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Proceedings of the Nineteenth Annual Convention

OF THE

AMERICAN STREET RAILWAY ASSOCIATION

HELD AT

Kansas City, Mo., October 16-19, 1900

The nineteenth annual meeting of the American Street Railway Association was held at Convention Hall, Kansas City, Mo., Oct. 16-19, 1900.

TUESDAY'S SESSION

President John M. Roach, of Chicago, Ill., called the meeting to order at 11:15 a. m.

THE PRESIDENT.—We have a distinguished citizen of this city with us this morning and he will extend a welcome to you. I take great pleasure in introducing to you His Honor, James A. Reed, Mayor of Kansas City. (Applause.)

Mayor Read then delivered an address, and said in part: "Kansas City, as much as any other city in the world, welcomes to her midst the representative business men of all other cities. We believe out here in the West that it takes capital and brains and courage to build cities. We know out here in the West that if capital comes to us it must come because it expects a fair remuneration. And I want to call your attention, gentlemen, to the fact that you are in Missouri; and, notwithstanding the fact that nearly all of the States that surround us, when hard financial conditions existed, placed upon their statute books laws aimed at the destruction of wealth of financial institutions, there never has been a syllable, line or sentence of what we commonly denominate crank legislation placed upon the statute books of Missouri. (Applause.)

"We believe here in this State that capital should receive its fair share of remuneration; but we believe, at the same time, of course, that these great institutions which you represent owe some duties to the citizens of the cities, and that it is their business and duty to serve the citizens, and serve them well. While we believe in that, we, at the same time, realize the fact that great financial institutions must be secure in their profits, and that all the people have the right to ask of them is a policy of 'Live and let live,' of serving the people and in turn of being benefited by the people.

"We believe in inviting the capital of the East here for the purpose of investing in great public buildings. I do not believe a single man lives who came to Kansas City and used ordinarily good business judgment in the matter of his investment in great public buildings, but to-day is receiving splendid dividends upon that investment."

PRESIDENT ROACH.—Mr. Mayor, on behalf of the association, I desire to thank you for your eloquent words of welcome spoken to us, and also to give you my personal thanks. The first business of this meeting is the calling of the roll. If it is the pleasure of the meeting, instead of taking time to call the roll, the official registration of the secretary will be deemed the calling of the roll. That has been the custom in the past, and will be considered as applying at this time, if there is no objection. The next business before the meeting is the address of the president.

President Roach then read the following address:

PRESIDENT'S ADDRESS.

It gives me great pleasure to meet with you in this magnificent Western city. I have every assurance that nothing will be left undone to make our visit most pleasant and profitable. There is a breadth of character and freedom of personality in this young metropolis of the plains which peculiarly appeals to the business man who has large interests entrusted to his care, and I believe the members of this association will show their appreciation of the many pleasant things provided for their entertainment while in this community. When this nineteenth annual convention of the American Street Railway Association shall have finished its labors I am sure I may safely say to Mayor Reed that none of you will have regretted the acceptance of the hospitality of the people of Kansas City, so graciously extended by him.

I see before me representative men from all the leading cities of this country. To your hands are entrusted street railway investments aggregating hundreds of millions of dollars, and the welfare of over a million persons. From the single track, one-horse car of forty years ago the business in which you are engaged has grown to a magnificence where nearly all fields of human endeavor are called upon to perfect its equipment or aid in its management. It has outgrown ridicule and financial instability, and in the rapid whirl of events has built cities, enriched its promoters and made possible a freer, healthier and happier life for its patrons. Each day the street car is entering more and more into the business life and pleasures of the community, and each day its benefits are becoming more apparent to the general public.

The street railways of America now represent the enormous investment in bonds and stocks of $1,800,000,000, upon which investors are receiving annually over $70,000,000 in dividends and interest. Salaries and wages amounting to $250,000,000 a year are distributed among the three hundred thousand employees necessary to equip, operate and manage this great industry, repair its 20,000 miles of track, handle its 60,000 cars, and meet the ever pressing demands for improvement. Directly and indirectly over 1,200,000 persons depend upon the traction interests of America for their livelihood.

An industry of such proportions penetrates and more or less affects all other enterprises in the country which sustains it. Nine-tenths of the business men and women of the United States look to the management of street railway companies to furnish them with swift, comfortable and safe transportation to and from busi-

ness. Still a greater per cent of pleasure seekers demand and receive from the same management to and from theater, casino, park and suburb transportation of such elegance of equipment and efficiency in service as to satisfy the most exacting. It has required heroism and patience on the part of street railway men, with so little friction, to meet the demands of a critical patronage in so excellent a manner as is being accomplished by them at the present time.

On all sides we hear the cry of improvement, and in every direction we hear the sound of the busy car shop as it responds to the demand for more modern equipment. The public is becoming more exacting, and there is need for the most perfect knowledge and the widest experience to successfully cope with the ever changing situations which confront the street railway manager. Street railway companies have frequently, at great cost, increased their miles of tracks, and added to an expensive equipment, primarily for the sole purpose of accommodating the public, by penetrating into outlying districts, unwarranted by additional business to be acquired in such territory. This policy has proved wise in nearly every instance. It requires considerable pluck on the part of a company to back a temporary loss in order to please its patrons. Those companies which have pursued such a course have generally been rewarded by more liberality on the part of municipalities, more good nature and praise from patrons, and an early increase in the new districts acquired, which soon brought those lines to a paying basis.

In thus catering to the wishes of the public the street railway industry of the United States has been brought to a high standard of excellence, and has kept safely in advance of traffic. The aggregate of miles of track has grown from a few hundred miles of single track, confined mainly to business centers, to many thousands of miles of thoroughly equipped double tracks, which have brought the country districts within quick and active touch with the larger cities. Such energy and management must and will be appreciated and fairly treated by the communities benefited.

It may be declared that corporations are without soul, but it cannot truthfully be said that street railway corporations are lacking in good sense or business principles. False economic doctrines yield to and flee before rapid development and prosperity. A well equipped street railway with modern service, which seeks to oblige the people, operated in any community, will develop the best resources thereof and bring prosperity to its people with such rapidity as to utterly confuse and put to flight all false economic doctrines.

Newspapers, reviews, magazines, periodicals and journals of this country, indeed of many parts of the world, are entitled to the thanks of this association for the fair and generous treatment accorded in their columns to the street railway men and their interests during the year. It is the province of these publications to exploit the great industries of the land. If upon one day we are able to congratulate ourselves upon their unstinted praise, we should patiently bear the publicity of our faults, if any there be, in the next issue.

The last year has been a period of notable activity and healthy progress, with but few disturbances of a serious nature. The managers of large street railway properties should shape their policy toward their employees and the public so that disturbances between employer and employee will be entirely eliminated from their history. The management of the great corporations of the country can best retain the adherence and loyalty of employees by adopting toward them a policy at all times just, and at the same time courteous, kind and conciliatory. The good-will of your employees and of your patrons will be found an asset of great value in the days of trouble, and most desirable at all times.

A business so widespread in its usefulness, holding and judiciously employing, as it does, so great a portion of the capital of the country, and so essential to the best interests and prosperity of the trade centers, should, and I believe in good time will, possess the very necessary good-will and hearty support of the municipalities it so faithfully serves. Our interests and those of the public are inseparably interwoven, and naturally harmonious. If such interests become strained and in conflict such conditions are unnatural and illogical, therefore it should become one of the leading features of our association to suggest a uniform policy for street railway companies, of so broad a gage that the mutuality of the best interests of the public and of the company shall be as apparent to the people as to the street railway managers themselves.

I take pride in announcing that the condition of your association, both as to membership and finances, is improving each year. I wish to urge you to make this gathering of use to our association and of importance to the street railway industry. This may be accomplished by a full attendance upon and participation in the business meetings. The executive committee has selected members who have prepared papers on important subjects, and I urge upon you the advisability of entering into full discussions and analysis of these subjects, so that a clear understanding of all questions presented may be carried home with you. I also urge the association to show appreciation for our friends, the supply men, who have produced for this annual meeting their splendid exhibit.

Allow me to request your hearty support in the work of the Accountants' Association, which meets in annual convention here at this time. Its work is of great importance, and is worthy of your most serious consideration.

To the secretary and members of the executive committee our thanks are due for the satisfactory manner in which they have assisted in conducting the affairs of this association. Personally their efforts have been highly appreciated.

The honor of having acted as your president for the last year has been most gratifying to me, and shall ever remain one of the pleasant recollections of my life as a street railway man. For my successor I bespeak the same courtesy and cordial co-operation which it has been my good fortune to enjoy. Gentlemen, I thank you.

The President.—The next business in order is the report of the executive committee.

Secretary Penington read the report of the executive committee. It consisted of the minutes of the meetings of the committee on Feb. 5-8 and Oct. 15, and related principally to the making of the necessary arrangement for the use of the hall, rules for exhibitors, etc. Upon motion the report was adopted as read.

The President.—We will now hear the report of the secretary and treasurer.

The secretary read the following report:

REPORT OF THE SECRETARY AND TREASURER.

