

# Electric Railway Journal

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NEW YORK—OCTOBER 13, 1911.—ATLANTIC CITY

### PROGRAM FOR TO-DAY

#### LAST CONVENTION MEETING

9.30 a.m. Closing Session of Engineering Association, Marine Hall,  
Convention Pier.

#### ENTERTAINMENT

10.00 a.m. Amateur Exhibition, Ocean End of Convention Pier.

10.00 a.m. Obstacle Golf, Lawn of Marlborough-Blenheim Hotel.

8.30 p.m. Musical Program, Exchange of Marlborough-Blenheim  
Hotel.

9.30 p.m. Informal Dancing, Marlborough-Blenheim Hotel.

#### Safeguarding Fares

The most important features of the report of the committee on fares and transfers, presented yesterday before the Transportation & Traffic Association, relate to methods designed to safeguard the receipts of conductors. The committee expressed surprise at the slow progress in the methods of collection and registration of fares, and it is very evident that in so doing it has called attention to one of the possibilities for improvement in railway operation. It is clear that, notwithstanding the prepayment principle and other improvements that have been introduced by many companies, there is still room for advances. It is unfortunate that the companies are obliged to consider so seri-

ously the necessity of protecting themselves against careless and dishonest employees and that part of the public which is anxious to ride free. While it is true, as the committee says, that definite steps should be taken to insure accuracy of records and returns, the problem should be considered from the two standpoints of mechanical device and improvement in the men. Both should be contributory causes of better results. The work allotted to the committee seems so large for one committee that it might be wise to confine its researches to the one subject of greatest importance with which the report deals, the collection and registration of fares.

#### The Reports on Education

Two reports on education have been submitted at this convention—one Monday at the American convention by the committee of which Prof. Norris is chairman, the other by the Engineering committee on engineering apprentices. Each discusses a different phase of educational work, and one which has not previously been considered at length by either association.

The electric railway business is so new that there has not been time to develop a large number of workmen who are sufficiently versed in electric railway practice to carry on maintenance work properly. At the same time, the business is so old and maintenance methods have become so far standardized as to make it worth while for men to learn the trade and for railway companies to encourage them in doing so. Times have changed since the early days when any bright machinist or workman could acquire in a short time the special knowledge required for inspection or repair work on electric railway properties.

While the reports of the two committees are on different subjects, in a sense they are supplementary to each other. The report on engineering apprentices recommends a regular apprenticeship course of four years for shop men, although it devotes its attention toward advocating particularly the education of men engaged on the work of car repair. The report of the committee of the American Association describes a correspondence course conducted last summer under the auspices of the association among twenty-seven men on the properties of five company members. The results obtained in the comparatively short time during which this course was in progress lead the committee to recommend a continuation of the experiment on a somewhat larger scale, and the committee has wisely, we think, added a recommendation that each student should bear a portion of the expense. This will make each man realize that the service which he is receiving is one involving sacrifice on the part of himself as well as of others, and this knowledge should be an incentive to good work. A larger number of students and a longer course are recommended for next year.

A correspondence course such as was conducted by the committee on education last summer and is proposed for next year when compared with school instruction suffers, of course, under the handicap of distance from the instructor. This handicap should be less, however, than in most other correspondence courses, because the students, instead of being isolated, are together on one property. There is not the same chance that individuals among them will become dis-

couraged as there is when each man works alone. There would be an esprit de corps which would maintain the interest of all in the work. On the other hand, the course has the advantages possessed by all systems of instruction by correspondence in that it compels each student to express his ideas in writing, and it is a maxim in education that the necessity of giving written expression to one's ideas induces accuracy and clear thinking.

There is no doubt that both courses would be most efficacious in developing the high grade of shop men for whom there is a great need on electric railway properties at present. The principal question which will be raised, we think, by railway companies will not be in regard to the intrinsic value of either course to either the company or to the man but as to whether the company which defrays the expense of this instruction is likely to be the final beneficiary. In other words, the question will arise whether the student will not be disposed, after finishing his course, to demand higher wages under threat of going to another company.

This objection, of course, is old, and it has been urged against the establishment of all apprenticeship courses, because in practically all of them the apprentice is paid, in wages and in the time taken to teach him, more than his services are actually worth. Undoubtedly there will be some defections. Nevertheless we believe that this condition will be largely counteracted by the natural tendency of most men to remain in the place where their work is giving satisfaction, and where they are receiving fair remuneration. This, we should think, would be especially true with men who have spent several years learning the details of electric railway repair work, because the special knowledge thus acquired would be less likely to be of value to them in any other industry than if they were simply good machinists and could readily work in any shop.

#### Economy in the Power Station

No fact is unhappily more familiar to the station manager than the failure of his equipment to give the expected degree of economy. Station design for high efficiency is now a familiar art, but between design and performance there is too often a great discrepancy. The study of the various causes of inefficiency in operation is a very important duty of practical engineering, and Mr. Stott's admirable report on developments in the generation of steam, read Wednesday at the meeting of the Engineering Association, points the way to most useful improvements on ordinary practice. As a glance shows, Mr. Stott deals directly with the problems of boiler and furnace economy. The fact is that in a great power station the prime movers and the electrical equipment of the plant have now been so well worked out that, while improvement, here as everywhere, is possible, it does not in point of absolute efficiency promise anything nearly so considerable as improvements in the generation of the steam.

Modern turbo-generator units give very high efficiency over a wide range of load and on the basis of their efficiency curves should require very low fuel consumption. From actual experience these theoretical expectations are not met even approximately. The steam performance, all things considered, including auxiliaries, is never quite so good as it should be, considering the known efficiency of the turbine itself at various loads, and going back a step further the generation of steam will in every case show the chief cause of failure of the system to reach its theoretical efficiency. From the known performance of the high-grade water-tube boilers used in most recent power stations the coal consumption, assuming first-class fuel, should closely approach 1 lb. per hp instead of approximating or exceeding 2 lb. To put it broadly, the consumption of fuel of supposedly known thermal value is always notably, and sometimes very largely, in excess of what should be necessary

from the known possible performance of the boilers for the supply of the requisite amount of steam.

Mr. Stott's suggestions are largely in the direction of checking the boiler performance and of keeping constant watch on conditions that promote boiler efficiency. Perhaps the largest single item that makes for inefficiency in the fire room performance as between coal and steam is uncertainty as to the practical thermal value of the fuel. It is one thing to make calorimetric tests of fuel and quite another thing to secure anything like these thermal values day in and day out under a boiler. Any of the familiar forms of calorimeter secure practically complete combustion, a condition which is never met on a large scale. A systematic study of the relation between coal supplied and ash rejected when using fuel of known calorimetric value would open the eyes of many an engineer to imperfections of furnace design and operation. One of the instruments referred to by Mr. Stott provides for the systematic and continuous measure of the fuel supplied, for instance to an automatic stoker. This in conjunction with a steam meter ought to give a continuous record of very great value.

Furnace design for maximum economy of combustion is the one thing in power plant economy now most in need of persistent attention. Mr. Stott points out the difficult conditions of varying load that must be met by the boiler and furnace, and his point that the boiler room equipment should be designed for maximum operating economy at the average load of the plant is well taken. There must, however, always be provision for effective forcing of any of the boilers even at some loss of economy. The methods of possible forcing are several. The use of duplicate stokers to which Mr. Stott refers and which is already practised by the Twin City Rapid Transit Company is a very feasible scheme, of which the economy, however, is not fully determined. The use of auxiliary oil burners in connection with ordinary furnaces seems to us also a promising method of doing the same thing. It is substantially the method used by the Denver Gas & Electric Company for quick firing of boilers in case of trouble on the transmission lines, and it is there found that the oil burners can be put into full action and the forcing process begun in three minutes. No method of forced combustion seems more prompt or more likely to be useful in emergencies, and while the full economy of a duplex coal and oil burning furnace has probably not yet been worked out, the plan seems deserving of more extensive trial particularly in places where reasonably cheap oil can be obtained.

#### Segregation of Freight and Passenger Costs

The adoption of the basis for segregation of passenger and freight expenses suggested by the joint committee whose report was considered Wednesday by the Accountants' and Transportation and Traffic Associations would lead to uniform results. We agree with the committee that that is the principal advantage to be obtained now from the use of a system of this nature. It is significant of the difficult nature of this task that the members of the committee reach the unanimous opinion that all items of expense that can be charged directly should be so charged. Other items, in the judgment of the committee, should be charged on the basis of proportionate car mileage or gross earnings. It would be interesting to know what results are secured from the application of the plan. It will not meet all the permanent needs of the industry if a scheme of this character is adopted for the sake alone of introducing uniform methods, but it will be a step in advance and the results secured may furnish data for further study of costs that will lead to a scientific separation of expenses which appears to be impossible now. Differences of opinion between competent authorities regarding the fairness of segregation of costs between departments are so radical that it is to be hoped the method outlined will be given practical tests in operation.

## Conventionalities

The delegation from Iowa this year has no head, but is a strong body, which includes among others, L. D. Mathes, Dubuque; Frank J. Hanlon, Mason City, and Brother Cass, of Waterloo.

Bill Bloss, who oscillates through Indiana with a view to congesting the manufacturing plant of the Ohio Brass Company with big orders, says he is only here for a few days and so is making the best of it.

Ask C. J. Franklin, general superintendent Portland (Ore.) Railway & Light Company, whether he really believes in discipline. That is to say, what is etiquette when a policeman tells you to crawl under a rope?

Daniel M. Brady, president of the Brady Brass Company, arrived in Atlantic City Wednesday evening on the Pennsylvania Railroad and he emphatically states that it was the Pennsylvania and not any other road.

It is a long journey from Fargo, N. D., to Atlantic City, N. J., but Curtis P. Brown, manager of the Fargo & Moorhead Street Railway Company, made it and he says that in his opinion this convention is very well worth the trip.

There was a run on the drug stores yesterday morning for court plaster, arnica and witch-hazel by the contestants in Wednesday night's athletic carnival. No serious casualties are reported, however. Red Cross Campbell had little to do during the battle.

Ed. Faber's program for Thursday was run exactly on schedule, as are the trains of the Great Third Rail Route from Chicago to Aurora and Elgin. The aforesaid program was noted to contain several periods devoted to having a picture taken on the Boardwalk.

Fred Stockwell, of the Barbour-Stockwell Company, finding that he could not escape the insistent demands for certain special work by hiding in the maze of the convention, has fled to his Massachusetts home. Daffydil—What made Charles Rufus Hot (Harte)?

LOST—Sam McGough is very much disturbed over the loss of his first name from the official registration list. Evidently in registering Sam the typist suspected that the Mc part of his name stood for Mike and something else, thus making the Sam part of it redundant.

C. G. Chamberlin, the handsome young representative of the Devoe & Reynolds Company, is again shaking hands with his many friends, and the only thing to be commented on besides the natural beauty of this popular young man is the stunning way in which he wears his cane.

James Anderson, president of the Canadian Street Railway Association and general manager of the Sandwich, Windsor & Amherstburg Railway, was seen busily engaged in explaining to his innumerable friends just why his two-year-old reciprocity prophecies were a little in error.

