generally by those who are engaged in this class of construction. "Power Stations," "Transmission Line" and "Distribution System" are headings under which the author advances some ideas based upon his experience, that are a departure from the practice generally followed, but on the whole they commend themselves as sound in theory, and many of them have proved successful when given a fair trial in commercial service. This is particularly noticeable in the matter of sub-stations. Mr. Gonzenbach recommends small stations, located at comparatively short distances, and equipped as simply as possible, so that the expense of attendance may be kept down. The sub-station building could also be used for a passenger and freight depot, and dwelling for the attendant, and the local agent could care for the station equipment when designed along the lines suggested. A competent man could have general supervision of the electrical system, and he should inspect the apparatus daily in all sub-stations, thus making it unnecessary to keep experts at the several points of distribution. The estimates regarding the cost of construction and equipment will be found to be conservative, yet they undoubtedly make ample provision for a road of the character considered, and it is for the guidance and instruction of men who may become interested in similar properties that these papers were originally written. The practice here outlined is not advocated for large interurban properties, where it is proposed to furnish service on a par with the more important steam trunk lines, but more particularly for the rapidly growing class which has done so much toward the development of sections in the West, which have not enjoyed the advantages of older communities.

Friction and Lubrication, a handbook, by William M. Davis; 225 pages, illustrated. Price, \$2.00. Published by the Lubrication Publishing Company, Pittsburg, Pa.

The author was for over ten years in the employ of a large oil refining company as mechanical expert, looking after tests and complaints, making experiments, etc., and is now in the employ of a large steel manufacturing company as oil inspector, and in charge of the lubrication of the engines and machinery at its numerous plants. He is, therefore, well qualified to discuss this subject, and his book will be found of interest to engineers, mechanics, superintendents and managers. Mr. Davis first discusses the general subject of friction, friction losses and the theory of lubrication. He then gives a chapter to the testing of oils for viscosity, the flash and fire test, specific gravity, etc., and follows this with a discussion of lubricating appliances and their care, and special chapters on common faults in lubrication and the lubrication of different classes of machinery. He points out that the object of lubrication being to reduce friction and heat, test will tell immediately whether this result is being realized, and believes that some large engine builders will equip the main bearings of their engines with thermometers, so that the temperature can be noted. He also points out that the best lubricant for a bearing, under normal conditions, may not do so well when heat commences, as a viscous oil, such as cylinder oil, which becomes thin and limpid at high temperatures without burning. His chapters on the care of lubricators and common troubles in lubrication are extremely interesting and valuable. One chapter is devoted to the

lubrication of street railway cars. He explains that grease has been used quite largely on electric car journals, but with the advent of the heavier car, running long distances at high speed, there is a tendency now to the use of oil, although grease is still used largely on motor bearings for the reason that owing to the close proximity of the armature the oil would get on the coil and injure the insulation.

Trust Companies of the United States. Compiled by the Audit Company, of New York. 228 pages; price, \$2.00. Published by the United States Mortgage & Trust Company, New York.

This volume contains statements from upwards of 1100 trust companies throughout the country, and consequently comprises a collection of facts which will be of interest to the entire financial public. These statements are compactly arranged and in the main show, in concise form, the condition of the companies on June 30, 1903. This, of course, eliminates the new companies formed during the last year, but aside from these the work is practically a complete summary of the conditions of these institutions, and the data presented comprises a very complete review of the financial condition and personnel of the trust companies of the country at the present time. The publishers claim, and apparently with reason, that nothing so comprehensive has ever been published in behalf of American trust companies. It is expected that the book will be widely consulted now, but its particular usefulness, it is pointed out, will be as a means of comparison with future statements of conditions, changes in personnel and other facts not hitherto obtainable for lack of complete facts and figures regarding trust companies.

The Financial Red Book of America for 1903. 388 pages; price, \$10.00. Published by the Financial Directory Association, New York.

The publishers announce their purpose of presenting a comprehensive, complete and reliable directory of the men and women in the United States who are estimated to be worth \$300,000 or more, including the leading financiers, industrial magnates, retired men of fortune, women of independent means, managers and executors of large unsettled estates, and others who fill stations of marked financial responsibility. The list is classified according to States in their alphabetical order and again subdivided in cities. Naturally the greatest number of persons coming within this classification are found in the larger Eastern cities, but it is worthy of mention that every State in the Union has its representatives in this volume. The minor cities and towns included are numerous, and it is evident that a considerable number of people of wealth maintain their homes far distant from the great centers of population. The publishers have gone to great trouble to make the work accurate in every particular, and in this they have received the co-operation of many prominent banking houses throughout the country.

Railroad Curves and Earthworks. By C. Frank Allen. Third edition, 200 pages. Illustrated; price, \$2.00. Published by Spon & Chamberlain, New York.