Cash in bank Oct. 10, 1899		$5,658.87
RECEIPTS TO OCT. 10, 1900		
Annual dues	$3,950.00	
Membership fees	250.00	
Space, Exhibit Hall, 1899	2,171.30	
Space, Exhibit Hall, 1900	47.00	
Interest on deposits	146.25	$6,564.55
		$12,223.42
EXPENSES TO OCT. 10, 1900		
Printing and stationery	$948.02	
Postage	162.00	
Salaries	1,500.00	
Miscellaneous expenses	50.00	
Executive committee, 1900	653.26	
Eighteenth Annual Convention, 1899	1,596.96	
Nineteenth Annual Convention, 1900	312.43	$5,222.67
Cash in bank Oct. 10, 1900		$7,000.75
		$12,223.42

October, 1895, $5,000 in debt.
October, 1900, $7,000 in bank.

MEMBERSHIP

Oct. 11, 1899		165
Members since last meeting		32
		197
LOSS		
Suspended	3	
Withdrawn	31	34
Membership Oct. 10, 1900		163

NEW MEMBERS

The following companies acquired membership at and since the last meeting:

Atchison, Kan.—Atchison Railway, Light & Power Company.
Aurora, Ill.—Aurora Street Railway Company.
Asbury Park, N. Y.—Atlantic Coast Railroad Company.
Bridgeton, N. J.—Bridgeton & Millville Traction Company.
Chicago, Ill.—Chicago Electric Traction Company.
Columbia, Pa.—Conestoga Traction Company.
Detroit, Mich.—Detroit & Pontiac Railway Company.
Dayton, Ohio.—Dayton & Western Traction Company.

Elgin, Ill.—Elgin City, Carpenterville & Aurora Street Railway Company.
Fond du Lac, Wis.—Fond du Lac Street Railway & Light Company.
Ft. Wayne, Ind.—Ft. Wayne Traction Company.
Galesburg, Ill.—Galesburg Electric Motor & Power Company.
Hamilton, Ohio.—Cincinnati & Hamilton Electric Street Railway Company.
Highwood, Ill.—Chicago & Milwaukee Electric Railway Company.
Joliet, Ill.—Joliet Railway Company.
Kansas City, Mo.—East Side Electric Railway Company.
Knoxville, Tenn.—Knoxville Traction Company.
Montreal, Canada.—Montreal Strect Railway Company.
Oakland, Cal.—Oakland Transit Company.
Pasadena, Cal.—Los Angeles & Pasadena Electric Railway Company.
Pittsburgh, Pa.—Consolidated Traction Company.
Peoria, Ill.—Peoria & Pekin Terminal Railway Company.
Pueblo, Col.—Pueblo Traction & Electric Company.
Schenectady, N. Y.—Schenectady Railway Company.
Sioux City, Ia.—Sioux City Traction Company.
St. Louis, Mo.—St. Louis Transit Company.
Seattle, Wash.—Seattle Electric Company.
South Bend, Ind.—Indiana Railway Company.
Vicksburg, Miss.—Vicksburg Railroad, Power & Light Company.
Venice, Ill.—Venice, Madison & Granite City Railway Company.
Willoughby, Ohio.—Cleveland, Painesville & Eastern Railroad Company.
Westwood, Mass.—Norfolk Western Street Railway Company.

MEMBERS SUSPENDED

The following members were suspended for non-payment of dues:
Newburyport, Mass.—Newburyport & Amesbury Street Railway Company.
Steelton, Pa.—Middletown, Highspire & Steelton Railway Company.
West Superior, Wis.—Superior Rapid Transit Railway Company.

MEMBERS WITHDRAWN

The following members have withdrawn during the past year, in nearly every case owing to consolidations:
Atlanta, Ga.—Atlanta Railway Company.
Baltimore, Md.—Baltimore City Passenger Railway Company.
Buffalo, N. Y.—Buffalo Traction Company.
Bridgewater, Mass.—Brockton, Bridgewater & Taunton Street Railway Company.
Cleveland, Ohio.—Akron, Bedford & Cleveland Railway Company.
Covington, Ky.—South Covington & Cincinnati Street Railway Company.
Detroit, Mich.—Wyandotte & Detroit River Railway Company.
Denver, Col.—Denver City Railway Company.
Derby, Conn.—Derby Street Railway Company.
Gloucester, Mass.—Gloucester Strect Railway Company.
Girardvillle, Pa.—Schuylkill Traction Company.
Manchester, N. H.—Manchester Street Railway Company.
New Britain, Conn.—Connecticut Lighting & Power Company.
Norwalk, Conn.—Connecticut Lighting & Power Company.
Niagara Falls, N. Y.—Niagara Falls & Suspension Bridge Railway Company.
North Tonawanda, N. Y.—Buffalo & Niagara Falls Electric Railway Company.
New York, N. Y.—Nassau Electric Railroad Company.
Paterson, N. J.—Paterson Railway Company.
Pueblo, Col.—Pueblo Traction Company.
Racine, Wis.—Belle City Railway Company.
St. Louis, Mo.—Cass Avenue & Fair Grounds Railway Company.
St. Louis, Mo.—Citizens' Railway Company.
Lindell Railway Company.
Missouri Railroad Company.
Southern Electric Railroad Company.
St. Louis Railroad Company.
Union Depot Railroad Company.
Taunton, Mass.—Taunton Street Railway Company.
Taunton, Mass.—Providence & Taunton Street Railway Company.
Wakefield, Mass.—Mystic Valley Street Railway Company.
Wakefield, Mass.—Wakefield & Stoneham Street Railway Company.

DEATHS DURING THE YEAR

Philip T. Begley, superintendent, Lowell & Suburban Street Railway Company, Lowell, Mass.....Dec. 24, 1899
Amos Breed, president, Lynn & Boston Railroad Company, Lynn, Mass.....May 22, 1900
Garrett A. Hobart, president, Paterson Railway Company, Paterson, N. J.....Nov. 21, 1899
John McNulta, receiver, Calumet Electric Street Railway Company, Chicago, Ill.....Feb. 22, 1900
Volney C. Turner, ex-president, North Chicago Street Railway Company, Chicago, Ill.....Dec. 2, 1899
J. H. Vander Veer, superintendent motive equipment, Brooklyn Heights Railroad Company, Brooklyn, N. Y...Dec. 3, 1899

Upon motion the report was received and placed on file.

The secretary then announced that the Kansas City Club and the Elks Club had extended a cordial invitation to all the delegates to visit their clubrooms.

THE PRESIDENT.—The next business before the convention will be the reading of a paper by Mr. Daniel B. Holmes, counsel of the Metropolitan Street Railway Company, Kansas City, Mo., on the subject "Consolidation of Street Railways and Its Effect Upon the Public." [This paper is published elsewhere in this issue.]

THE PRESIDENT.—We would be glad if anyone has anything to say to hear from him. I imagine the gentleman has treated the matter so comprehensively and in such a diplomatic manner there is very little additional that can be said.

The secretary announced that there would be a reception held Monday evening, at 8:30 o'clock, at the Midland Hotel, at which all the delegates and others in attendance upon the convention were invited to be present. That on Wednesday at 2 P. M. there would be a trip to Armour's packing house, and in the evening a theater party at the Coates' Theater.

The meeting then adjourned.

WEDNESDAY'S SESSION

President Roach called the meeting to order at 10:50 o'clock a. m.

THE PRESIDENT.—For reasons unnecessary to explain at this time, we have changed the order of business somewhat. The names of the nominating committee have been selected, and the secretary will now read them. This committee will also recommend to the association a place for our next meeting.

The secretary read the names of the committee on nominations as follows: Chairman, John A. Rigg, Reading, Pa.; E. C. Foster, Lynn, Mass.; E. G. Connette, Syracuse, N. Y.; D. B. Dyer, Augusta, Ga., and Robert McCulloch, Chicago, Ill.

THE PRESIDENT.—I would say to the gentlemen who have any idea of asking the association to hold its next meeting in their city, that they can see Mr. Rigg, the chairman of the committee on nominations, any time at their convenience. Mr. Rigg will appoint a time and place for the meeting of the committee.

SECRETARY PENINGTON.—Mr. President, I will state that I have received invitations from the Mayor of Cincinnati, the president of the Cincinnati League, and from President Kilgour, of the Cincinnati Street Railway Company, asking us to hold the next convention in that city. I will turn these invitations over to Mr. Rigg, chairman of the committee.

THE PRESIDENT.—The next order of business is the reading of papers. The first paper on the programme this morning is entitled "A Comparison of the Various Systems of Electrical Distribution for Street Railways," by C. F. Bancroft, electrical engineer Massachusetts Electric Companies, Boston, Mass. Mr. Bancroft is not in attend-

ance at the meeting, and it will devolve upon the secretary to read the paper.

The secretary read the paper, which will be found elsewhere in this issue.

The President.—We would be pleased to hear from some of the gentlemen who are present in reference to the subject matter of this paper. I will call upon E. C. Foster, of Lynn, to open the discussion on this paper.

Mr. Foster.—Mr. President and gentlemen, I thank you for calling upon me, but as I am not an expert electrician, it seems to me that I am hardly competent to discuss the merits of the paper which has been read. I think that Mr. Bancroft has treated the subject in a very broad way. He is a very competent man, and is employed by the same companies which employ me. We consider him one of the ablest electrical engineers in the East. I do not care to undertake to discuss this subject. There are many others here far more competent to do it than I, and I should be pleased to hear from Colonel Heft. I thank you for calling upon me, Mr. President.

The President.—Is Colonel Heft in the room? If so we would be pleased to hear from him. As Mr. Heft is not present, I will call upon E. G. Connette, of Syracuse, N. Y., to give us his views upon the subject.

Mr. Connette.—I thank you, Mr. President, but I think, like Mr. Foster, that the paper is of such a technical nature, and the ground has been so fully covered, that there is nothing that can be said which would be interesting in addition to what the author has already stated.