C. B. Fairchild, Jr., statistician, Chicago City Railway, and Mrs. Fairchild sauntered up and down the Pier, but it is understood that the sauntering was not so very good for the first few hours after their arrival. Probably this was because of their many friends greeting them so often.

F. D. Norviel, general passenger and freight agent Indiana Union Traction Company, after witnessing Witmer's flights with the Curtiss hydro-aeroplane yesterday afternoon immediately made arrangements with the Curtiss Exhibition Company for flights at several points on the lines of the Indiana Union Traction Company. The first flights of the series will take place at Anderson, Ind., on Wednesday, Oct. 25. The flights will probably be made by C. C. Witmer.

Charles A. Lindstrom, chief mechanical engineer of the Pressed Steel Car Company, Pittsburgh, Pa., arrived in Atlantic City Thursday morning with his two daughters. He came to help out W. H. Wilkinson, of the New York office of the company, who has been kept busy as chairman of the roller chair committee.

"Charlie Jones" ordinarily would be considered an easy name to transcribe on a typewriter, but somehow or other the machine stuttered and now the genial superintendent of transportation of the Aurora, Elgin & Chicago Railroad is down in black and white as H. J. Jones, which name, to him, does not mean anything.

George Keummerlein, Jr., superintendent of transportation, The Milwaukee Railway & Light Company, has the distinction of being the only really and truly railway man who is a full-fledged associate member of the Illinois Electric Railways Association. All the other so-called associate members are either peddlers or pencil-pushers.

It's a safe bet that the Electric Service Supplies Company never knew that its Keystone valves would ever be connected to a pushball, or that the Burdett-Rowntree Company never knew that its air compressor is the slickest thing in the world for blowing up a pushball. If you want to know how the combination worked, ask the pushball men.

J. S. ("Maek") McWhirter, superintendent car equipment Third Avenue Railroad, New York, was seen disporting himself like a dolphin in the surf on Thursday morning fully recuperated from his pushball efforts of Wednesday night. He was chaperoned by George E. Auston, the natorial expert of Flatbush and Poo-Bah of the American Engineering Company.

President Castle of the Manufacturers' Association yesterday sent to the Dearborn Drug & Chemical Works a letter containing the following well-merited words of appreciation: "On behalf of the American Electric Railway Manufacturers' Association I wish to express our appreciation of your generosity in permitting your Mr. H. G. McConnaughy to devote so much of his time to the arduous duties of the chairmanship of the exhibit committee. Mr. McConnaughy's work in this connection has reflected great credit upon both himself and the association."

Through the kindness of a judge whose "quality of mercy is not strained," Thomas A. H. Hay, president Northampton Traction Company, Easton, Pa., was permitted, almost at the last moment, to visit this convention accompanied by his rosy cheeks and a dress suit. It takes more than a little litigation to keep the "Man from Montana" away from his fellow-magnates. Mr. Hay's brother, W. O. Hay, vice-president, general superintendent, purchasing agent and a few other things of the Northampton Traction Company, reached the convention first. He is accompanied by his son, who is going to follow father's footsteps when his college days are over.

J. G. White & Company extended a dinner Wednesday evening at the Marlborough-Blenheim to the representatives of its various railway properties and to those from the New York office at the convention. The railway companies represented at the dinner were the Tri-State Railway & Electric Company, Steubenville, O.; Eastern Pennsylvania Railways Company, Pottsville, Pa.; Wilmington & Philadelphia Traction Company, Wilmington, Del.; Tri-City Railway Company, Davenport, Ia.; Augusta Railway & Electric Company, Augusta, Ga.; Oklahoma Railway Company, Oklahoma City, and the Manila Electric Railroad & Light Company, Philippine Islands. The officials of these companies were greeted by the nine representatives of the New York office who are in attendance at the convention.

## THE NEW PRESIDENT

Thomas Nesbitt McCarter, who is president of the Public Service Corporation and who was elected president of the American Electric Railway Association yesterday, has always taken an active interest in the association, and has attended regularly its conventions. He was born in Newark, N. J., Oct. 20, 1867. He received his early education at the Newark Academy and at Pingry School, Elizabeth, preparing for Princeton University, from which he was graduated in 1888. He studied law at Columbia Law School and in the office of his father, the late Thomas N. McCarter, one of the recognized leaders of the American Bar. Upon being admitted to practice, Mr. McCarter became a member of the firm of McCarter, Williamson & McCarter, which connection he maintained from 1891 to 1899, when he withdrew and began the practice of his profession alone.

In April, 1896, John W. Griggs, then Governor of New Jersey, appointed Mr. McCarter judge of the First District Court, Newark, for a term of five years. After three years' service, however, he resigned. During his time on the bench



Thomas N. McCarter, President-elect American Electric Railway Association.

Mr. McCarter wrote "McCarter's New Jersey District Court Practice," which work is still recognized as standard throughout the State.

After retiring from the bench in 1899, Mr. McCarter was chosen as the Republican candidate to represent Essex County in the State Senate. He was opposed by Samuel Kalisch, who was recently appointed to the Supreme Court Bench by Governor Woodrow Wilson, and defeated Mr. Kalisch by more than 5000 votes. Mr. McCarter was elected leader of his party in the Senate for one year. He had practical charge of the State campaign which resulted in the election of Franklin Murphy as Governor and managed the campaign which led to Hon. John F. Dryden's election to the United States Senate in 1902.

On Jan. 1, 1902, Mr. McCarter retired from the general practice of law to become general counsel of the Fidelity Trust Company, one of the largest financial institutions in the State, of which he had for years been solicitor. In March of the same year he was appointed by Governor Murphy as Attorney General of the State for a term of five years. He was then completing his term as senator and his colleagues promptly confirmed him in his new position as the successor to the late Samuel H. Gray.

Less than a year after he assumed the rôle of legal adviser to the State, Mr. McCarter was chosen to serve with John I. Waterbury, John D. Crimmins, the late A. J. Cassatt

and the late E. F. C. Young on a committee to which was intrusted the task of devising a plan for the rehabilitation and development of street railway and other public utility properties in New Jersey. The work of the committee led to the organization of the Public Service Corporation of New Jersey, which took over some eight or ten street railway systems and a number of gas and electric properties in the northern, central and southern sections of the State. As the result of his work on the reorganization committee, Mr. McCarter was prevailed upon by those most directly concerned to accept the presidency of the new company. He retired from the practice of law to devote his energies to his new field of endeavor, and under his management the properties were rebuilt, improved and extended and their activities so accelerated that the gross revenues were increased from about \$10,000,000 in 1903 to something like \$30,000,000 last year. An organization was developed, so that the railway business, the gas business and the electric business are carried on by the Public Service Railway Company, the Public Service Gas Company and the Public Service Electric Company respectively, leaving the Public Service Corporation of New Jersey as a parent or holding company. The corporations under Mr. McCarter's management furnish one or more forms of public utilities to 193 municipalities, which have a combined population of more than 2,000,000. A description of the railway properties of the Public Service Corporation was made the subject of the Convention Issue of the ELECTRIC RAILWAY JOURNAL this year.

## SOCIAL EVENTS TO-DAY

As this is the closing day of the convention, the program of entertainment contains no formal events. At 10 A. M., C. C. Witmer will repeat his flight of yesterday afternoon in a Curtiss hydro-aeroplane off the end of the Pier. In the evening there will be music and informal dancing at the Marlborough-Blenheim Hotel. The obstacle golf links will be open in the morning only, and the competition for prizes will close at noon.

## TRAINS FROM ATLANTIC CITY

For the convenience of those who may be leaving to-day the following times of departure of trains from Atlantic City for Philadelphia and New York via the Philadelphia & Reading and Pennsylvania Railroads are given.

To Philadelphia—Reading: 9 a. m.; 11 a. m.; 2:40 p. m.; 5:35 p. m.; 8 p. m.

To Philadelphia—Pennsylvania: 9 a. m., electric; 10 a. m., steam; 11 a. m., electric; 12:45 p. m., electric; 2 p. m., steam; 3 p. m., electric; 4:45 p. m., steam; 4:45 p. m., electric; 7 p. m., electric; 9 p. m., electric; 11 p. m., electric.

To New York—Reading: 8:45 a. m., 2:10 p. m.

To New York—Pennsylvania: 9:15 a. m., 2:30 p. m.

The Philadelphia & Reading station in Atlantic City is at the corner of Atlantic Avenue and Arkansas Avenue.

The Pennsylvania stations for steam and electric trains adjoin each other, at the corner of Atlantic Avenue and Tennessee Avenue.

## PHOTOGRAPHS OF THE ATHLETES

Those who wish to purchase photographs of the group of contestants in Wednesday evening's athletic carnival can do so from Harper Smith, the photographer at the corner of Boardwalk and Kentucky Avenue, Atlantic City. We are publishing this notice because the entertainment committee thought that it would be of more convenience for the delegates and others who wish this photograph to have the notice appear in print rather than to have the photographer circulate on the Pier for orders.

### THE CONTESTANTS OF WEDNESDAY NIGHT

The accompanying photograph shows the doughty athletes in the contest Wednesday night. The victorious "lifers" in the baseball game stand triumphant at the right, with President Erady holding the loving cup in the center. The "stonebreakers" look as downcast over their defeat as though they had been condemned to another twenty years of penal servitude.

Car 23, which proved Wednesday evening that it knew how to "skiddoo" away from unlucky 13, is in the center of the discomfited ball players. The triumphant pushball mechanics are at the right, and the defeated dudes at the left. The policemen, as in the contest and in daily life, are in front of the picture, while the umpire and chairman of the entertainment committee remain modestly in the background.