This book was originally written for students in engineering colleges, and consequently much of the material is similar to that found in other field books, as it covers the same ground in the conventional manner of such treatises. But since its first appearance in 1899 much additional matter has been inserted, and in the third edition an entire new chapter on the spiral easement curve has been substituted for the former data. The treatment of this subject is new in detail. Additional matter has been added to chapters on other special features, particularly that on "Special Problems in Earthwork." Although prepared originally for students, the work has been found of great value by engineers in practice and has been received with general favor.

Field and Office Tables, Especially Applicable to Railroads. By C. Frank Allen. 293 pages; price, \$2.00. Published by Spon & Chamberlain, New York.

This work comprises convenient tables for easement curves and for earthwork computation, including the "Cubic Spiral" easement curve, also the "Offsets from tangents for a 10-deg. curve," and "Angles proportionate to squares of distances." The two latter are especially applicable to easement curves, and they allow the rapid and simple working of spirals of any length or for any setoff from the tangent. The tables for earthwork computation, especially those for regular three-level sections and for prismoidal correction, are based upon tables used for computing the earthwork in actual practice on a prominent Western railroad, and that for triangular prisms is similar in principle to that for prismoidal correction. There are a number of new features in this work, including tables seldom found in books suitable for field use. An explanation of tables is also printed, and it forms a very valuable feature.

MEXICAN CAR BUILDING PLANT

Construction work is about to begin on an extensive car building plant to be erected in Mexico City by the Mexican Car & Foundry Company, in which Isaac M. Hutchinson, of Mexico City, who represents the St. Louis Car Company and other prominent American manufacturing concerns, is the leading spirit. The initial capacity of the plant will be twenty cars per day. Later on electric cars will be built at the rate of a score monthly. The plant will be electrically operated. An independent power equipment will be installed. Contracts will be awarded within the next three weeks for a 500-hp plant. The equipment, including machine tools, etc., will involve an expenditure of about \$100,000.

STREET RAILWAY PATENTS

UNITED STATES PATENTS ISSUED OCT. 6, 1903

[This department is conducted by W. A. Rosenbaum, patent attorney, Room No. 1203-7 Nassau-Beekman Building, New York.]

740,558. Adjustable Truck Wheel; William E. Hamilton, Zanesville, Ohio. App. filed Jan. 17, 1903. The axle of one pair of wheels is adapted to slide toward and away from the other pair in ways in the truck-frame by means of racks and pinions, to thereby shorten or lengthen the wheel-base.

740,572. Snow-Plow; Fred Kiefer, Priceburg, and Charles Freeman, Scranton, Pa. App. filed Jan. 31, 1903. Blades are hinged to the wings of the plow and held in place by springs, which permit of their yielding when abnormal pressure is reached, thereby obviating disabbling of the device. The blades, after riding over the unyielding obstruction, spring back to normal position.

740,577. Trolley Pole; Joseph F. Mackin, Columbus, Ohio. App. filed April 25, 1903. The trolley pole consists of a frame in the shape of a parallel ruler, which permits the trolley-wheel to remain at all times in a vertical plane.

740,707. Trolley; Bruno Stenvall, New York, N. Y. App. filed March 21, 1903. The trolley pole is made up of two rods, carrying two horizontally arranged wheels, and is pivoted to the base and to the wheel-frame in such a manner as always to maintain the axis of the wheel in the same horizontal plane.

740,792. Attachment for Street Car Hand-Straps; Charles Andrews, Chicago, Ill. App. filed March 2, 1903. An auxiliary handle suspended from a cord wound upon a spring-winding roller, which is mounted upon the usual hand strap.

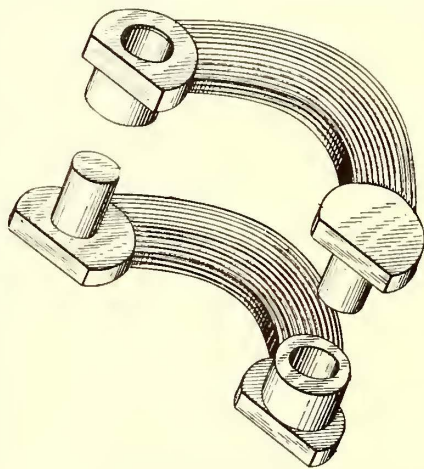
740,851. Track Sweeper; Bennard Hemann, Belleville, Ill. App. filed March 11, 1903. Brushes mounted adjacent to the rails on a shaft in a yielding frame and caused to rotate by means of an endless chain connection, with a shaft having friction pulleys engaging the car wheels.

740,860. Brake Mechanism for Cars; William S. Howland, Old Saybrook, Conn. App. filed May 26, 1903. The brake-shoes are applied by springs and held out of operative position by tension devices controlled by the motorman.

740,912. Rail-Bond; Louis Pfingst, Dorchester, Mass. App. filed July 16, 1902. A double bond having their respective ends connected together through two openings in the web of the rail.