The President.—I can fully appreciate what the gentlemen have said, after listening to the paper. It certainly seems to cover the ground quite fully. We would like to hear from Colonel Dyer, of Augusta, Ga.

Mr. Dyer.—Gentlemen of the convention, I am not at all prepared to discuss a technical paper of this character. I think that the subject has been treated most exhaustively, and it is a valuable paper. This association certainly owes a debt of thanks to the gentleman who wrote it. I am wholly unable, however, to go into the details of the paper and discuss the advantages of the different systems which have been referred to.

Mr. Connette.—Mr. President, I would suggest, if you will permit me, that we hear from Charles W. Wason, of Cleveland.

Mr. Wason.—Mr. President and gentlemen of the convention, it seems to me that from the standpoint from which the author of the paper has taken up the subject there is very little to discuss as to applying the theories of the paper to any particular road. The fact that the condition of each road, as it is presented, determines in a great measure the character of the electrical application, there really is hardly anything that we can discuss. If we had a road which we desired to equip, then the question would come up as to which one of the several systems presented would, in the minds of the gentlemen present, be competent to bring out the best results. Under the circumstances, it does not seem to me that there is really anything to discuss.

Mr. Connette,—I move that the paper be received and the thanks of the convention tendered to the author. Motion carried.

The President.—The next regular order of business is the reading of the paper on "Painting, Repainting and Maintenance of Car Bodies," by F. T. C. Brydges, superintendent of car shops Chicago Union Traction Company, Chicago, Ill.

The secretary read the paper, which will be found elsewhere in this issue.

Mr. Harrington.—I have prepared some statements of the cost of the various kinds of painting we have done. I made some statements last year at the meeting which seem to be rather low in price. I have prepared these figures from work actually done and took five different operations, took them from our detailed sheet. For instance, the first-class operation, which was for an 18-ft. car body, including the entire repainting of the car, the roof and the trucks, under the contract price, piece-work system, the cost was $28 for labor and $19.79 for material, the total cost being $47.79. I have here, which I will hand to the secretary, a detailed statement showing the various operations and the material entering into them. On a second-class operation, same work, on a 16-ft. car body, the total cost was practically the same. On a third-class operation, a $14 contract cutting in of paint work, varnishing, etc., the total cost was $24.21, the material being $10.21. The fourth-class operation was outside painting of vestibules and cutting in dashers, touching up main body, blacking off iron work, one coat of finishing varnish, one coat of paint on roof, dashers, floors and platforms and one inside coat of finishing varnish. The contract price for this work was $8.50, and the materials $7.71, making a total of $16.21. The simplest operation is probably the fifth-class operation, outside touching up dashers and main body of car, outside blacking off of iron work, one coat of outside finishing varnish, one coat of roof paint and one coat of paint on inside of dashers, floors and platform. The contract price for this work is $4, and the material $5.13, making a total of $9.13 as an average. This work is done on the piece-work system. Under the usual system of hiring labor, we usually found our work cost in labor 50 per cent to 100 per cent more than under the piece-work system. I have taken these figures from our books, and have had some talk on the subject with other street railway managers, and they think that the figures are very satisfactory.

Mr. Foster.—I would ask through you, Mr. President, the price paid by Mr. Harrington for the labor in doing that contract work?

Mr. Harrington.—Twenty-five cents an hour for the painter. The assistant painter gets 15 cents an hour.

Mr. Rigg, of Reading.—I move that the paper be received and the thanks of the association be extended to Mr. Brydges. Carried.

The secretary announced that a trip would be made to Armour packing house at 2 o'clock Wednesday afternoon, and there would be a theater party in the evening at the Coates' Theater, and that on Friday at the Convention Hall there would be a vaudeville entertainment, provided by the supply men.

The meeting then adjourned until 11 o'clock Thursday morning.

THURSDAY'S SESSION

President Roach called the meeting to order at 11:10 a. m.

Secretary Penington.—I wish to announce that seventeen companies have joined the association at this meeting:

Dallas Consolidated Electric Street Railway Company, Dallas, Tex.
Danville Street Railway & Light Company, Danville, Ill.
Detroit, Rochester, Romeo & Lake Orion Railway Company, Detroit, Mich.
Jackson Railway, Light & Power Company, Jackson, Miss.
Kansas City-Leavenworth Railway Company, Kansas City, Kan.
East Side Electric Railway Company, Kansas City, Mo.
Lebanon Valley Street Railway Company, Lebanon, Pa.
Meridian Street Railroad & Power Company, Meridian, Miss.
Schuylkill Traction Company, Norristown, Pa.
Hoosac Valley Street Railway Company, North Adams, Mass.
Ottawa Railway, Light & Power Company, Ottawa, Ill.

Ottawa Electric Railway Company, Ottawa, Ont.
Holmesburg, Taconey & Frankfort Electric Railway Company, Philadelphia, Pa.
Monongahela Street Railway Company, Pittsburgh, Pa.
Rockford Railway, Light & Power Company, Rockford, Ill.
Saratoga Traction Company, Saratoga, N. Y.
Terre Haute Electric Company, Terre Haute, Ind.

THE PRESIDENT.—Gentlemen, we will now proceed to the regular order of business this morning. The paper on the programme is entitled "Double-Truck Cars: How to Equip Them to Obtain Maximum Efficiency Under Varying Conditions." This paper is by N. H. Heft, president of the Meriden Street Railway Company, Meriden, Conn.

This paper will be published in an early issue.

THE PRESIDENT.—Gentlemen, we invite the members to come forward and inspect the plans prepared by Colonel Heft at considerable trouble and expense, showing the details of the construction of the car he has spoken of. (A number of the members then inspected the plans of the car.)

PRESIDENT ROACH.—I would state, gentlemen, for your information, that all of the cuts, as shown here, will appear in the minutes of the meeting, to be printed hereafter and distributed among the street railway men of the United States and Canada. I desire personally to thank Colonel Heft for his able paper, and we will be much pleased to hear it discussed by the members of the association. To start this discussion, I take pleasure in calling upon E. C. Foster, of Lynn, Mass.

MR. FOSTER.—I have listened with a great deal of interest to the paper read by Colonel Heft, and have also given a casual glance at the drawings submitted. I think that Colonel Heft is on the right line in the way of making improvements. We all know that it is desirable to have cars constructed as light in weight as possible, and yet to be sufficiently strong to meet all the requirements and conditions. I am very glad, Mr. Chairman, that Colonel Heft has taken up this subject. We all know that the varying conditions under which we operate in the various States and municipalities require different kinds of equipment. There are places, of course, on the interurban lines where an equipment designed similar to that submitted here could, without doubt, be operated very successfully. The Lynn & Boston Railroad Company, with which I am connected, for instance, is operating lines running into Boston. We have one line over a distance of 16 miles from a small town on the coast, Marblehead, through Swampscott, Lynn, Revere and Chelsea to Boston. On that line we are operating 12-bench double-truck open cars, equipped with four motors. The closed-car equipment consists of 25-ft. box cars with double trucks and four motors each. We have been operating over this line about fifteen months at a maximum speed of 30 miles an hour, and we have found by our experience that the operation of four motors is more economical than the operation of two motors over the same line under the same cars and under the same conditions. To be sure, there is an increased consumption of power. We are all willing, I believe, to concede that, and I think Colonel Heft will agree with me, although he shakes his head to the contrary. From tests made we are sure of it. The operation of four motors, of course, depends upon the speed you wish to attain, and that it is desirable to attain. In operating upon a line where your speed is not more than 12 miles to 15 miles per hour, I question whether it would be wise to adopt the practice of using four motors. We are also operating on many lines 16-ft., 18-ft. and 20-ft. cars. With those cars we use, as is customary, the usual two motors. We have various types of motors, but we have learned by our experience that the double-truck car, with two motors, or four motors, is more desirable and profitable to operate; and we are now rebuilding some of our smaller cars and converting them into 25-ft. cars. We are doing that successfully. We are also building a large number of new 25-ft. double-truck cars.

MR. CHAMBERLAIN, Brooklyn.—You will appreciate that the average mechanic in this country has his "hobbies," as well as the average professional man. Without referring to any part of the electrical equipment which Colonel Heft has designed for his peculiar class of cars, there are two or three innovations from the present practice in the construction of the car body which may well attract attention. With most of us, innovations of this character are subject to adverse criticism. I know of nobody who would be subject to adverse criticism less than the author of this paper, who has had such a vast amount of experience in this direction, and it seems that it is right and proper he should make an innovation of this character. I speak more particularly of the construction of a car without longitudinal truss rods. I think that Colonel Heft has designed a car of something over 42 ft. in length, and gains his body support by a number of cross transoms built in the form of the ordinary iron body bolster, welded at the ends, filled in with wood, and supported through the center with longitudinal I-beams running from one end of the car to the other. The author of the paper has evidently succeeded in obtaining the minimum of weight with the maximum carrying capacity, and I think, gentlemen, you who are practical men, and you certainly all appear to be, will agree with me that that is the object to be sought.