### NICKEL-STEEL RAILS IN ROCHESTER

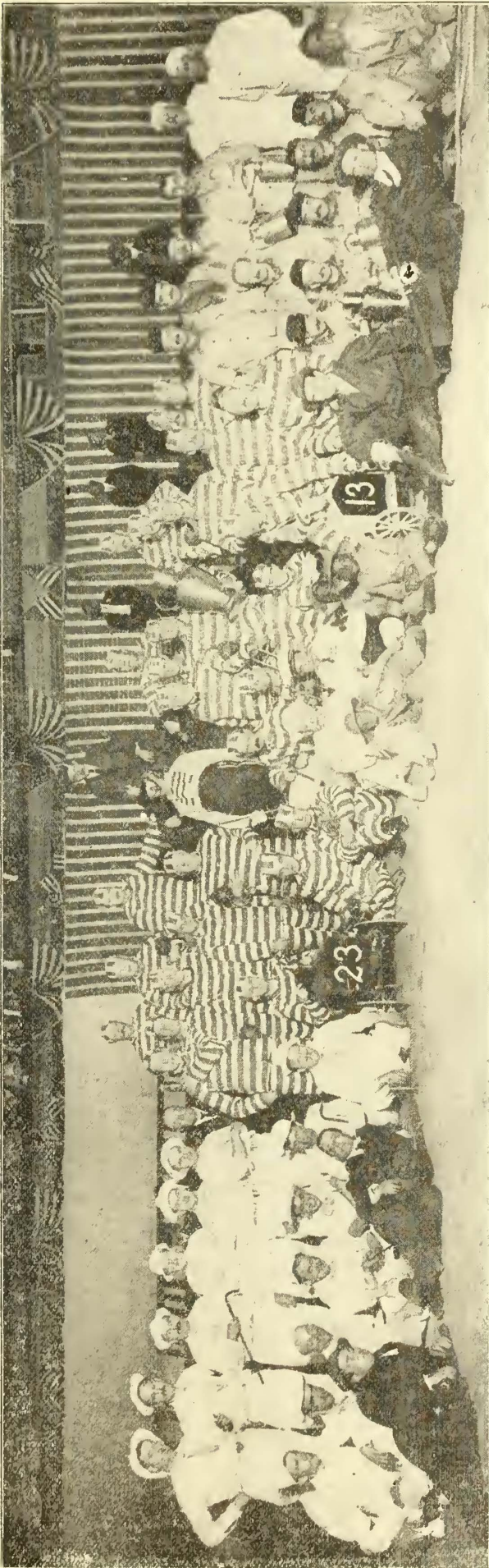
The New York State Railways at Rochester have been conducting some very interesting experiments on the wear of rails of different compositions. E. J. Cook, general manager of the company, has been strongly of the belief that a well-maintained track is one of the most desirable adjuncts of economical operation and that track maintenance can most readily be secured by a high quality of track construction.

The standard type of rail in Rochester, except on the streets of very heavy traffic, is a T-rail, which is laid in paved streets with a grooved stone block and in brick pavements with a molded brick. In the spring of 1909 the company laid on State Street, Rochester, a section of double track about 800 ft. in length of 7-in. 100-lb. T-rails, containing about 3 per cent of nickel. The surface maintained by these rails was so good that the company this summer laid 150 tons more of the same rail. Operation will be commenced over this track this month. Although the track laid in 1909 has shown no signs of cupping or other deterioration at the joints, the company decided to make the new track even more perfect, if possible, by its equipment with nickel-steel joints. The Continuous joint is standard on the company's lines, and arrangements were made with the manufacturers of these joints, the Rail Joint Company, to provide a supply of nickel-steel continuous joints to equip the track. Nickel-steel bolts and nuts were used with these rail joints.

Track work to be undertaken in the immediate future includes still another interesting feature. Although present indications point to a very low rate of wear by the nickel-steel rail, the company is anxious if possible to use rail of equal durability but with an alloy which is less intrinsically expensive than nickel. Hence it has also decided to lay a section of track with high carbon rails and has just placed an order for 250 tons of 7-in. T-rail with a percentage of carbon varying from 0.75 per cent to 0.875 per cent. Such a rail, of course, is much less expensive than the nickel rail. The company is of the belief that a rail of the high carbon percentage mentioned is amply strong enough structurally to sustain the most severe traffic which will be imposed upon it in electric railway service, and that it can be handled and laid without danger of breakage if sufficient care is taken in unloading the rail. For the rest of the new track construction to be undertaken in Rochester the company has ordered titanium rail, which has been its standard for some time and of which it has laid 1500 tons this year. The type of titanium rail employed has been a 5-in. 100-ton A.S.C.E. section. This rail is purchased from the Lackawanna Steel Company and the nickel rail from the Pennsylvania Steel Company.

The company has also been using some chrome-nickel wheels.

A Group View of the Contestants at the Carnival Wednesday Night.



## CLOSING SESSION OF THE AMERICAN ASSOCIATION

The closing session of the American Electric Railway Association was held at the Greek Temple yesterday afternoon. President Brady called the meeting to order at 3 o'clock and read the following letter from Thomas A. Edison:

"Dear Sir:—I would suggest that the association appoint a committee to investigate the storage battery cars now in operation in various parts of the country, driven by my new battery.

"I predict a great future for the cars of this character and think the committee if appointed will be surprised both technically and commercially."

The president said that he thought the letter might wisely be referred to the Engineering Association with the suggestion that it investigate the general subject of storage battery cars if it should think proper.

President Brady then read a telegram from Past-President W. C. Ely, in which Mr. Ely said that he was making a good, though slow recovery and hoped to be at the mid-winter meeting. President Brady said he had also received a letter from President Calhoun, of the United Railroads of San Francisco, saying he had expected to be in Atlantic City but had been unexpectedly prevented.

The secretary then presented the report of the committee on the Brill prize. It was contained in a letter from The J. G. Brill Company as follows:

Mr. H. C. Donecker, Secretary American Electric Railway Association:

Dear Sir:—The jury of award, consisting of W. A. House, president United Railways & Electric Company of Baltimore, appointed by the American Railway Association; H. W. Blake, editor of the *ELECTRIC RAILWAY JOURNAL*, and S. M. Curwen, vice-president and general manager of The J. G. Brill Company, has rendered its decision on the relative merits of the theses submitted in the 1911 senior thesis contest for prizes of \$250, \$150 and \$100 offered by The J. G. Brill Company for the best thesis on the subject "Design of a Prepayment Car for City Service," which is as follows:

First prize and John A. Brill Memorial Medal: A. Herber. Packer, Armour Institute of Technology, Chicago.

Second prize: Charles F. Clise, Sheffield Scientific School, Yale University.

Third prize: Henry S. Bagley, department of electrical engineering, University of Arkansas.

In view of the fact that only five theses were submitted in the contest this year, we have decided to discontinue our offer to the senior students of the engineering departments of universities and colleges.

Yours truly,

(Signed) "THE J. G. BRILL COMPANY."

### ELECTRIC RAILWAY DICTIONARY

The next business was the report of the committee on electric railway dictionary, which is printed elsewhere. H. H. Adams, Metropolitan Street Railway, New York, presented the report, which was accepted and adopted and the committee was discharged.

### TAXATION

Calvert Townley, Lackawanna & Wyoming Valley Railroad, presented the report of the committee on taxation. He called attention to various features of the report and in conclusion said the report recommended that a committee on taxation be continued and that it be enlarged by the appointment of a member from each state.

Upon motion of Mr. Fassett this was done.

### OTHER REPORTS

The following reports of committees were then read: Committee on determining the proper basis for rates and fares, committee on compensation for carrying United States mail, committee on federal relations, committee on insurance. They are found in abstract elsewhere in this issue.

### PHYSICAL VALUATIONS

An address on "Physical Valuations" was then presented by O. T. Crosby, president Wilmington & Philadelphia Traction Company, Wilmington, Del. This address will be published in abstract in an early issue of the *ELECTRIC RAILWAY JOURNAL*. A vote of thanks was extended to Mr. Crosby for his paper.

Mr. Crosby's paper was discussed by Prof. D. C. Jackson, Massachusetts Institute of Technology; Prof. M. E. Cooley, University of Michigan; C. N. Duffy, Milwaukee, and C. G. Young, New York.

### REPORT OF COMMITTEE ON RESOLUTIONS

Gen. George H. Harries, Washington, chairman of the committee on resolutions, then submitted a resolution expressing the regret of the association at the death of officials of member companies of the association who had died during the year. A resolution of thanks was also expressed for the increased interest taken in the association by the technical and daily press, the resolution referring to "not merely the faithful, efficient all-the-year-round service of the *ELECTRIC RAILWAY JOURNAL* but also the extremely valuable and gratuitously circulated convention daily issues of that wise spokesman." There was also a resolution of thanks to the American Electric Railway Manufacturers' Association "for its long time and growing co-operation in our work, for its highly successful contributions to the success of this convention and for the spirit of helpful good fellowship displayed by the members on all occasions." Another resolution referred to the wide-awake and flourishing condition of the association as being due to the devoted skill of the officers and committees, and the thanks of the members were tendered to President Brady and those others "who had labored untiringly to produce results which are in every sense most gratifying."

### LETTER BALLOT

President Brady called attention to the importance of the member companies voting by letter ballot on standards and recommended practice of the Engineering Association. On motion the recommendations contained in the president's address were referred to the incoming executive committee with power to act.

### NOMINATIONS

J. H. Pardee, chairman of the committee on nominations, then presented the report of that committee. The following gentlemen were named as officers of the association for the coming year:

President, Thomas N. McCarter, Public Service Railway, Newark, N. J.

First vice-president, George H. Harries, Washington, D. C.  
Second vice-president, Charles N. Black, United Railroads of San Francisco, Cal.

Third vice-president, C. Loomis Allen, Syracuse Rapid Transit Railway, Syracuse, N. Y.

Fourth vice-president, Charles L. Henry, Indianapolis & Cincinnati Traction Company, Indianapolis, Ind.

The report also stated that a letter had been received from Vice-president W. G. Ross, requesting that he should not be considered for re-election because he had severed his active connection with his former electric railway interests.

On motion the secretary was instructed to cast one vote for all of these gentlemen and they were declared duly elected officers for the coming year.

The newly elected president, Mr. McCarter, had been called away early in the afternoon by an engagement and was not present, but the retiring president introduced Gen. Harries, the new first vice-president of the association. Gen. Harries made a few remarks in his genial vein, after which a motion to adjourn was carried.

The Board of Control has approved the specifications for the projected tube railway in Toronto, to cost between \$4,000,000 and \$5,000,000.

## THURSDAY MEETING OF ENGINEERING ASSOCIATION

President Harvie called the meeting to order at 10 a. m. The report of the committee on buildings and structures was the first paper on the program. Martin Schreiber presented the report.

### BUILDINGS AND STRUCTURES

The secretary then read written communications on the report from Charles H. Patton, of the Cleveland Inspection Bureau; William A. Stoney, manager, Fire Underwriters' Electrical Bureau, and J. W. Brown, assistant Superintendent of transportation, Public Service Railway, Newark.

Mr. Patton wrote that there were two features that should be given a thorough test before finally acting thereon. Reference was made to open sprinklers in car yards and monitor nozzles for car yards. Insurance engineers were not all favorably impressed with the monitor nozzle scheme or with the open sprinkler plan for open car yards. A committee of the National Fire Protection Association probably would make some investigations between now and its next meeting and report on them at its annual meeting.

Mr. Stoney wrote that it would be for the interest of the street railway companies to send copies of the report to the members of Fire Underwriters' Electrical Bureau and some others. It would undoubtedly convince the underwriters that the electric railways were endeavoring to minimize fire hazard and would be to the mutual benefit of all parties concerned.

Mr. Brown said that the subject of buildings and structures, while mainly an engineering proposition, had many features of vital importance to the operating officials, particularly when new carhouse plans were under consideration. Economical maintenance was vitally important in these days, when the cost of performing the service steadily increased while the nickel grew no larger. Closely allied with economy of maintenance was economy of movement, and this conservation of the time element should be taken into account in carhouse design. The spectacle of a carload of restless passengers impatiently waiting in front of a carhouse while the conductor went to the receiver's office, situated in the rear of the building, or while the motorman sought his locker in the second-story back, was not an uncommon sight. The two or three minutes' delay thus occasioned was costly and could be greatly reduced by proper design.