740,929. Closure for Street Cars; Charles S. Sapp, Wilmington, Del. App. filed May 9, 1903. A double curtain for open cars, one part passing upward and the other downward when opened, the upper curtain having a sash of glass.

740,985. Street Car Fender; Emil Melzer, Zella, St. Blasch, Germany. App. filed Jan. 12, 1903. Details.



PATENT NO. 740,912

PERSONAL MENTION

MR. RICHARD C. SWING, superintendent of the Cincinnati & Columbus Traction Company, of Cincinnati, Ohio, was married last week to Miss Susanna Isham, of Mt. Auburn, Ohio.

MR. H. H. VREELAND, president of the Interurban Street Railway Company, of New York, has started the fund for the erection of a laboratory for the department of railway engineering of Sibley College, Cornell University, with a gift of \$1,000.

MR. ROBERT SCOTT, who has for two years been superintendent of the Muncie Belt Railway Company, Muncie, Ind., has tendered his resignation and gone to Chicago to accept the position of superintendent of the Indiana Harbor Railroad Company.

MR. ELLIS BARTHOLOMEW, president of the Toledo, Columbus, Springfield & Cincinnati Traction Company, was married Sept. 13, at Toledo, to Miss M. A. Armbruster, of that city. News of his marriage was not known to Mr. Bartholomew's closest personal friends until a few days ago.

MR. FRANK J. GOULD, of New York, first vice-president of the Virginia Passenger & Power Company, of Richmond, Va., and his sister Miss Helen Gould have given the local branch of the Street Railway Young Men's Christian Association at Richmond \$5,000, which it is proposed to apply to the improvement and equipment of a clubhouse for the employees of the company.

MR. J. M. MERRILL, for the past two years superintendent of the Ohio Central Traction Company, has been made auditor of the Western Ohio Railway, succeeding Mr. Charles Thrasher, who is general manager of the New York & Long Island Traction Company, of Mincola, N. Y. All of the properties mentioned are controlled by the Pomeroy-Mandelbaum interests, of Cleveland.

MR. JOHN TEEGARDEN, superintendent of the Lima Electric Railway & Light Company, of Lima, O., was married a few evenings ago to Miss Lucy Cardiff, of Atchison, Kan. The employees of the company turned out in two decorated special cars, and headed by a band, tendered the couple a rousing surprise. They presented the bride and groom with a number of articles that will be especially serviceable in their home.

MR. THOMAS P. SWIN, the secretary-treasurer of the Brooklyn City Railroad Company, died Thursday, Oct. 8, at his home in Brooklyn, in the 46th year of his age. Mr. Swin entered the employ of the Brooklyn company as a messenger boy and went through various grades to the secretaryship, which he has held for the past nine years, succeeding Secretary Thompson, to whom he was first an assistant. He is survived by a wife and two children.

SOME CHANGES are announced in the personnel of the Boston Elevated Railway. Mr. Geo. S. Lawler has been appointed superintendent of power distribution. On the elevated division Mr. Harry M. Seward has been appointed to succeed Mr. Frank C. Stowell, resigned; Mr. Frederick P. Wyman has been appointed chief train dispatcher, to succeed Mr. Fred. H. Orr, resigned; and Mr. James G. Mabee has been appointed second train dispatcher.

MR. J. S. BADGER, general manager of the Brisbane Tramways, of Brisbane, Queensland, passed through New York last week on his return to Australia. Mr. Badger attended the convention of the American Street Railway Association in Saratoga last September, since which time he has visited London, at which city the head office of the Brisbane Tramway Company is located. Mr. Badger expects to sail for Australia about the middle of November, and will reach home about the middle of the following month.

MR. J. W. SMITH has left the employ of the Jersey Central Traction Company to become superintendent of the Schuylkill Traction Company, of Girardville, Pa. Mr. Smith was born in Illinois in 1871, spent his boyhood at Newburgh, N. Y., and graduated from Cornell University in 1893. After working for some time in Philadelphia he accepted a position with the General Electric Company at Schenectady. He was engineer and superintendent of the Fairmount Park Transportation Company, of Philadelphia, for about six years, and resigned that position to act as constructing engineer for the Jersey Central Traction Company.

MR. WALTER H. MANSFIELD has been appointed general manager of the Keeseville, Ausable Chasm & Lake Champlain Railroad Company, of Keeseville, N. Y. Mr. Mansfield was for five years assistant roadmaster of the West End Street Railway, of Boston, and for ten years was connected with H. Gore & Company, general contractors, of Boston. At present Mr. Mansfield is connected with the Powers & Mansfield Company, of Troy, N. Y., which owns the controlling interest in the Keeseville, Ausable Chasm & Lake Champlain Railroad Company. Mr. J. A. Powers is president and treasurer of the Powers & Mansfield Company. Mr. Powers built the Hudson Valley Railway, and was formerly president of the Niagara, St. Catherines & Toronto Railway Company.