There are some questions I would like to ask Colonel Heft in private, and he has kindly invited me to inspect his cars when they are put on the road. One question I have in mind is with regard to what might be the result of an end collision. I do not know whether this truss, running longitudinally through the car from one end to the other, would be all that is adequate, and would perform the functions and give the proper camber to the car, that the ordinary longitudinal truss rods do. You will recollect some years ago that the managers of the steam roads went wild in following out the idea of reducing the weights of their rolling stock, until they reached a point where they almost passed the limit of safety factor. Colonel Heft advises me that he has carried through on this device a factor of safety sometimes reaching as high as 25 per cent. If he has done that he has certainly covered all the ground that is necessary to make the vehicle safe, and one that would do good service in actual practice. I was very careful to inquire of the Colonel whether he placed all his strength on a line with the sills. When we have a collision we do not collide with the clear story of the end of the bonnet, but we generally get it on the end of the buffer. Of course, we all know there are some roads which never have any accidents, and they do not have to experience any difficulties of that kind. I was particular to ask him whether the strength was on a line with the longitudinal timbers, and whether the frame above that included posts and trusses in the framing, and the clear story was lightened up correspondingly. It would be a difficult matter to put all of the strength in the clear story, or on a line with the roof, because when this is done and the car runs into any obstruction the roof would probably keep going on and the body remain where it was.

Not to occupy any more of the time of the meeting, I would like to ask the author of the paper whether he has sufficient strength with the transverse brace to overcome the difficulties which I have outlined?

MR. HEFT.—I will say, in reply to Mr. Chamberlain,

that I have endeavored to get all of the strength longitudinally, lightening the upper portion of the car, but constructing it in such a manner that the upper portion is braced to the lower portion and tied to it, both longitudinally, vertically and otherwise. I would say, for the information of the members, that we have under contract the construction of five of these cars. We expect that the first one will be turned out in from four to six weeks. We expect to operate this car from Port Chester, N. Y., to New Rochelle, N. Y. I would be very glad to show the car, when in operation, to any of the members of the association. I may be wrong in my ideas concerning this car, but we are putting up our own money to build it. If it is a failure, we will have to foot the bills. (Applause.)

W. E. Harrington, Camden.—The question of four-motor equipments seems to be one of a mooted character. There are a large number of roads using four-motor equipments, but there seems to be relatively very little known as to the number of watt-hours per car mile which the different equipments require, and with the idea of bringing out that point as a feature of discussion, I would like to place this question before the meeting: "What is the experience of those present, who have made tests, as to the watt-hours required by the different equipments mentioned?" Mr. Foster says it takes more power with the four-motor equipment, and Colonel Heft says it takes less. They are both highly representative men, and yet they differ on this point. Our road is about to place some equipment orders. I have been urging four-motor equipments, and yet I must confess I am somewhat in the dark as to the relative merits of the different equipments. [I know from tests I have made that the double-truck 40-ft. car equipment, with two 38-B Westinghouse motors, on maximum traction trucks, have taken an average of 2000 watt-hours per car mile, whereas the same weight of car, with the center pivotal truck, with No. 49 Westinghouse motors, 35-hp, under identically the same conditions, takes an average of only 1200 watt-hours per car mile. Again, a single-truck car, with an 18-ft. body and under similar conditions, takes an average of 900 watt-hours. I would like to know if there are any data from actual test to show the number of watt-hours consumed by these different equipments. I have made a series of tests on different classes of cars, showing the watt-hours. I deem this matter of very great interest, and I will file with the secretary a statement of the results secured in these tests. I did not encounter any difficulty in getting information of this character, and I think the information obtained by me would be interesting to the other members, in showing the number of watt-hours consumed per car mile with the various forms of equipment.

Mr. Heft.—In answer to the gentleman, I will say I have not the figures of the tests at hand, and do not remember the figures of the tests, but we have made a series of tests during the last three years with double-truck cars, equipped with one, two and four motors, as I have stated in the paper, and we have kept a very close and accurate record of the results. The weights of the different trains on which these tests were made varied from 15 tons to 250 tons. The speeds varied from 10 miles to 65 miles an hour.

There is no place where the car is operated with an increase of current with the four-motor equipment, except while accelerating, but you gain a quicker and higher acceleration by this increased consumption of power. The average consumption of the current, however, and even the total consumption of the current in the running of the cars, is less with the four-motor equipment than with the two-motor equipment. That is beyond dispute. I can furnish the data to that effect, and I think the General Electric Company and the Westinghouse Company, also, can furnish any of our members with data which will substantiate that statement. It is unquestionably correct.

Mr. Wason.—I would ask the writer of the paper if the additional cost for the drilling of the hole through the axle and the armature shaft is commensurate with the results, and whether he is seeking to lighten the axle, or to be assured of the quality of material?

Mr. Heft.—In reply to Mr. Wason, I will say that I am willing to admit that the drilling of the axle is a debatable question. About five years ago we commenced to use hollow axles on our high-speed motors, and the results have been so favorable in the way of lessening hot boxes, hot journal bearings, and everything of that kind, that we have decided to adopt that form of axle. It decreases the weight about 25 per cent, with a loss of strength, varying according to the size of the axle, of from only 3 per cent to 5 per cent. We have never had any of them break. We had a great deal of trouble with our axles on our heavy high-speed motors, and we found it necessary to increase the diameter and weight of the axles. We were loath to do this, and so we adopted the plan of drilling a hole through the axle to lighten it. We not only lighten the

Tests Made by W. H. Harrington, of Camden, on Watt-Hours per Car Mile with Different Equipments

Date	Car	Controller	Average Points	Resistance	Truck	Dia. Wheel: Large	Dia. Wheel: Pony	Wheel: Tread	Wheel: Base	Weight Wheel: Large With Axle	Weight Wheel: Small With Axle	Motor	HP	Average Watts	Average Volts	Average Amperes	Maximum Amperes	Full Speed	Time Using Current	Time Coasting	Between Haddonfield and Fed. St. Ferry, Up and Down	Time Start to Stop	Watt Hours Per Car Mile
Aug. 17	120	K-11	3.5	No. 3 West. Col.	St. Louis, Dble	33 in.	24 in.	2 in.	4 ft. 2 in.	1,125 lbs.	725 lbs.	2-38-B	50	24,250	485	50.8	185	70	27.4 min.	10.6	To ferry, 6.99	38 min.	2,092
" 17	134	K-10	4.8	G. E. 1-101, 1-102	Brill 27-G	33 "	24 "	2 "	4 " 2 "	1,125 "	725 "	"	50	22,419	477.5	47.4	200	70	28.75 "	12.25	To Had., 7.35	39 "	1,845
" 21	"	"	5.2	"	"	33 "	----	2 "	4 " 2 "	--------	------	2-No. 3 West.	30	17,719	470	37.7	160	60	31.75 "	10.5	To ferry, 6.99	42.25 "	1,690
" 21	"	"	4.8	"	"	33 "	----	2 "	4 " 2 "	--------	------	" "	30	14,382	470	30.6	125	40	27.2 "	9.8	To ferry, 6.99	37 "	249
" 23	114	"	3.1	No. 3 West. Col.	21-C	33 "	----	2 "	6 " 6 "	900 lbs.	------	2-Walker No. 5	30	9,028	488	18.5	85	35	23 "	14	To ferry, 6.99	37 "	795
" 23	"	"	2.8	"	"	33 "	----	2 "	6 " 6 "	900 "	------	" "	30	7,986	493	16.2	40	37	27.4 "	14.6	To Had., 7.35	42 "	760
" 16	58	D	--	Davis West	Manier	33 "	----	2 "	6 " 6 "	950 "	------	1-No. 3 West.	30	7,055	538	18.3	60	--	--------	----	Mer. to C., 4.34 *	29.75 "	812
" 16	"	"	"	"	"	33 "	----	2 "	6 " 6 "	950 "	------	" "	30	13,494	519	26	60	35	31.4 min.	15.2	Bridge to C., 3.43 *	18 "	1,180
" 22	129	K-10	3.01	G. E. 2-1042, 1-102	Brill 27-G Dble	33 "	----	2 "	4 " 4 "	1,050 "	------	2-No. 49	35	15,357	451.7	34	125	60	22 "	16	To Had., 7.35	47 "	1,479
" 22	"	"	2.8	Westinghouse	"	33 "	----	2 "	4 " 4 "	1,050 "	------	" "	35	11,988	444	27	118	50	22 "	16	To ferry, 6.99	38 "	1,034
" 24	80	"	3.8	"	21-E	33 "	----	2 "	7 " 7 "	1,050 "	------	" "	30	9,541	470	20.3	80	33	27 "	13	To Had., 7.35	40 "	864
" 24	"	"	3.4	"	"	33 "	----	2 "	7 " 7 "	1,050 "	------	2-No. 3 West.	30	8,058	474	17	72	32	24.3 "	11.7	To ferry, 6.99	36 "	690
" 20	107	"	"	2-Westinghouse Col.	21-A	33 "	----	2 "	6 " 6 "	1,050 "	------	" "	30	9,086	488	17.8	65	33	22 "	14	To ferry, 6.99	36.5 "	781
" 20	"	"	3.2	"	"	33 "	----	2 "	6 " 6 "	1,050 "	------	" "	30	8,892	494	18	88	35	24.5 "	15.5	To Had., 7.35	40 "	804

axle, but we get the benefit of having a ventilated axle. It overcomes crystallization in the axle.

J. I. Beggs, Milwaukee.—In connection with the statement that four motors take no more current than two motors, I would ask Colonel Heft whether he meant four motors of the same size, or two motors having the same capacity as the four might have had?

Mr. Heft.—We have made experiments with motors of different capacities, but all of the motors were of the same size, and used on the same class of equipment.