Economy of movement was also associated with economy of maintenance in track layouts at carhouses. Where morning and evening rush-hour service required pulling out cars on headways of from one to three minutes every facility should be afforded to get them out of the carhouse with the minimum interference with each other. "Neck of the bottle" conditions must be avoided wherever possible. Congestion at the carhouse had been responsible for many gaps in the service downtown during the rush hour. In various ways the design of buildings and structures affected the work of the operating department, and with economy as the desired attainment it would seem wise to consider these features in connection with maintenance.

Proper facilities for employees might be considered a modern innovation. It was the result of the latter-day conception of the relations between railway companies and their employees. Men were very largely creatures of environment and where inadequate toilet facilities kept in a slovenly manner were maintained, there would be found slovenly employees. Opportunities to wash and brush up in a clean, sanitary lavatory would always be taken advantage of and result in a better appearance of the rank and file.

The suggestion of the committee with regard to locker rooms, assembly rooms and their proper heating, lighting and ventilation should meet with prompt approval by the operating men.

A third suggestion he would make was the development

of an efficient corps of fire fighters from among the motormen and conductors during their waiting time at carhouses by instruction and actual use of fire apparatus. This might be of value sometime and would prove an enjoyable diversion to the employees.

E. T. Munger, Hudson & Manhattan Railroad, New York, did not believe in steam heat or hot-water heating systems for use in carshops or carhouses, particularly the latter. The difficulties with steam were usually due to the freezing of pipes in cold weather. On cold nights it was necessary to keep the shops and houses as warm as in the daytime when the men were working, to prevent freezing, while, as a rule, heat was not needed at night. With the blower system of hot-air heating there was no danger of freezing pipes or flooding pits and floors with water, consequently it was an economy. With steam and hot-water heating there was usually more or less water falling from the top of the pipes, which was a nuisance. With regard to doors for large openings there were several designs of rolling doors on the market. One type could not be repaired; with another it was only necessary to take out the damaged portion of the door, straighten and replace it, and the door was again ready for service. The great trouble with rolling doors was that the motormen or switchmen bringing the cars into the shop would not open wide enough to clear the cars. Referring to the recommendation as to heating the inspection sheds, he had always been in favor of a warm pit for the men. They had more nimble fingers, and oftentimes the heat in the pits would melt off snow and ice and disclose things that needed attention. With regard to fire protection in carhouses and terminals, including open yards, there was at the present time an awakening in the public mind to the enormous loss by fire each year. The street railway companies were contributing their full share to the loss. He agreed with the committee that automatic sprinklers should be furnished as the best possible protection in inclosed places. Where cars were stored in yards in large numbers he believed that a sprinkler system which could be operated by an employee was the best thing.

E. B. Katte, New York Central & Hudson River Railroad, said that in building the electric equipment shops at Harmon and the inspection sheds at White Plains hot air was used entirely for heating. About fifteen years ago it was a custom to have all the locomotive repair shops heated with steam coils in the pits. That practice was almost obsolete now on the New York Central. Hot air was used in all of the engine houses and especially in the pits; and in all the electric pits or locomotive shops an abundance of hot-air heat was provided. Roller doors had not been used by the New York Central. The principal trouble with them was that they would stick in a short time. Even the best of them corroded and even when they were repainted the paint interfered with the operation of the doors. It had been his company's practice to use outside swinging doors that come together in the middle between the tracks. In the substations where very large doors were also used roller doors were considered, but in the later designs a sliding door was used. The earlier ones had large swinging doors.

D. G. Knight, Public Service Railway, Newark, believed the best door for carhouses was a sliding door. The swinging door was exposed to the weather twelve months of the year, but the sliding door was exposed only about eight months of the year, and was protected from the weather all the time. The swinging doors cost from \$100 to \$250 a pair and their life was not over six years, while he thought the life of the sliding doors would be twelve or fifteen years. With regard to the outside construction of buildings he warned against the use of any kind of projections, which catch water and freeze up in the winter time and split the brick. In roofs he would keep away from all hips, valleys and large cornices, which added to the maintenance cost.

E. T. Munger spoke about putting in the stub-end tracks at inspection sheds. They were more trouble to operating men than perhaps any other feature around the yard. The first cars that were taken into the barn on a stub-end track were always the last cars out. Stub-end inspection shops were a positive detriment and cost the company a great deal of money every year.

Secretary Litchfield said that the Interborough Rapid Transit Company in the last year had opened up lunch rooms at the various terminals, taking particular care that the location of these lunch rooms should be accessible to the men. He thought that was a controlling point as to whether they were going to be successful or not. One of the latest ones had been put up in one-half of a subway passenger station. A large proportion of the passengers came in on the side of the station, so the other side had been given up almost entirely to a recreation room in which was a restaurant. It had proved very popular, because the men could get a quick bite in between runs.

Martin Schreiber said relative to floors that some architects thought that a reinforced concrete floor with a cement finish should be used in employees' rooms and offices. Personally, he was of the opinion that the wood floor was better. A tiled floor was to be preferred over a cement floor. He asked if any of the members present had had any experience with artificial floors, such as were used in the Hudson & Manhattan terminals and in some cars. One of the advantages of artificial flooring was it was not dusty, as all concrete floors had been found to be, even though they were painted, and it lent itself very nicely to running up into corners, etc., so that it could be kept clean easily.

E. T. Munger said the Hudson & Manhattan Railroad had been using composition flooring on cars ever since the road opened. Recently it was necessary to repair a number of the first floors that were put in, and a series of experiments was begun with different makes. They were now using a flooring which cost 10 cents per sq. ft. for the material. The labor of laying it amounted to about 1 or 1½ cents per sq. ft. After three or four men were broken in to lay this floor they could lay it very quickly. The flooring which he was using at the present time had a much softer feeling under foot than a concrete or a cement floor, did not seem to be affected by frost and it did not crack.

Henry N. Staats discussed the "Fire Protection" section of the paper. He said that six years ago H. J. Davies, chairman of the committee on insurance of the American Association, had asked him why electric railway properties should be rated so high; why they could not eliminate the hazards, and make the risks of such character that the railway people could obtain their insurance at rates as low as the factory mutuals of New England were giving to their members? He had replied that if the electric railways would themselves become interested to the extent of protecting their own interests there would be no trouble in getting or obtaining the very lowest rates of insurance applicable to the hazards. At that time the proper rates which should be applicable to electric railway property were not known, and there had been a great contest over the question of rates during the past six years. The railways were now winning out. They were learning to think and act for themselves, and were getting the results in the reduced rates of insurance. During the past six years the rates on electric railway properties have been reduced from an average of 1½ per cent on each \$100 per annum down to less than ¾ per cent. About 73 or 74 cents was the average rate to-day on such property, including both protected and unprotected property. Protected properties were those which had been protected by the most scientific means for extinguishing fire. That might appear to be a pretty satisfactory rate, but mill mutual companies, which include cotton mills, woolen mills, paper mills, combined wood and iron works and planing mills, carry a total of \$2,500,000,000 of

insurance and at average rates of less than 10 cents per annum on each \$100 of insurance.

The hazards connected with the properties of electric railways were less than the hazards in any one of these various factories to which he made reference, with the exception of machine shops. There was no reason why the electric railways in this country should pay more than is being paid by these factory people for their properties. They should pay less. They should obtain their insurance at 10 cents or less on each \$100 of insurance carried; and he hoped before the expiration of another year to prove that the exact cost to the insurance companies was 9.93 cents.

Mr. Staats then read a description of the Monitor nozzle system of the Woorhill Road car yard of the Cleveland Railway, which supplemented the brief description of this installation in the committee's report. The insurance rate on that car yard after the nozzle equipment had been installed was reduced \$1.05 per \$100 from the former rate. The old rate was \$1.45 and after the installation of the equipment it was reduced to 40 cents. The company saved almost enough in one year to pay for the entire installation of that equipment. The company was going to ask to have the rate made 20 cents instead of 40 cents.

Referring to the installation of sprinklers in the open yard of the Interborough Rapid Transit Company, which he said cost \$100,000, Mr. Staats thought that there was only one feature lacking, that was the monitor nozzle or universal nozzle system to reinforce the open sprinkler heads. With that class of protection the Interborough should be able to protect the yards at the reduced rate of 10 cents, or carry its own insurance.

F. G. Simmons, Milwaukee Electric Railway & Light Company, speaking as a member of the committee, said that the committee had prepared nothing which should go at this time to the committee on standards except "Instructions to employees for fire protection." Those rules were applicable in almost any instance, and should be referred to the committee on standards for adoption as recommended practice.

Mr. Hand, Continuous Glass Company, described methods of making wire glass by the old method, styled the "sandwich process," employing two rolls and two corings. In using that process there was an interval of chill and an initial strain was put on the glass which seemed to cause it to crack without apparent cause, especially in skylight construction. The so-called continuous process consists of a single pouring and a single rolling without an interval of chill, and the glass entered the annealing ovens at a bright cherry color. The process of annealing required about three hours' time, during which the glass traveled about 260 ft. It issued ready to trim or cut to size. This glass behaved admirably when used in terminals, car barns, train sheds and skylights generally, and rarely cracked. It is frequently used in 24, 36 and 28-in. widths and in lengths up to 108 in. A pitch for the glass in skylights of less than 3 in. might be challenged. In this climate he would prefer 6 in. pitch. His company was producing for carhouses and roundhouses a corrugated glass. The process used admitted of incorporating wire in a plate of glass ¼ in. thick and many hundreds of thousands of square feet had been set in the deck lights of trolley cars. Clear wire glass was being used for street car vestibules in Washington, D. C.

Henry S. Staats said he recommended wire glass very highly in certain places, but the one place where it should not be used was in the transom of the car windows. Where automatic sprinklers were used, it was necessary to get water inside the car. This matter had been taken up by The J. G. Brill Company and others, and a strong recommendation had been made not to use wire glass in car transoms.

It was moved that the report of the committee be accepted and placed on file, and that portion of the report on "In-



struction to employees for Fire Protection" be referred to the committee on standards with the recommendation that it be approved by it as recommended practice. The motion was carried.

## WAY MATTERS

J. M. Larned, Pittsburgh Railways, presented the report of the committee on way matters. The question of a standard girder rail had been before the association for some years and tentative sections had been submitted by various committees, but there were no data to show the principles which may have governed them in their designs. It had therefore seemed desirable to draw up an analysis of the rail section submitted, showing under the headings the functions which the girder rail was required to meet and perform, the dimensions affecting such functions and the reason, so far as practicable, for each dimension. The committee was of the opinion that in order to meet the requirements for a girder rail, two depths were called for, a 7-in. and a 9-in. rail with corresponding guard rails. The committee, however, was not able to consider during the year other than a 9-in. section. A tentative bolted joint for this rail had also been submitted for the consideration of the next committee. It would be well for the association to consider a specification for steel in rails in the near future as the chemical analysis and manufacture of these rails had been too often left entirely with the manufacturers.