Mr. Beggs.—I do not know whether I made myself clear. We made some very exhaustive tests, and they were so opposed to the position which Colonel Heft now takes that I took occasion to have B. E. Sunny, the Western manager of the General Electric Company, and also Theodore P. Bailey, the manager of the railway department of the General Electric Company, of Chicago, to come and witness the tests made on this mooted question of the amount of current consumed by these different equipments. Of course, this matter is a very important one to all of us.

I might say that we adopted double-truck cars as a standard for our entire system five years ago. We have been using them ever since, and are continually increasing the number. We have given a great deal of attention to the development of the most advantageous car, the most durable car, the car which will best stand the strains to which Mr. Chamberlain referred, as ours is one of the roads that has collisions, and a number of them, unfortunately, and some pretty severe ones. We operate 350 miles of road, and have one electric line 61 miles in length. We try to build the equipment to that it will be interchangeable, in city use or in suburban service, as we have a consolidated system, and we run the cars interchangeably. I must take issue with Mr. Heft's statement to the effect that four motors do not take more current than two motors. If you equip a car with two G. E. 1000 motors, or four 1000 motors, I think any gentleman, when he comes to pay for the current, will pay for 20 per cent more current in the four motors than in the two motors; but he will get 50 per cent better service with the four motors. That has been our experience. Our cars for three years were equipped with two motors. For the past two years, after careful experimenting and taking into account the various costs entering into the matter, of which the smallest is power, we have adopted four motors as a standard, be they of whatever size they may. We can get much better results from 150 hp in four motors under a car than we can with 250 hp in two motors under the car. That is our experience. The results may differ in various sections of the country, but with us the four motors have certainly taken from 20 per cent to 25 per cent more current than the two motors, running under exactly similar conditions, not for the purpose of test, but putting them in regular service on long distance on city lines, with wattmeter, voltmeter and ammeter, so as to cover all the points. The use of these four motors is a very important thing on our standard car, which is 41 ft. over all, and seats forty-four passengers, with cross seats, and weighs somewhat heavier than the car referred to by Mr. Heft. I trust that Mr. Heft will succeed in making his car all that he desires.

I was very much interested in the points raised by Mr. Chamberlain, as we have found that, in order to put a car on the tracks in our city so that it will stay there, in spite of a head-on collision, as we sometimes have, even with the greatest degree of care, it requires some weight and strength to withstand the shock so that the car will not be absolutely shattered. We had a case recently with a green motorman on a curve, where our car was thrown off the tracks across the street, with result that the car was not much injured except that a corner post was knocked off. I think Colonel Heft has seen how our cars are braced. We use the longitudinal truss rod and truss plank, with a rod through it. We do not feel that we can take chances with the longitudinal brace; we want the strongest construction possible to put in the car. Therefore, I should take issue with Mr. Heft on that point.

As stated, the results of the tests made were somewhat contrary to what the experts had given us to believe we might expect would be as regards the power consumed. For that reason I had Mr. Sunny and Mr. Bailey come to Milwaukee on two or three different occasions to make those tests, not simply tests on a special car, but on the regular service, equipping different cars on our regular service with different types of motors—two G. E. 57, two G. E. 1000, and four G. E. 1000 under different cars. I do not believe there is any question that the four motors will take more current, but, as has been said, you get quicker acceleration. You have no slipping wheels. In our practice we are going to put two additional motors on all the cars we equip in the future. The higher speed you can make compensates for the increased power consumed. In the city service where we use these cars, as we do entirely, with blocks running from 200 ft. to 300 ft. in length, it is an important matter if you can save a second or two on each street corner in getting the car into rapid motion; and when the car gets on a slight grade, or starts on a slippery rail, it will immediately pick up speed and get off without spinning the wheels. That is what the four motors will do. I believe that four smaller motors are much more effective than perhaps 50 per cent increased capacity in two heavier motors. I give you my experience, gentlemen, for the reason that we have running some three hundred of these double-truck cars. We have one line which is 61 miles in length. We control all the city lines in Milwaukee and Racine, 25 miles south, and extending 35 miles south to the city of Waukesha. We have a complicated system, but it is run as one entire system. If we have a certain call for cars on any of our interurban lines, we can take our city cars for this purpose, because they are interchangeable.

To compete with the steam railroads we are now giving our attention to the development of a new car that will be 50 ft. over all, and upon which we propose to mount four motors of 75 hp each. The steam railroads throughout our Western country are beginning to realize they have a real competitor in electric lines in distances of 50 miles or 60 miles, and, as a consequence, they are reducing the rates of fare very materially and putting on an additional number of high-speed trains to run short distances. We propose to build an electric car for the double purpose of being able to make 60 miles an hour with four of these G. E. motors, and with the further purpose that in case we have a congestion of travel on any of the lines running to our summer resorts, we can hitch three or four trailers to the car and make 35 miles to 40 miles an hour, and handle a larger body of people at a much reduced cost. We may have peculiar conditions in our city, but that is one of the things we have in mind. With these cars which we are going to build, and under which we are to put four motors, we should want a more substantial construction than the cars shown in the drawings which have been submitted to us, although these cars may be all right for the service for which Mr. Heft designed them. I have given you the result of our experience in five years of operation with double-truck cars and four-motor equipments.

Mr. Heft.—I wish to say, in reply to Mr. Beggs, that his statement is true, judged by his conditions, while I also insist that my statement is true taken from my condi-

tions. Mr. Beggs' cars, I believe, are operated largely through city streets, and are frequently stopped and started; and, as I stated in reply to Mr. Foster, there would be a greater current consumption in producing the acceleration of the car when starting and stopping so often.

Mr. Beggs.—I might state, gentlemen, that this test was not made on a city line. It was made on our Waukesha line, a 20-mile road, with a train every hour each way. We make the run in fifty-two minutes, and keep up an hourly service with two cars. The test was made on that high-speed line, upon which there are very few stops, and sometimes no stops in a distance of 10 miles.

Mr. Heft.—Then I must insist, under that condition, that my statement is correct. (Laughter.) I will say, to satisfy Mr. Beggs, if he will come down to inspect our system, I will give him an opportunity to witness a test, and if he does not agree with me I will pay his expenses to Meriden and back.

Mr. Beggs.—It will be a pleasure and worth all the expense to spend a day with the Colonel, outside of the test; but I shall take advantage of the opportunity he offers to have this test made. I shall, however, want to know how his instruments are calibrated. I shall also want to take some expert along with me to see these tests. I am not an expert in electric railway matters, except on the commercial side; but I feel sure there is some mistake in the readings of the motors. I was told what the Colonel tells us, but it did not agree with my own practical experience, and what I considered would be the result when I was seriously considering three years ago, this very question of whether or not we could afford the current consumption required by four motors. The first report which came to me from a gentleman whom I considered to be a highly scientific, technical engineer, harmonized with what Colonel Heft has told us, and the report went further and said that four motors saved 10 per cent, and he submitted the figures to demonstrate it. Then I concluded I would call in other experts, and I did call in Mr. Sunny and Mr. Bailey, and I went on the cars myself with these gentlemen, and spent several days with them. The result was that I found it took fully from 20 per cent to 25 per cent more current with the four motors than with the two motors, on the same character of service, the same cars and load, and running exactly during the same hours, as we made the tests on different days, so as to get exactly the same conditions.

Mr. Foster.—As I understand it, the conditions under which Colonel Heft has been making tests are different from the ordinary conditions under which street railways operate. The conditions there are these: That the test was made upon a steam railroad roadbed, with stops at infrequent intervals; that is to say, that the run would be made from one station to another, a distance of two or three, or five, or even ten miles. That being so, I think it is possible that they do operate, as he says, without consuming a greater amount of current than they would with two motors. Our experience in operating four motors on the same type of car, over the same road, under the same conditions, as near as it is possible to obtain them, has been that it requires from 15 per cent to 23 per cent more current to operate four motors than two motors. We make tests twice a year, and pay for current on that basis, and we believe that the tests are carefully made, as they are conducted by the representatives of the Boston Elevated Railway Company, over whose tracks we operate, and who furnish power to our company. Tests are also made by experts representing our company.

Mr. Wason.—On one of our suburban lines we started two years ago to put on two 75-hp motors on each car, and found it almost impossible to make our time in the city, or in the country where there was any grade. We did that for the purpose of eliminating one-half of the repairs, as we supposed. Later, we removed the two 75-hp motors and put on four 50-hp motors, with much more satisfactory results, as we were able to make our time and consumed but a very small amount of power more than with the two 75-hp motors. The results were very much more satisfactory, and I think there is no question but for all suburban work four motors are preferable to two motors, no matter what the amount of power you put into the motors is.

The lightening up of a car for suburban work seems to me a little questionable. I think that a year from now Colonel Heft will be able to give us some more definite data on this point. We have been strengthening our cars from the start, rather than making them lighter. Sometimes now they leave the track for a shorter road across the fields. It seems to me that we ought not to consider making the cars lighter. The ordinary railroad man buys his equipment and expects it to last a reasonable length of time, and it seems to me that it must be strong. Of course, the strength should be put in the best possible places, and I think that, rather than making the car lighter, we should make it stronger. In the steam railroad practice the car is cambered up in the center. In the first of our suburban cars the manufacturers insisted upon putting the camber in the center, but we found after using the car a short time we could put the camber there ourselves. The trouble was to keep it from bulging up in the center, so that a truss rod in a long 40-ft. car was a useless thing.