Mr. Charles A. Clark, Cleveland Railways, submitted an extensive written discussion on the committee's proposed design of 9-in. rail. He approved of the shape of the head of the rail which was the same as he had been using for two years. He thought the tread should be inclined to the gage. All rails wore to about the angle shown in the design submitted by the committee. The width and depth of the groove was sufficient to accommodate wheels with M. C. B. flanges. He thought the head of the rail was slightly too narrow and that it should be made  $2\frac{3}{8}$  in. wide instead of  $2\frac{1}{2}$  in.

Mr. Clark preferred a 7-in. rail instead of a 9-in. rail. He thought a 7-in. rail weighing about 100 lb. per yard could be made as strong as the 9-in. rail submitted by the committee. The difference in weight amounted to 51.8 tons per mile, making the difference in cost, at \$40 per ton, \$2092. The joint plates also weighed 133 per pair. This would amount to about \$130 per mile, making the total saving \$2200 per mile. In addition there was a saving of  $\frac{1}{2}$  in. in depth of excavation, amounting to \$290 cu. yds per mile at 50 cents, or \$150. There was also a saving in the paving blocks. He presented a calculation showing that if the interest on the additional cost of 9-in. rail laid on track was taken into account and the life of the track was assumed to be 15 years, there was a saving of \$593 per mile in that time. If brick paving was used, this saving would amount to \$2636 in 15 years. He did not agree with the committee that a deep section was needed on account of the joints, as he had found that heavy joint plates of less height had done the work quite as well. With regard to the width of the base, the 9-in. rail would have to have a base 7.08 in. wide to have the same resistance to overturning as a 7-in. rail with a base  $5\frac{1}{2}$  in. wide. He was now conducting an experiment with titanium steel rails, containing 0.70 to 0.85 per cent carbon and 0.10 per cent titanium. The rails were very hard, but were also ductile. He had also increased the carbon in the joint plates to from 0.60 to 0.70 per cent. He highly recommended grinding rail joints before new track was put into use.

H. F. Merker, East St. Louis & Suburban Railway, said it was not the intention of the committee at any time to recommend the adoption of a 9-in. rail to the exclusion of a 7-in. rail as a standard. Mr. Clark's ideas of a good rail agreed very closely with the committee's. So far as the angle of the lower part of the head was concerned, 10 deg.

was adopted by the committee because it would be very difficult to determine exactly what this angle should be.

Regarding the practice of bonding under the fish-plates, this was a very common practice and for that reason it would have to be provided for in a standard. In regard to the width of the base, the manufacturers were considered in this regard, and it was undoubtedly true that by going to a width greater than  $6\frac{1}{2}$  inches, great difficulties would be encountered. A width of  $6\frac{1}{2}$  in. was undoubtedly sufficient for stability.

A. F. Nelson, Pennsylvania Steel Company, said that from a practical standpoint the proposed rail had some good points, but he would recommend especially the thick web. The weakest point in all 9-in. girder rails to-day, especially in rails with thin webs, was in a line right through the bottom joining the web and the flange. The committee gave the weight of the rail as 136 lb. He had laid the section out a few days ago, and found that the rail would really weigh a little over 139 lb. The area given of 13.6 sq. in. would make it  $138\frac{1}{2}$  lb., so that the rail is about 3 lb. heavier. He thought the tram was a little thin through the bottom of the groove. It should be at least  $\frac{1}{8}$  in. thicker. The point of the flange was heavy enough. The flange as a whole was too thin for such a heavy rail. The engineer to-day was trying to get the same amount of metal in the head as in the flange, if anything, favoring the flange. A comparison of this rail showed 6.08 sq. in. against 3.77 sq. in. There was no reason that he could see why manufacturers should have any difficulty in furnishing such a rail if it was adopted.

R. C. Cram, Connecticut Company, said the committee realized that in rolling rails, both the head and the base should be made of an equal area or cross-section if possible, but there were other considerations than the question of weight. The amount of metal in the base of a girder rail did not need to be as much as in steam road rails, because it was not necessary to provide for the heavy side thrust which came from unequally balanced locomotive drivers.

Victor Angerer, William Wharton, Jr., & Company, thought the rail section proposed by the committee was admirably worked out. Of course a 7-in. section was a necessary adjunct. The tram of the rail was thinner than might be used to suit the conditions in some cities. The thickness eventually would be reduced by the wear produced by vehicles, and the top would be grooved out by the vehicle traffic in some cities. It was to the interest of the railroad companies to keep the vehicles off the track and make it difficult for them to follow the track, but unfortunately that was an impossibility in some cities like Philadelphia where the streets were so narrow. Another point to which he called attention was the design of a guard rail for curves. Unless the depth of the groove was reduced to less than  $1\frac{3}{8}$  in., which was undesirable, the thickness of the metal in the center of the bottom of the groove would not be sufficient to withstand the side thrust of the cars on sharp curves.

Martin Schreiber referred to the fact that the committee made a definite recommendation to send this section on to the standard committee alone. He did not think anything would be gained by sending the 9-in. rail alone. The committee conceded that the 7-in. rail must be designed before the subject was fully covered. There was also the 9-in. guard and a 7-in. guard to be covered before the rail subject would be complete.

E. O. Ackerman, Columbus (Ohio) Railway & Light Company, said the proposed section was the best thus far developed for the weight. The web was a departure from the usual rail. Personally he preferred to have the smaller dimension of the web carried down to near the neutral axis and then have the web curved instead of straight, thus slightly increasing the dimensions near the under side of the head of the rail without changing the amount of metal

in the web. The width of the rolling surface or top of the rail he thought was sufficient for the wheel treads which the association had adopted as standard. The amount of provision made for wear upon the rail was perhaps greater than that of any rail section which was being used. In the future there would be more wear upon the surface of the rail than in the past, and the matter of increasing the thickness of the ball of the rail to provide for this was important. If 1/16 in. more was added to the top of the ball of the rail it would give increased life enough to fully warrant it. The addition of 1/8 in. on the top would give practically 12 1/2 per cent more life from a rail with an increase of perhaps 3 per cent of metal. Until a 9-in. guard section rail was fully developed, he would not favor adopting the plain rail as a standard.

H. F. Merker offered a motion that the executive committee be instructed to refer the consideration of a 9-in. girder grooved and guard rail and a 7-in. girder grooved and guard rail, and rail joints for same embracing the principles outlined in the report of the way committee for 1911, to the way committee for 1912. The motion was carried.

#### WAY DEPARTMENT RULES

J. M. Larned then opened the discussion on the book of rules for the government of way department employees which was presented by the committee. The book of rules endeavored to cover both urban and interurban conditions. This had caused to be added to the book some rules which might be considered unnecessary from a city operating point of view, but were necessary from the viewpoint of the interurban road. Many of the rules were largely copied from the standard interurban book of rules. In other respects the rules were entirely general and would apply to both city and interurban services. With but slight alterations they would meet the requirements of most companies.

Fred Simmons, Milwaukee, presented a written discussion, in part as follows:

"My criticisms and suggestions are based purely on my own views and opinions and must necessarily be to a large extent general. I am willing to concede the advisability and possibly the desirability of the adoption of certain rules of this general character; what I do question is both the advisability and the desirability of adopting at this time, either as recommended practice or as standard, a set of rules as far reaching and as detailed as those now before us. It seems to me that the first step in this proceeding should be to endeavor to lay down some standard form of organization for the way departments, before adopting a voluminous set of rules and regulations which would of necessity have to be very largely modified, altered and amended by many of the members in order to make them properly applicable. The organization chart proposed by the committee seems to be a very comprehensive one although it does not fit in with the present form of organization existing in the way department of which I am at present in charge.

"However, before these rules are so adopted, we should endeavor to agree on a standard chart of organization which can be made in such a manner as to be capable of contraction along exact lines so as to fit the organization and requirements of any of the smaller systems. This may mean the formulation of a series of such charts, two or three, or even a half dozen as the necessity might develop.

"In 1902 the American Railway Engineering Association took up this subject for consideration. No definite conclusion was reached. In 1906 the committee on rules reported a proposed set of rules contemplated to cover the following points: Protection in case of obstruction of track; condition of under, over and grade crossings and proper protection of same; reporting neglect of any department whereby train movements would be jeopardized; personal attention to renewal or extraordinary work. It also formulated some rules for the government of supervisors of structures and supervisors of signals.

"The rules submitted covering the supervision of track were only fourteen in number and it is therefore evident that the association proposed to move slowly in the matter, giving it a great deal of study so as to avoid cumbersome and erroneous rules.

"In the rules under discussion you will find from twenty-five to thirty rules telling us what constitutes a motor or engine, what constitutes a single track, what constitutes a double track, etc., and it seems to me unnecessary to cumber up a book of rules with a lot of this to all intents and purposes unnecessary verbiage.

"In 1910 the rules of the American Railway Engineering Association had been amplified to such an extent that ninety rules were then adopted covering general rules for the way department, track supervisors, track foremen, supervisors of structures, bridge and building foremen, signal supervisors and foremen. As these last twenty-four rules may be eliminated from most of the departments of the electric railways concerned in this work, we would then have but sixty-six rules covering the employees of the way department, and this, after a matter of eight years' work in connection with the formulation of the rules. It therefore seems to me apparent that in attempting to adopt at this time 169 rules covering this work, we are proposing to begin at the wrong end of the ladder.

"In conclusion I desire again to emphasize my recommendation that the form of organization first be standardized, and that then rules which would apply be formulated, but I think that the committee should start with, as before stated, a small number of rules which might be shown to be undisputably necessary and then the rules amplified from time to time as the committee and the association found desirable."

M. J. French said there was one great obstacle to the steam railroads adopting any one set of rules. They have had their rules for years, developing them and working them out, and they are very loathe to give way on that. There seemed to be a great deal of prejudice in regard to these rules. The sooner some rules were put into effect the better it would be. In compiling these rules the committee had considered the rules which have been already adopted or passed on to be adopted by the transportation association.

H. F. Merker said it was the intent to leave no doubt as to what was meant by certain terms. He would view a book of rules as a table of symbols in a book where many symbols were used.

R. C. Cram said in connection with the organization chart that the committee in preparing this started out with several charts, and on the lines suggested by Mr. Simmons; and in that they had several distinctly marked organizations for various sized properties. It had simmered down to this one organization.

M. J. French said that so few rules as Mr. Simmons suggested would require practically an annual revision. If any of the rules in the book were objectionable they could be omitted by any particular company.

Martin Schreiber thought the rules were too large a subject to send to the standardization committee with but one year's consideration.

J. M. Larned said the subject of rules would be before the association from the time they adopted a standard book of rules until the end, and they would be continually undergoing improvement until printed.

A motion that the recommendation of the committee on way matters as given on page 12 of the 1911 report be adopted was passed.

A vote of thanks was given to the committee for the excellent work it had done in the past year in getting up the new idea for the rail section, and for the large amount of labor expended on the rules.

Adjourned until Friday at 9.30 a.m.

## THURSDAY SESSION OF THE TRANSPORTATION & TRAFFIC ASSOCIATION

The first matter of business at the Thursday morning session of the Transportation & Traffic Association was the report of the committee on fares and transfers. The report, which was read by M. R. Boylan, Public Service Railway, will be found on another page of this issue.

### FARES AND TRANSFERS

E. J. Cook, Rochester, presented a sample of the transfer he had put in force about two years ago when he made certain changes in the rules. On account of the increased percentage of transfer business, it was found necessary to make a general clean-up. The matter was taken up from the legal standpoint first to find grounds for a system of transfers which could be carried out in practice. The general form of the transfer finally devised and adopted was somewhat different from the usual transfer inasmuch as it only carried two punch marks, the idea being to enable the conductor with a minimum number of punch marks to indicate not only the line and the direction, but also the junction point or transfer point.

After handing out samples, Mr. Cook said that the idea of the color scheme was this: It is divided into four fifteen minute parts each hour, each color representing fifteen minutes. In other words, the white transfer would be void at thirty minutes after the hour punched. One punch mark indicated the hour and the other the line on which it was good. The men found it easier to lift the transfers, and the expiration of the transfer was more readily told on the car than in any other way. Mr. Cook said further that the various changes in the transfer system were widely advertised, but it was some time before the general public was fully informed of the situation. The direct result of this change was a falling off in the percentage of transfers and revenue passengers and a possible saving in receipts, but it also prolonged the time necessary for the purchase of additional equipment to handle additional traffic.

C. E. Learned, Boston, believed that the committee's report was one of the most comprehensive ones he had ever read, and many things about it were well worthy of adoption. As an illustration he quoted from it as follows:

"It is surprising that a matter so vital to the welfare of the operating companies should have shown so little progress in methods employed, and that no really scientific basis such as is applied to so many other branches of our work has been devised to insure accuracy of records and returns from the passengers carried on electric railway lines."

Mr. Learned said that was very apparent to anyone who operated twenty-five or thirty years ago in horse car days. In other words, the register of to-day in a general way was no better than the one of thirty years ago. It was simply a record of the passengers carried. The time had certainly arrived, especially in the operation of prepayment cars, when serious attention would be given to a suitable mechanical device. The present form of transfers in general use was, to a large degree, responsible for delays in issuance and acceptance. They were printed to cover every transfer point on the system and consequently it was necessary to use very small type. If printed by lines it would necessitate only points where transfer was permitted to be indicated, and on extending the privilege of transfer no cancellation other than date or time would be necessary. As regarded the standard form of transfer, he thought it high time that one should be adopted. They should be distinctly a.m. and p.m. To avoid loss by office cancellation some check must be used on the date canceled, say Oct. 3, or passed to another year, in order to save it. In Boston they thought of arranging the matter of dates by letter. Take "A" for any particular day or consecutively for two or three days, following with other letters

of the alphabet. This would make it necessary for the conductor to come to the office each day and get his new transfers, so the company could expect him to turn in all the old ones. If he received a transfer letter "A," he would know he should have that letter "A" on all that he took in. There were but few conductors who examined the cancellation as to time unless they operated lines in the country where few board or where they were required to turn in transfers every trip. The question of a transfer law was certainly very important. They had stopped the abuse by a law passed in Massachusetts some few years ago. Under that law they had been able to prosecute something like one hundred cases, losing but two cases in the entire number tried. He thought there was a great deal of trouble in proving intent to defraud when a man gave away a transfer. The law is very short and directly to the point. It reads as follows:

"All street railway companies shall cause to be printed on the transfer ticket issued by them to passengers the condition under which such tickets may be used. Whoever uses a transfer ticket in violation of any such condition, or whoever uses or attempts to use a transfer not issued to him, or whoever for value disposes of or attempts to dispose of a transfer ticket issued to him to any person, or whoever for value delivers or attempts to deliver a transfer ticket not issued to him to any person, shall be punished by a fine not exceeding \$50 or by imprisonment for a time not exceeding thirty days."

Mr. Learned said that under that law they had been able to prosecute everybody except the man who gave the transfer away. They found that the people who gave away transfers simmer down to newsboys who would solicit transfers and hand them to persons who purchased papers. The company's agents followed the man who received it to the point where he attempted to use the transfer. Thereupon fare was demanded and upon refusal his name and address were taken and a summons secured for him to appear in court. The man was kept under continued surveillance to see if the name and address given was correct. Invariably the man gave a wrong name and address, which was prima facie evidence of intent to defraud. The cases were tried, the sentences ranged from five days to six months and the fines from \$10 to \$300. Regarding blind registers he said the blinding of the register in an old-fashioned collection was one thing while with the prepayment system it might mean altogether another thing. With the system used today in the ordinary registration of fares, they returned the overs and collected the shortages. With the blind register one could neither return the overs nor collect the shorts. The shortage on a blind register meant that the man had not only received the amount of money that he was short but that he had registered the shortage, so that the shortage on a blind register was a gain to the company. In the open registration the mere fact of 40 fares having been turned in to the auditor proved that 40 fares had been registered. That made easy counting and no trouble. If a man had collected 60 fares and had turned in for 40 only, the company made one dollar by the error. With a blind register, of course, it would be necessary for the man to pay the amount from his own cash in the morning and then at night turn in what he had over. As to prepayment cars, Mr. Learned said that in Boston, fortunately, they were on lines where very few transfers were issued. They had so far been unable to find the fare box that they wanted to adopt. They used an ordinary box as an experiment simply to educate the people to deposit the money in a box. This box was open, but the management was considering a box of more serious form. All transfers were registered on a separate register because the conductor had to account for every passenger. The claim that they should not be registered on account of the time consumed in registration or inability to get clerks to count accurately was an ad-

mission of incompetency that the same managers would hesitate to express regarding those hired to collect and examine the cash fares collected. Of course the expense in checking up transfers as to date, time, etc., was an expensive matter, but it was justified by the importance of the subject.

Bruce Cameron, St. Louis, said that on his system each conductor put all of his transfers on a given trip in an envelope and marked on the envelope his leaving and arriving time; all of those transfers must be within that time. Every date is printed on the transfer and there are only two punch marks, the line and the time.

M. C. Brush, Boston, referred to his transfer-checking experiences on a smaller property than St. Louis. They collected the transfers exactly as in St. Louis, in an envelope under a time stamp. Then they checked out the time of the receipt of the transfer as shown by its punch and the time shown on the envelope by the time stamp. They believed that by that means they had absolutely prevented the abuse of transfers by conductors and by passengers. A number of their inside men continuously called attention to the fact that several conductors had left as a result of not being able to make any further money on account of this transfer system. When transfers were collected in an envelope, a man who was thoroughly familiar with all the lines and transfer points was selected to check one day's business in about four or five days. Consequently, he did not check every day's business, but the conductors had no knowledge as to whether they were going to be checked Monday or Friday. This man laid one conductor's transfers out in order. It was found of course that where two conductors roomed together, one man pulled out say ten to twenty transfers in the morning and guessed that at 12 o'clock he would come to a certain transfer point (say the number of the transfer was 2500) and he would punch it for that hour, presuming that he would reach No. 2500 by that hour. Then the other man did likewise. Thus the company would find by looking at the transfer numbers that No. 2500 was issued at 12 o'clock perhaps whereas No. 2600 was issued at 11 o'clock. The conductor was then called in, shown all the transfers and asked to explain the disparity in numbers and the hour of punching. The only reply was that he had pulled the transfers out from the middle of the book. In about three months the conductors began to realize that the transfers were being checked and at the end of about nine months there were not more than three or four instances where there was apparent intent to do anything dishonest.

Mr. Cameron said they checked their transfers, too. The greatest trouble was with conductors rooming at the same place or who had exchanged transfers. There was little of that trouble now that he knew of. The main trouble was in the abuse of the transfer privilege by the passenger. They had made a few arrests and gathered in a few of the worst ones.

C. D. Emmons, Fort Wayne, asked if the conductor was permitted to keep his punches and his transfers over night. If they were deposited every night, that would prevent some of the frauds mentioned.

Mr. Learned said they were allowed to do so. They kept the transfers until they are used up. They turned in the opening and closing number, that is, they turned in the number of the blank transfers that they started with and then the last transfer on their pad at night.

W. B. Rockwell, Pottsville, said that in his experience there was no use in having the open register; that the blind registers were the only ones to be used.

Mr. Boylan said they returned all overages. They had printed in the upper left hand corner of the day cards a space in which to name the amount of change at start, the amount of change at ending and also to give the number of transfers used. If they found that a conductor turned in 25 or 50 cents more than the total registered passengers

as called for by the slip while having \$5.00 at the start and \$5.00 at the end, the overs were not returned; but if he had \$4.50 at the end and \$5.00 at the start, they did return the 50 cents.

J. J. Anderson mentioned his transfer system as applied to a railway with a terminal station. The line transfers, those that were issued before reaching the terminal, had been cut down to within six or seven blocks of the terminal. The line transfers issued were ordinary transfers good for one direction and within a certain time limit. Inside the station a terminal transfer was issued to all passengers who desired them. They were issued by the motorman as well as the conductor. The terminal transfers were good only in the station but were accepted on any car except on the car on which the passenger came in. The transfers were good all day if the passenger stayed in the inclosure, but not good if he went outside. The company evidently was saving money, as many people were saying now that they had to pay 10 cents for a shorter ride than they used to get for 5 cents. The line transfers had been cut down about 20 per cent.

J. S. Moore, Syracuse, asked what was the common practice with regard to time limit on transfers issued by city lines which had interurban transfer points or where the interurban operates over the tracks of the city line.

Mr. Cherry replied that on his system the transfer allowed the passenger to get the next connecting car.

On motion of Mr. Brush the report of the committee was accepted.

#### SCHEDULES AND TIME-TABLES

The next matter on the program was the report of the committee on the construction of schedules and timetables, which was read by I. H. McEwen. This paper is printed elsewhere in this issue.

Mr. McEwen said one of the members had made a suggestion which had not been included, namely, under the heading of "Supplements to New Timetables," the further recommendation that in many instances changes of timetable might be made sure by designating on the summer schedule the trains which would be discontinued at the end of the season.

Mr. Emmons said many of the ideas given were very excellent indeed, but there was one question in his mind. He wanted to know if the committee gave attention to the standardization of leaving time for those who operate local and limited cars. In the West it was found almost impossible to do this. If they had the limited leaving one hour after the local, then at the end of the line it is nearly up to it, so a further length of time must be allowed in operation.

Mr. McEwen said no consideration had been given to this topic, but that was because it was mainly a local condition depending largely on the length of the line.

H. A. Nicholl, Anderson, said this report seemed to cover the situation very fully. With reference to the question of Mr. Emmons, it appeared to him that it was good practice for interurban companies to start their cars from the larger terminals on the even hour and half hour as near as possible. If they should be operating a schedule with both limited and local cars, the hourly starting should be followed just the same. In the case of the local cars they should run only as far as they could so as to keep to the one-hour spacing as closely as possible and take a fresh start. If a railroad had business that was standard or constant it was well to schedule the freight train, but if the business is intermittent, one day having a large business at a station and the next day a small one, he thought that in that case the freight trains should be run as extras. His company made a practice of having a detention report for every train operated, the limit being five minutes for a train to be delayed. These detention reports showed the cause for the detention and the number of minutes lost.