Mr. Harrington.—I would ask Mr. Beggs what the tests showed where they ran two No. 57 motors, compared with four G. E. 1000 motors—whether the results from the four G. E. 1000 motors showed a less consumption in power than they had in the use of the two No. 57 motors?

Mr. Beggs.—The current was less on the four G. E. 1000 than on the two No. 57.

Mr. Harrington.—Did not you get better results?

Mr. Beggs.—We got quicker acceleration. I want to say here, as our experience, and to throw out a suggestion as opposed to what might be inferred from Mr. Foster's remarks, that whether the service is for 8 miles an hour, about the standard for city service—our city service is maintained pretty close to 9 miles an hour on the average—whether the service is for 8 miles, or 15 miles, or for 50 miles an hour, put four motors on a double-truck car. The distance does not make any difference whatever. The main question with many roads in this matter is the increased investment, but you will save the interest on the increased investment in reduced cost of maintenance. It costs considerably less to maintain four motors under a car of the same size than it does to maintain two motors under the same car. The difference in cost of maintenance will more than offset the interest on the increased cost of the investment.

Mr. Connette.—Mr. Beggs has just answered the question I was going to ask, whether or not the increase in the efficiency of the motors by reason of having four motors rather than two would compensate for the increase in the investment. I presumed that would be the case with four motors as compared with two motors. Mr. Beggs states that the maintenance is less. I wanted to know something about that point, and as that question has been answered, I do not think I have anything further to say.

President Roach.—Gentlemen, we have Mr. Vreeland of New York with us this morning. I would like to have him say something on this subject, or such other subject as he may wish to talk upon. We ought to have some benefit of his great knowledge of the business.

H. H. VREELAND.—We have gotten into rather a technical discussion. I do not claim to be a technical man. Our peculiar conditions in New York are such that we cannot go into the character of construction which warrants the use of the standard double-truck car with four motors. We do it on a number of lines controlled by the syndicate which owns the New York lines, and wherever it is possible, and we are not held down to the matter of a sixteenth of an inch in step heights, as we are in Greater New York, we go to the square-body car and use the four motors. The peculiarity of our streets in New York is such that longitudinal lines, by reason of Central Park, have to use very narrow streets. We have to conform to the old type of construction, with sunk panels, to keep the cars moving. We have a number of cross streets through which the important lines operate, and the difference between the sunk-panel car and the square-body car means keeping the line in operation all the time, as against stoppages every once in a while of from ten to twenty minutes, owing to the numerous teams using the streets during the day. Take, for instance, our Fifty-Ninth Street line, running across town. If an ordinary truck is standing at the curb, the hub will go under the sunk panel of our car; while if we used a square-body car, we should not be able to pass. We also find it necessary to have step-raisers.

I want to say, as I said not long ago on this proposition, and as has been expressed a number of times, we are not trying to do gilt-edge railroading in New York. I mean to say that these things are not necessary. I had a man recently say to me that he thought it was an unwise thing to have step-raisers of an open car under the control of the motorman. It means to us on the down town streets of New York that the motorman can signal the conductor to raise the step and pass a truck without a stoppage of the car. which, under the ordinary conditions of a solid step, could not be avoided, and when you are running the cars five seconds apart, as we do in Centre Street, down town, it is a great advantage to be able to raise the step and allow the car to pass.

The proposition under consideration is so local with us in that respect, that to discuss it from the standpoint from which these gentlemen have taken it up would not amount to much, except as concerns our experience with the consolidated system in New Jersey, where we run high-speed, long-distance interurban cars. On that system we use the large type of car with four motors. We get the largest carrying capacity car we can with the highest speeds, and do not consider particularly whether there is more or less power consumed, if we can compete successfully with the surrounding steam railroad conditions. We have long lines, and in every instance they are in competition with the steam railroads.

The Board of Railroad Commissioners of the State of New York recently made a very thorough test of brakes. While we had nothing to do with that test, our men put on the instruments, and in this way we got some figures as to the power taken with our single and double-truck cars. Both are equipped with two motors, and the test showed that with the same sized motors on single and double-truck cars, there was an increase of about 20 per cent in the consumption of current in the double-truck car. I speak of this because I am uncertain whether it was due to the increased weight of the car or the increased length of the car. So far as the question of general car construction is concerned, we have not to consider so much the question of collisions at high speeds as we have the question of a "hogging" of the cars, as we term it; and as Mr. Wason says, it is no trouble to get any kind of a camber in our Broadway cars.

MR. SERGEANT.—I have been extremely interested in the paper which Mr. Heft has presented. I want to say, in the first place, that I have seldom seen so much valuable matter so admirably put in so few words. I think this paper is a model of brevity and information. On the question of power, of four-motor cars versus two-motor cars, or two-motor cars versus one-motor cars, there seems to be considerable difference of opinion. While we have had no experience in actual service with four-motor cars, for the purpose of determining what the power consumption was, we made some very careful tests with two and four-motor equipments. We found with the ordinary railway motors of different types that we got a little better acceleration with the four motors. We obtained, as a matter of fact, 10 per cent decrease in time, better speed, but we had to use 50 per cent additional current to get it. I should suppose the question is one of local conditions. Certain electricians have been trying to persuade me for years that two motors consumed less power than one motor. We have records covering a good many years that one motor consumes less power than two motors..

In regard to our elevated equipment, possibly we have been making a mistake. What we are intending to use is motor cars having one motor truck with 150-hp motors on that truck, making a motor truck and one trailer truck. Every car will be a motor car, and we will use the multiple control system. I hope inside of the next year, if you come to Boston, we can show it to you in successful operation. It will be the only elevated road which will go underground as well as be elevated, and we have to overcome long grades of 5 per cent and descending grades of 8 per cent. We feel, therefore, we want the greatest acceleration we can get.

MR. MACCORMACK.—While I was with the Brooklyn Rapid Transit Company, the president of that company thought it was advisable to have double-truck cars, and the first car that was built had the wheels all of one size, and the question came up whether it was advisable to put four motors on the car or two motors. Tests were made to decide this question, and it was finally decided to equip the cars with two motors on account of maintenance. An order was placed for double-truck car bodies. We had not yet determined whether we had the right kind of truck, and whether it was advisable to use four or two motors. We had some maximum traction trucks on the road, and in making the test in regard to the power and the efficiency in acceleration, it was found that the maximum traction truck was giving much better service. In consequence, we adopted the maximum traction truck, and I believe it was the only truck we could work with two motors and continue the service in Brooklyn. The fifteen cars referred to were equipped with wheels which were all of one size, and we had to pull those cars off the road whenever we got 3 ins. or 4 ins. of snow on the ground. It was absolutely impossible to get them over the road. I complained to the president of the company, but he thought I was wedded to the maximum traction trucks, and insisted on running them. One day he happened to be at Richmond Hill, going to Brooklyn. It was a twenty-four-minute run from Richmond Hill to Ridgewood. The president got on one of the cars with wheels all the same size, and he was fifty-two minutes getting there. He thought the wheels traveled a thousand miles. These cars were equipped with two motors. The next day we discontinued the use of the fifteen cars equipped with these trucks, because we had so many delays. They dragged the road and it was found impossible to operate them.

In Cleveland, when I went with that company, I found that all the cars were double-truck cars with wheels the same size. Some time ago I had a cyclometer put on the

driving wheel, the wheels equipped with the motor, and a cyclometer on the idle wheel, and the record showed that the driving wheel made many more revolutions than the idle wheel. I do not know that I can say much more, Mr. President, for the information of the gentlemen, but I want to say, in reference to Mr. Heft's paper, that it will give us more food for thought and study than any other paper presented to this association. There is one important thing he speaks of, and that is doing away with the brake-beams, having the brakes hung and operated direct, without brake-beams. I think that is something that can be appreciated, particularly in view of the trouble we have had in regard to chattering brake-beams and brake-beams catching up rubbish on the road, and sometimes when we have accidents we will find that brake-beams are a large factor in them.

Mr. McCulloch, Chicago.—Colonel Heft's paper has been discussed almost entirely on the question of economy in power, and from the standpoint of the strength of the car in its construction to resist damage from collisions. Most of us who have been in the street railway business a good many years remember when our cars were only 10 ft. in length, and to-day we have them 46 ft. in length; then they weighed 4000 lbs., and now they weigh 40,000 lbs. Then we had only 1 hp, or 2 hp, and now we have 268 hp. We did not consider the question of power at all, nor the question of the strength of the car to withstand shocks. We were considering how we should be able to carry more passengers, and how we could better please the man who has the nickel. I do not think it is a question at all of whether we shall use a little more horse-power or not if we can carry in greater safety the passengers who are in our cars, and we can carry a larger number of passengers. We can very well afford to burn an additional bushel of coal if we can carry a few more passengers to pay for it.

As to the collisions which have been referred to, and the construction of the cars to withstand the shocks, I suppose the only way to prevent collisions is to run the road with only one car. When we have a collision we do not consider what has become of the car, whether its transverse section is weak, or how much it will cost to repair it. What we do is to institute inquiries to find out whether there was some woman in the car whose transverse section was weak, and we shall have to pay for it. (Laughter.)

President Roach.—Gentlemen, you have heard the paper read and the full discussion which has been had upon it. What is your further pleasure in regard to the paper?

Mr. McCulloch.—I move that the paper be received and placed on file, with the thanks of the association to Colonel Heft for having written it.

The secretary announced that the members of the association were cordially invited to visit the plant and park of the East Side Electric Railway Company. An invitation was also read from the Country Club, of Kansas City, Mo., extending the privileges of the club to the members of the association. A further invitation from the American Stoker Company was read, inviting the members to visit a power plant equipped by that company.