These facts were tabulated daily and sent to the head of every department interested. At the end of thirty days they get a résumé of all detentions. The single sheet timetable was all right, but he saw no reason why it could not be in book form just as well. He found that some of the principal steam railroads at the present time were using the book form. This book had a good cover and was not readily damaged by the trainmen. They had not only the time of the trains that they were operating on that division but also the trains of other divisions. He believed further that timetables should not only have the times of the trains or the schedule printed thereon, but should also have such other information as would be given the trainman outside of the regular rules of the rule book. He should have special instructions, bulletins, a list of the surgeons, and, as on their line, a list of the stop numbers, for the use of the conductor particularly. Referring to timetables for public use Mr. Nicholl firmly believed that the large folder of standard size was preferable to a small one in general practice, for the particular reason that it could be put in hotel racks. The small local timetable seemed to be sufficient for individual special trains.

On motion by Mr. Emmons the report of the committee was accepted.

#### TWO-CAR TRAIN OPERATION

The next paper was one by C. J. Franklin, entitled "Two-Car Train Operation for City and Suburban Travel." Mr. Franklin's paper appears elsewhere in this issue.

C. N. Wilcoxon, Michigan City, said that he wanted to discuss not the two-car train but rather the practicability and value of operating trains of two cars or more. The interurban railway people in the middle West have had the problem of giving good service on lines operating out of the larger cities for a considerable distance where they have a very congested traffic, or where a portion of a line is operated through an industrial section where there is great congestion of traffic during the morning and evening hours with a comparatively light traffic during the other hours. He had had some experience of this kind while connected with the Cleveland & Southwestern Railway. The service had reached a point where the number of trains operated could not be increased. The traffic could only be handled during rush hours and on holidays by increasing the number of single units rather than increasing the number of schedule trains. By reason of certain conditions it was not as yet practicable to operate trains of more than one car. He was now connected with a line answering the latter description, that is, approximately one-third of the total miles was through a thickly settled manufacturing district. In fact, for a distance of approximately 25 miles it might be said to be a continuous town, made up of very large manufacturing establishments, employing from between 200 and 300 to between 4000 and 5000 men, most of whom went to work in the morning and home in the evening. The remaining two-thirds of the mileage, 57 miles, was through a sparsely settled district, where the population per mile of track was comparatively small. The business during six months of the year was very light. It had not even justified hourly service of the ordinary car. On the other hand, the traffic was very heavy for four or five months during the summer season, requiring an hourly service. Possibly for 53 per cent of the time they took care of the traffic as it should be handled. The engineers had fully appreciated the conditions and the property was designed for train operation. It was the practice to operate morning and evening, for the period of possibly an hour and a half to two hours each morning and evening, trains of two, three, four and five cars. The Sunday operation is hourly service, and during the summer season two-car trains were run. Their business, which was very considerable, differed radically from that handled by the average interurban road. They were called upon to handle a large num-

ber of people who all wanted to go at practically one time. What they could handle easily by reason of their train operation would be absolutely prohibitive even on the best constructed interurban roads to-day.

H. H. Adams, New York, thought the question of cost had to be given careful consideration. Mr. Franklin had mentioned in the last paragraph of his paper that they were operating prepayment cars and that the forward platform of the second car had to be closed up; that in itself was a disadvantage. The rear car did not have the same advantage that the forward car had. That had led him to think of the center-entrance car. He thought that a car of this type, with doors having the centre section lowered to bring it practically on the level, permitting one step with a centre entrance and an exit on either side of that centre entrance, would divide passenger load in the car practically in half while the facilities for exit would be equal from either end. That type of car had quite an advantage over the car with the two platforms. One could take a car with multiple-unit control and put the motorman in a cab at the side, thereby increasing the seating capacity. Of course, one platform instead of two would also give additional seating capacity. He thought a car of that type would increase the seating capacity by fully 15 per cent over a motor car with two platforms for double car operation, or over cars with a large platform at one end and a small one at the other end for single car operation. In the use of a car of that type for city service due consideration had to be given to the question of the time required for the operation of the doors. The operation of doors on a car meant the slowing down of the car. The congestion might not be sufficient to have that loss amount to any considerable amount of time, but if the congestion was great the stops per mile were high and the loss might be considerable.

Mr. Adams believed that if these cars were to be operated at a speed which did not exceed 25 m.p.h. as a maximum it was thoroughly possible to get very light equipment. A car say 47 ft. over bumpers, equipped with two maximum traction trucks, and having some of the later type of motors, possibly the air-cooled motor or the motor with field control, would have light electric equipment and need not weigh more than 35,000 lb. complete. This would make a very economical train unit as far as the power requirements were concerned.

The following letter on the subject, written by P. N. Jones, general superintendent Pittsburgh Railways, was read by the secretary:

"In Pittsburgh we have had no two-car train operation experience unless we except a single trial trip made five years ago with a multiple-unit train consisting of two motor cars and two trail cars. I remember that on this trip the final trail car decided at one corner to go up a side street and at another point the trolley of the third car left the wire and finally we arrived at the end of a thirty-minute run fifteen minutes late, although we hauled no passengers.

"We decided that two cars were quite enough for one motorman to look after in congested city streets and since then have adhered to our old method of using a single motor car with one trail car for the evening rush. While realizing that the two-car train having both cars equipped with motors has many advantages, I do not agree with the author when he says there is no room for discussion between the two types. Trailer operation has its advantages, among which are:

"First—Most city railways already possess four-motor equipments with motors of sufficient capacity to pull light trailers, for one trip, morning and evening. With the better methods of insulation and the superior mechanical design, the motors are not in any way injured by the rush hours' overload.

"Second—Lower first cost. Double-truck trail cars seating sixty people can be purchased with trucks for almost

half the cost of a motor car with its equipment, making the total cost of a motor car and a trailer approximately three-fourths the cost of the two-car train.

"Third—Smaller power requirements for the evening peaks. The peak load has been the nightmare of every railway operator who has anything to do with the furnishing of his own power. For about an hour each evening the power requirements are from 50 per cent to 75 per cent greater than for any other corresponding period of the day. Every pound that can be taken from the weight of the equipment at this time is very much more important than removing a pound at any other time of the day.

"In Pittsburgh we have a double-truck trailer weighing 22,300 lb. and seating sixty people. If the usual methods of design were followed the second car in a two-motor-car train would ordinarily weigh from 50 per cent to 75 per cent more than a trailer, and would therefore take 50 per cent to 75 per cent more power.

"Fourth—A trailer car can be designed for the easy control of one man. One of the greatest handicaps to any kind of two-car train operation in city streets is the greater number of stops that become necessary because of the greater number of people being handled. This slows down the schedule at a time when everybody is in a hurry to get home. There is no possible arrangement of a two-car train that does not have this tendency to slow down the schedule, and, of course, the larger the unit and the more unwieldy the second car, the larger and greater becomes this factor.

"We have in Pittsburgh a center-entrance trail car with 22-in. wheels and the floor level a little less than 30 in. from the rail. This requires only one step into the car and is the quickest loading car that we have ever had. Almost without exception the trailer conductor has given the signal to the conductor of the high-platform motor car before the latter has all its passengers on or off. The conductor being placed at the center of the car can watch the passengers boarding and alighting, especially since he has no trolley to look after. With a motor car as the second unit, having the front door closed, there is sure to be congestion in the aisle near the rear door, resulting in delay in boarding and alighting. In this case the second car is slower in loading and unloading than the first car, thus adding to the average length as well as number of stops.

"Fifth—The statement that a two-car train accelerates much more rapidly is not true excepting when all the axles of both cars are driven electrically. With maximum traction trucks, or ordinary trucks having only two motors per car, not to exceed 70 per cent of the weight of the car and equipment is on the driving wheels. With a light trailer such as described above, a simple calculation disclosed the fact that two-thirds of the weight of the train is on the motor car axles.

"Sixth—The multiple unit train is much more complicated than the ordinary equipment with trailer. Wires of some sort must be carried from one car to the other and the number of contracts, wires, switches, etc., is practically doubled. This necessarily means that the maintenance charges are increased, excepting in the single instance when the motor car has insufficient capacity to operate itself properly for eighteen hours per day.

"It may be argued by some that the later forms of train control have been much simplified and are more easily kept in repair than the drum type of controller. If this be true (a statement I very much doubt), then equip the motor car with the improved control apparatus, and still the motor car and trailer has half the apparatus of the multiple-unit train.

"I quite agree with the author that for long interurban runs or for city service where stops are infrequent, two standard motor cars hooked together will work very well as a two-car train, but for the situation as it exists in

many cities, the trailer is a very much cheaper and better method of taking care of the evening rush, especially since there are thousands of double-truck motor cars in the country weighing from 45,000 to 55,000 lb., which give ample traction for pulling the trailers.

"The whole situation may be changed if some of the methods which are now being attempted to reduce the motor car weights are successful, since there would not be sufficient traction to pull a trailer of any size behind the motor car. We have a scheme in Pittsburgh which we are arranging to try out which we expect will bring the weight of a 60-passenger motor car down to 32,000 lb."

Referring to Mr. Jones' letter, Mr. Franklin said that Mr. Jones had designed his motor cars and equipped them with such size motors that they could handle a trailer without overloading. If he had loops at each end of the line where he needed no switching he could get possibly good results with trailer operation. He was using trailer operation under those circumstances himself on a line which was adapted to it, notwithstanding a short grade of about 3 per cent across one of their bridges, over which there was very heavy truck traffic. The roadway is planked, giving a very bad rail. One could see the multiple units go up half way and stop and pick up again without a wheel slipping, whereas when the motor and trailer went up they were stuck until the next car came up and gave them a lift. The advantages of two-motor equipment were that it could be used as one train, which made it merely a four-motor equipment in its operation. It gave more flexibility than the trailer and four-motor car; but where special conditions existed such as loops at each end of the line and the equipment was heavy enough to pull a trailer, the trailer operation had its advantages. Nevertheless the fact remained that multiple unit operation would take the place of trailer operation very largely.

On motion of J. N. Shannahan, New York, a vote of thanks was extended to Mr. Franklin for his excellent paper.

N. W. Storer, Westinghouse Electric & Manufacturing Company, said that for many years he had been much impressed with the value of multiple-unit control not only for city but also for suburban and interurban service. It was a little amusing after what he had just heard but eight years ago he had presented before the Engineers' Society of the Western States a paper entitled "The Effect of Multiple Control on the Traction Problem of Pittsburgh." In that he had offered some of the very same advantages which Mr. Franklin had so ably presented and he had never seen any reason for taking back what he had said at that time. They still had a traction problem in Pittsburgh in spite of Mr. Jones' very light-weight trailer cars. He could not agree with Mr. Jones very far in his preference for trailer operation. Mr. Jones seemed to have the opinion that acceleration was simply a question of adhesion, but motors had certain limitations in regard to capacity and the car which was properly motored would certainly be able to accelerate very much better alone than it could when operating a trailer if it was operated anywhere within reasonable limits of its capacity. Of course, if it was considered safe to overload the motors for one or two hours at a time, which Mr. Jones admitted was necessary where trailers were operated, trailer service was a possible consideration.