President Roach.—Gentlemen, the next order before the convention is the report of the committee on nominations. This committee will also include in its report a recommendation as to the next place of meeting.

Mr. McCulloch.—With the consent of Mr. Rigg, the chairman of the committee on nominations, I would like to make a statement. In suggesting those who shall be our officers for the coming year, some member of our nominating committee has guaranteed strict attention to the duties of the office by each one of those we recommend, and we will ask any of the gentlemen who are nominated if he does not mean to attend to the duties of his office, if he is elected thereto, and give his earnest support in helping to carry the association along in a successful way, and give his personal attention to the meetings of the committee, we would like to have him decline the election, and let someone else be put in his place who will attend to the duties of the office.

Mr. Rigg, chairman of the committee on nominations, presented the following report:

Kansas City, Mo., Oct. 18, 1900.

To the President and Members of the American Street Railway Association:

Gentlemen—Your committee on nominations respectfully reports that it recommends New York City, N. Y., as its next place of meeting, and also recommends the following gentlemen for officers of the association for the ensuing year:

For president, Walton H. Holmes, president Metropolitan Street Railway Company, Kansas City, Mo.

For vice-president, Herbert H. Vreeland, president Metropolitan Street Railway Company, New York, N. Y.

For second vice-president, N. H. Heft, president Meriden Electric Railroad Company, Meriden, Conn.

For third vice-president, J. B. McClary, general manager Birmingham Street Railway Company, Birmingham, Ala.

For secretary and treasurer, T. C. Penington, treasurer Chicago City Railway Company, Chicago, Ill.

Executive committee, the president, vice-presidents and John M. Roach, Chicago; F. L. Fuller, Wilkesbarre, Pa.; George W. Baumhoff, St. Louis, Mo.; John R. Graham, Quincy, Mass., and John Harris, Cincinnati, Ohio.

The following resolution was unanimously passed by the committee:

Resolved, That the next meeting of the American Street Railway Association be limited to three days instead of four, and that the day set apart for the personal examination, by members, of the supply men's exhibit be the middle day of the interval. Very respectfully submitted,

John A. Rigg, Chairman.
Robert McCulloch.
E. G. Connette.
E. C. Foster.
D. B. Dyer.

President Roach.—Gentlemen: The election of officers is by ballot, and I will select Mr. McCulloch, of Chicago, and Mr. Beggs, of Milwaukee, to act as tellers.

Mr. Bean, St. Joseph.—I move that the secretary be authorized to pass the unanimous ballot of the meeting for the gentlemen nominated. Carried.

The secretary duly passed the ballot and the president declared the gentlemen nominated to be duly elected as officers of the association for the ensuing year.

President Roach.—There will be no further meeting of the association, but we will adjourn until to-morrow night at 7 o'clock, to meet at the Coates House for the annual dinner.

I desire to thank the members of this association for their kind consideration while I have been your president, and if there is anything I can do at any time to help the association, I will be pleased to have you call upon me while here and at home. (Applause.)

I will state, in reference to the paper which was to have been presented by Nicholas S. Hill, Jr., general manager of the Charleston Gas & Electric Company of Charleston, S. C., on "The Storeroom and Storeroom Accounts," that Mr. Hill has been ill for a long time, and has been unable to prepare the paper.

Mr. Heft.—I move that the thanks of the members of this association be tendered to our able and genial president and the other officers of the association, for the able manner in which they have conducted the affairs of the association during the past year.

The motion was carried by a rising vote.

Mr. Vreeland.—Before we adjourn, it would seem right along this line that it would be proper for this association to express its appreciation of the entertainment that has been extended to the members of this association by the Metropolitan Street Railway Company of Kansas City, and by the leading citizens of Kansas City, whose generosity has never been paralleled in my history in connection with associations of this character.

The motion was put and unanimously carried.

The meeting then adjourned.

The Entertainments

The entertainments provided for the attendants at the convention were worthy of the traditions of the Street Railway Association, and were heartily enjoyed. To those who had never visited the city before, and they comprised a large portion of those in attendance, the excursions to the neighboring points of interest were particularly welcome.

The first regular entertainment was a beautiful reception given in the parlors of the Midland Hotel on Tuesday evening by the officials and the Kansas City committee and their wives to the visitors. The full suite of parlors on the first floor and the grand stairway were utilized for this purpose, and were decorated by a profusion of palms and other potted plants, while over the hall mantel and at various other places were great bunches of American Beauties, with sheaves of carnations on the center tables. An orchestra, screened behind palms under the stairway landing, furnished music, and refreshments of punch, sandwiches and cakes were served from small tables. Many Kansas City people were invited to be present, and they and the visitors were well cared for by the reception committee, made up as follows: Mrs. C. F. Holmes, chairman; Mrs. G. T. Stockham, Mrs. Chester Snider, Mrs. J. H. Durkee, Mrs. W. E. Kirkpatrick, Mrs. W. A. Satterlee, Mrs. Walton H. Holmes, Mrs. A. M. Crow, C. F. Holmes, G. T. Stockham, John Brown, F. J. Taggert, Col. C. F. Morse, W. T. Osborn, Lathrop Karnes, Frank Peck, Henry Evans. Besides the ones named, the Commercial Club sent over a delegation headed by H. W. Evans and Secretary E. M. Clendenning. Most of the delegates to the two conventions were present.

During the afternoon many delegates spent their time at the Convention Hall inspecting the exhibits. Others improved the opportunity to drive about the city or take trips through the residential portions or into the suburbs on the cars of the Metropolitan Street Railway Company. As usual, the buttons of the association provided free transportation on all the lines in the city and vicinity.

On Wednesday evening a large party visited Armour's packing house, the largest establishment of its kind in the world. Fifteen special cars assembled about 2 o'clock at the corner of Eighth Street and Grand Avenue, close to the Midland Hotel, to transfer the visitors to the Armour establishment. Most of the attendants, including a large number of ladies, participated in the excursion, and as many of them had never seen a packing house before, the sights they beheld were found of much interest.

In the evening, the attendants were entertained at Coates Theater, the entire house of which was placed at their disposal by the Metropolitan Street Railway Company. Tickets were distributed by the secretary, and the theater was crowded. The performance was "The Runaway Girl," and several local hits were made which amused the audience greatly. At one point in the performance a reference was made to the convention button, and as the heroine, Miss Jerome, complained that no button had been provided for her, a large tin button the size of a dinner plate and corresponding to that worn by the delegates was handed over the footlights amid the laughter of the audience.

While the delegates were at the convention hall in the morning, the visiting ladies were taken for a drive about the city in coaches. Parties were made up at the Baltimore and the Coates and taken to the Midland, the general headquarters, whence the entire party started. The regular ladies' reception committee, Mrs. C. F. Holmes, chairman, had the party in charge, and three tally-hos were filled with sightseers. They were taken through Grand Avenue, East Eleventh, Locust and East Ninth Streets, the Paseo, Gladstone and Independence Boulevards, to Scarritt Point, back to Fifteenth Street, out Troost Avenue and Warwick Boulevard, through Westport and to the Country Club, where luncheon was served. From thence the party returned to the Midland, where all joined the crowd that went to Armour's.

On Thursday afternoon a very interesting trip was made to Fort Leavenworth, and the National Soldiers' Home at Leavenworth. A start was made by special train over the Missouri Pacific Railroad from the Union Depot, about 2 o'clock, and the fort was soon reached. This is an historic structure established in 1827, at the time when it was needed to protect the early settlers against the Indians. While the conditions have changed entirely since that time, it is still maintained as a large post, and is one of the most important home military stations in the country. Within the grounds are also the United States penitentiary, also a new Federal prison, now being built by convict labor. The visitors were met on their arrival by Government officials and escorted through all the buildings, after which a return was made to the train, which proceeded to the Soldiers' Home. This is also a Government institution, some 8 miles from Fort Leavenworth. A fine lunch awaited the visitors, after which they were escorted about the grounds by resident officials, and entertained by a fine band concert. The return was made to the hotels in Kansas City about 7.30. Some of the visitors made the trip to Kansas City by the trolley line of the Kansas City & Leavenworth Electric Railway, others by the train, while quite a considerable part went to Fort Leavenworth by trolley.

During all of the three days a great many of the visitors improved the opportunity by making trips about Kansas City on the cable and electric cars. For this puprpose Mr. Holmes generously placed at the disposal of the delegates his own private car, and those who had the fortune to ride upon it greatly appreciated this act of courtesy. The grounds of the Country Club, as well as its golf links, were thrown open to the delegates, many of whom improved the opportunity of visiting these beautiful grounds.

As mentioned in the proceedings, the Kansas City Club and the Elks' Club also extended the entrée to their rooms to the visitors. Here also the official button was all that was required to gain entrance. This courtesy was very greatly appreciated, and many took advantage of the kind invitations, especially in the case of the Kansas City Club, whose fine clubhouse was located near the Convention Hall, and was thus very accessible.

On Friday afternoon the vaudeville entertainment provided to the delegates by the supply men took place in the

convention hall. It was preceded by a parade starting from the convention hall and passing through the downtown districts. The cavalcade, which followed a band, was led by a remarkable looking animal to which it would have puzzled a professor of natural history to have given a correct name.

The vaudeville show in itself was a great success, and the fact that so much talent existed off the stage was a surprise to many. In the evening occurred the banquet, which is described elsewhere.

The Banquet

The banquet at the Coates House Friday evening was the formal ending of the convention. It was unfortunate that the calls of duty were too importunate for some of the delegates to enjoy the sumptuous repast provided, but there were some 200 who remained and partook of the choice viands and rare wines with which the board was spread. The banquet was served in the grand dining-room, the decorations of palms, ferns and great bunches of American beauty roses being most elaborate. At a long table across the east end, presided over by Vice-President John A. Rigg, toastmaster of the occasion, sat the officers and executive committeemen and the speakers of the evening. There were several substitutes among the latter, and the members of the entertainment and banquet committee are to be congratulated on the ability they displayed in obtaining such excellent alternates to those speakers who were prevented from attending. Even the president, John M. Roach, had received an important summons and had left for home earlier in the day, necessitating a change of toastmaster. Vice-President Rigg, however, proved himself most efficient in this capacity, and about 11 o'clock, as he mounted the platform of a car front which formed part of the decorations, he was greeted with hearty applause by the diners. This car front was a unique representation of a Metropolitan car platform, complete with brake, controller, gong, etc. Mr. Rigg in a few well-chosen words of compliment introduced President-elect Holmes as motorman and incidentally the toastmaster of the occasion. Thus was the new president most gracefully installed, and the banquet proceeded with added gaiety.

After a short address the new toastmaster introduced W. S. Gilbert, who responded to the toast, "Looking Backward," and brought out much laughter and applause by his witty treatment of the history of railroading. Frank Hagerman was down upon the programme for the toast, "The Trial Lawyer," but his place was ably filled by Judge McAnany, who divided his remarks into four stories illustrating four stages in the life of the average legal aspirant. J. H. Stedman, of Rochester, responded to "Our Guests" in place of Gardiner Lathrop, but he really took advantage of the opportunity to thank the city for its entertainment. Other toasts were most humorously handled by Frank B. Walsh and Chester Snider, and the merry-making lasted far into the night.

It was evident to all the delegates and their friends that the hospitality of Kansas City includes music which deserves the name, and the orchestra, which kept in almost constant tune during the banquet, was greatly appreciated. The only lulls were occupied by songs by the Virginia quintette and others. The *menu* was most artistic, and the appropriate design of a Metropolitan trolley car with some amusing side-lights created many a laugh. Altogether the banquet was a most fitting climax to a most successful convention, and will leave a pleasant memory with all the fortunate ones who attended.

Walton H. Holmes

Walton R. Holmes, the new president of the American Street Railway Association, comes of a family which has long been directly associated with street railway properties. In 1871 the first street railway to be opened in Kansas City was started by Nehemiah Holmes, father of the new president. This road consisted of a horse car line between Kansas City and Westport, and in 1875 Walton Holmes, then only about twelve years old, entered the service of the company in a subordinate position. He has therefore been intimately connected with all the important developments which have taken place in the growth of what is at present one of the largest and best operated systems in the West.

Before he was twenty-one Mr. Holmes was made vice-president of the road, and since that time, in connection with his brother, Conway F. Holmes, who has also remained constantly prominent in the affairs of the company, he has been identified with the management of the property

WALTON H. HOLMES

and largely responsible for its remarkable success. He is a man who does not believe in being "penny wise," but has the faculty of making business come to him by the judicious expenditure of money in building new lines. This liberal policy of opening up undeveloped territory upon the outskirts of the city, supporting in every way the improvement of the public parks, and giving the people what they want before they have learned to ask for it, has reflected upon the company the benefits merited and has placed Mr. Holmes, personally, among the leading citizens of the town. His long familiarity with every detail of the operation, his love of the work and his ever ready help to his employees, make him extremely popular with the men, and it is not an uncommon sight when accidents or breakdowns occur, as they will even in Kansas City, to see him directing operations or occasionally lending a hand, with a knowledge of detail and a hearty good-will that only long years of experience can give.

The present Metropolitan Company, of which Mr. Holmes is now the president, was organized in 1886. With its organization may be said to have begun the modern trolley régime in the city. The company now has about 160 miles of road, of which 120 miles are electrical and 40 miles cable. The transformation of many of the cable lines to electric is a matter of but a few months, however, as they have already been condemned by the management and the work of installing a trolley system begun.

Mr. Holmes is not only public-spirited in theory, but is largely interested in many important enterprises. He is president of the Kansas City Electric Company and has given his financial support to many other public service properties. His well known services on the executive and local committees guarantee the efficient fulfilment of his presidential duties, and the convention of 1901 is assured of an energetic, painstaking and satisfactory chairman.

Echoes of the Convention

President Roach made an excellent presiding officer, and was one of the most conspicuous figures of the convention.

C. S. Palmer, president of the Bar Association of Kansas City, and attorney for the Heim Line, was a regular attendant at the convention.

The display of blanks and forms made by the Accountants' Association attracted widespread comment and interest among members of both associations.

Many favorable comments were made upon our October issue, and we wish to take this occasion to thank the many who extended us their congratulations upon it.

T. M. Jenkins, general manager of the St. Louis & Suburban Railway Company, showed his great interest in the convention by bringing to it a large number of his staff.

John A. Rigg, of Reading, of whom one of the Kansas City papers said that he was president of 110 electric railways, was present and took an active part in the convention.

The daily published on the four days at the convention by our contemporary, the *Street Railway Review,* was eagerly sought after, and was highly creditable to the publishers.

H. H. Littell, who was president of the first convention, held in Boston in 1882, was present at Kansas City and had a host of friends. He was accompanied by his son, Clarence Littell.

Hon. E. P. Shaw, of Boston, was a prominent attendant at the convention. Mr. Shaw has been State treasurer of Massachusettts for a number of terms, and is very influential in electric railway circles in Boston.

W. Worth Bean was present during the final days of the convention, and was one of the very few there who had never missed a convention. Mr. Bean was absent during the opening of the convention owing to sickness in his family.

The visiting ladies were well entertained during the four days of the convention. The excursions and plans for them included several trips about the city, a visit to the Country Club in tally-hos, and a special luncheon on Friday afternoon tendered by Mrs. C. F. Holmes.

Cleveland was well represented by Ira A. McCormack and C. W. Wason. Both these gentlemen have the highest reputation as street railway managers, and have done much to advance the interests of the properties with which they are connected, as well as of the association.

Many delegates participated in the special trip over the Heim Line, tendered by the managers of that company to the association on Friday morning. On the same morning the accountants were the guests of the Metropolitan Company on a tally-ho drive. They were shown about the city by J. A. Harder, auditor of the system, who was elected vice-president of the Accountants' Association.

The vaudeville show given at the convention hall on the afternoon of Friday was well attended and well presented. All of those who were instrumental in thinking of and arranging for this entertainment are deserving of thanks, but especial mention should be made of Elmer P. Morris and V. C. Gilpin, who devoted a great deal of time to the undertaking.

Telegraph, postal and express offices were opened in the convention hall, and proved a great convenience to the delegates and exhibitors. The different departments at the convention, including the registering department, were in charge of conductors of the lines of the Metropolitan Street Railway Company, and their tasteful blue uniforms and attractive appearance spoke ably for the high class of men employed on the system.

One of the pleasantest features of the convention is that of meeting old friends. The street railway consolidations of the past few years have made many changes in personnel. In many cases old-time friends have been separated and have taken up their residences in cities thousands of miles apart. A street railway convention enables them to come together often for the only time during the year, and this occasion was enjoyed fully.

The address of John I. Beggs, of Milwaukee, before the Accountants' Association, on "What Does the General Manager Want to Know of the Accounting Department?" was generally considered as one of the clearest and most concise summaries ever made outlining the work of any one department in street railway operation. Mr. Beggs is a forceful speaker, and his long experience in electrical work makes his opinions on any subject related to electrical traction or lighting of great value.

The proposal of the supply men to relieve the local managers, in future conventions, of the details connected with placing of exhibits, etc., through the action of a standing committee, seemed to meet with general favor. This is always an arduous task, and it hardly seems fair to impose this work on an official of the street railway company where the convention is to be held. In this connection it might be said that this work was most admirably carried out at the Kansas City convention, and reflected great credit on the Kansas City authorities.

Many familiar faces were absent from this convention; among them were Charles Clemenshaw, of Troy; C. T. Yerkes, of Chicago; E. S. Goodrich, of Hartford; H. C. Moore, of Trenton; John W. McNamara, of Albany; D. G. Hamilton, of Chicago; C. D. Wyman, now of Boston, and formerly of New Orleans; A. E. Lang and Thomas H. McLean, of Toledo; W. F. Kelley, of Oakland; E. E. Higgins, of the STREET RAILWAY JOURNAL, and John A. Brill, of Philadelphia. Others whom all would have been glad to see were John B. Parsons, of Philadelphia, and F. A. Fuller, formerly of Chicago, but now of Wilkesbarre, and who was elected to membership in the new executive committee.

The Brooklyn Heights Railroad Company was well represented at the convention by Clinton L. Rossiter, president; Eugene Chamberlain, superintendent of equipment; William Robbins, division superintendent, and Newton W. Bolen, division superintendent. Mr. Rossiter took an active interest in all the proceedings and also made a most careful investigation of the exhibits. Mr. Chamberlain is a newcomer in the street railway field, and made many friends on the special train and at the convention. He was formerly connected with the New York Central & Hudson River Railroad Company, and is one of the many steam railroad men who have been selected to control the affairs of important street railway systems.