Mr. Storer did not believe, however, that he could make the same schedule with the trailer that he could with the single motor car. Mr. Franklin had brought out the fact that operating two-car trains would make a better schedule in spite of a possibly larger number of stops than operating the same total number of cars singly. He believed that statement thoroughly true, as he felt that in the congested sections of the city the two-, three-, or four-car trains would permit the use of 50 per cent more cars on the street at one time with the same amount of congestion. Regard-

ing the use of multiple-unit trains on interurban lines, Mr. Storer said the point had been well brought out as to the advantage of this system in keeping the trains on their regular schedule and being able to handle the excess traffic which comes under certain conditions.

F. E. Case, General Electric Company, said there were undoubtedly a number of roads which could operate two-car trains and thereby increase the carrying capacity. Besides Mr. Franklin's road, there were probably half a dozen others which used that equipment. One point Mr. Franklin's paper did not touch on was that with his multiple-unit cars he had two styles, one with four motors and one with two. He could run those trains in combination either of two two-motors, two four-motors or one two-motor car; and furthermore, it would be entirely feasible to have cars of greatly varying weight connected together in one train, provided the maximum speed of the cars was approximately the same.

W. H. Sawyer, Ford, Bacon & Davis, New York, said that, with all due respect to Mr. Franklin's paper, it seemed to him that in many analyses the much-maligned trailer would be found the most economical proposition. The use of trailers in the early days was due to expecting something for almost nothing, and it had been found prohibitive when liability to accident and satisfactory operation were considered; but that did not mean that trailers could not be used to advantage today. Most trailer service meant overheating the motors or over-motoring the equipment, but let trailers be considered conservatively, using them in such a manner that the single car, properly equipped for single car operation, could safely haul a trailer without overheating the motors. The car leaving the carhouse at 6:30 a. m. had its motors comparatively cool and could for from one to two hours haul a trailer safely without overheating the motors. This also held true of the car which left the carhouse at 4:30 p. m. after a long rest. By using trailers on these cars only the overheating of motors could practically be avoided, while securing the advantages of two-car operation. The whole point was not to overload the motors beyond a safe rise in temperature. To avoid the former disadvantages of trailers, they must be equipped with proper couplings, lights, brakes and protective devices, like the multiple-unit car. The second car of any two-car train must have special precautions taken to prevent accident. The prepayment features could be cared for in the same way as in the multiple-unit car. The centre-door car should have real study. He added that the design of multiple-unit apparatus for city cars had made a notable advance in the last two years but there were many instances where the extra first costs would not warrant the expenditure.

Mr. Franklin said that when he prepared the paper he did not have in mind bringing forth the advantages of two-car train multiple-unit operation only for relieving the rush-hour service. He had in mind what they had done in Portland for the last four years; that is, using a multiple-unit two-car train for city service for eighteen hours straight. A trailer for one trip was a good thing, but what was one going to do then? He wanted to bring out the fact that there were conditions where one could increase the service where necessity demanded it by 33 per cent at the same platform expense.

#### GENERAL BUSINESS

The next business on the program was general business. The report of the committee on resolutions was as follows:

"Whereas, the entire program arranged for the benefit of our members clearly indicates the conscientious efforts of the members of your executive committee in the selection of useful and interesting subjects and the reports themselves, as presented here, evidence energetic work on the part of each one of the members of the different committees:

"Now, therefore, be it resolved that the members of the American Electric Railway Transportation & Traffic Association

beg leave to record their grateful appreciation of the faithful, efficient and conscientious way in which the officers and executive committee members and the members of the standing and special committees have executed the duties imposed upon them. Respectfully submitted. E. F. Schneider, chairman; J. J. Johnson, J. Stanley Moore."

#### NOMINATIONS

The report of the committee on nominations was as follows:

President, J. N. Shannahan, New York, N. Y., president Pottsville Union Traction Company; first vice president, Dana Stevens, Cincinnati, Ohio, vice president and general manager Cincinnati Traction Company; second vice president, D. A. Hegarty, New Orleans, La., manager New Orleans Railway & Light Company; third vice president, M. C. Brush, Boston, Mass., assistant to vice president, Boston Elevated Railway.

Members of the executive committee: A. Gaboury, Montreal, Que., superintendent Montreal Street Railway; C. F. Handshy, of Springfield, Ill., general superintendent of interurban lines, Illinois Traction Company; C. B. Buchanan, Richmond, Va., general superintendent railways, Virginia Railway & Power Company; H. A. Nicholl, Anderson, Ind., general manager, Indiana Union Traction Company.

The report was signed by Robert I. Todd, chairman; C. Loomis Allen and Bruce Cameron.

After these gentlemen were duly elected the newly elected president, J. N. Shannahan, was conducted to the president's chair by Mr. Todd. After thanking the members, he said that the president of the association could not carry on the work of the association to a successful conclusion without the aid of every man. He hoped that when he asked gentlemen to serve on the committees he would receive their cordial consent and service.

Under new business W. B. Rockwell moved that the elimination of the reading of printed papers be submitted and referred to the executive committee for favorable action.

The motion was referred to the executive committee with power to act.

The meeting then adjourned.

### THE AVIATION EXHIBITION

Yesterday afternoon C. C. Witmer gave a fine exhibition flight with his Curtiss hydro-aeroplane. All morning an interested and curious crowd had been grouped about the machine, which was being tuned up on the beach opposite the Marlborough-Blenheim hotel. A few minutes before 4 o'clock the machine was run down on the beach to the water's edge and Witmer took his seat in the amphibious craft. The Boardwalk was packed with spectators and the ocean end of Convention Pier was black with people. Unfortunately the Pier management permitted the general public on the Pier and many of the convention delegates were unable to secure places of vantage to see the flight.

Witmer took a short run down the beach and entered the water without a hitch. He continued well out in the ocean, occasionally rising in the air, then dipping again to the surface of the water. He returned toward the shore and then went out again before making a successful landing on the beach through the surf. He was in the air and afloat about twenty minutes.

Another exhibition will be given this morning at 10 o'clock. In order to avoid postponing this promised flight on account of the possibility of rough weather Witmer is planning to start early in the morning and fly to the Inlet. If the sea is calm he will fly from the Inlet along the shore to Convention Pier, reaching the Pier shortly after 10 o'clock. If the sea is too rough for a flight to the Pier he will give an exhibition flight at the Inlet.

## REPORT OF THE COMMITTEE ON FEDERAL RELATIONS

BY GEO. H. HARRIES, CHAIRMAN; F. R. FORD, C. S. SERGEANT, R. I. TODD, L. S. STORRS, RICHARD M'CUCCLOCH

Steadily, and against the continuing protest of those far-seeing publicists who deem it easily possible that grave injury shall increase as the self-governing powers of the several states are diminished, we are moving toward absolute Federal control over corporations and natural persons engaged in interstate commerce. To this movement the great transportation agencies no longer offer objection. Driven in every direction but the right one by the conflicting winds of state legislation they are ready to welcome a statute which will be *the* statute and under the terms of which they shall definitely know what they can do. The Sherman Act—which many lawmakers insist should not be amended—leaves the answer to practically every commerce question in the keeping of the grand jury. The great need is for a potent and capable federal force which shall in large sense supplant the inexcusably destructive practice of to-day by definite regulation which shall prohibit the doing of specifically unlawful things. It may be by federal incorporation or "license," although the idea of "license" is illogical and repugnant. The right to do business is basic and therefore has precedence over permission. More probably the legislative conclusion will be "registration." In the propositions submitted to Congress both methods are set forth, and to many of the disputants either conclusion would be satisfactory. But there is a wide difference of opinion among them as to the powers to be placed in the hands of the registering authority. Here the devotees of the sacred Sherman Act insist, practically, that the only way in which the business man can find out whether his method is right or wrong is by going ahead after his own fashion until the grand jury passes upon his procedure. In that way lies industrial confusion and financial disaster. The demand of the hour and of the age is for direct information prior to possible indictment; for a controlling body clothed with authority to say "Yes" or "No;" something closely related to the power which—whether lawfully or otherwise, but with high personal and political courage—averted that frightful shrinkage in values which must have come to this country had Tennessee Coal & Iron been thrown on an abnormally debilitated market.

Whether anything like well-balanced and permanent statutes will be enacted during the approaching session not even the various leaders can safely foretell. With the ever-present presidential campaign approaching a junction with the campaign for 1916 no man knows what one Congressional hour may bring forth, but there is reason for hoping that some good will come out of our legislative Nazareth.

While the output of Federal energy during the past twelve-month has been almost equal in bus-bar quantity to that of any like preceding period, yet, so far as our business is concerned, there has been a marked drop in voltage and every evidence of a decrease in the distributing and disturbing efficiency. This is due, possibly, to the fact that instead of one great prime-mover we now have a large number of comparatively small and necessarily less economical units. Remedial measures taken by many companies have, of course, reduced the supply of partisan fuel and decreased the B. T. U. of opposition.

With the nominating conventions almost summoned each party and every faction of one party will strive for accomplishment. There will be much playing with fire in spite of the fully demonstrated danger of such recklessness, but there will also be determined effort to sanely solve the great problem of the time—the problem in which we have so much at stake.

There is demand for at least one Moses, and there are many

candidates. Each is industriously yearning to be called to Sinaitic elevation, there to be named and equipped as the one who led his people out of the wilderness and to whom the borders of the promised land may not prove a barrier. Surely wisdom will somewhere be apparent.

### FEDERAL INCORPORATION

Five new bills dealing with Federal control are ready for consideration and others may reasonably be expected at the next session. Some of the more thoughtful legislators are of the opinion that Congress has not sufficient information on which to base sound legislative effort. To meet that situation Representative Martin Littleton will urge his bill to create an industrial and corporate commission to be composed of five members of the Senate, five members of the House and five members not members of Congress to be appointed by the President of the United States. It is to be the duty of this commission to inquire into the method by which industrial and corporate enterprises enter into and transact interstate commerce, and to report at the earliest date practicable what legislation is necessary to enable the Government of the United States to regulate, supervise and control the entry of and the transaction of business by industrial and corporate concerns engaged in interstate commerce. This measure will undoubtedly be opposed by some of those who are satisfied that the remedy lies not in delay but in immediate and direct legislation.

Senator Newlands, of Nevada, who has given the matter much attention, is sponsor for the bill which proposes to create an interstate trade commission, which is to be the successor of the Bureau of Corporations. By that commission all interstate corporations heretofore or hereafter organized within the United States whose gross annual receipts or the total annual receipts of whose subsidiaries exceed five million dollars shall be registered, and shall thereafter be known as "United States Registered" companies, and shall have the sole and exclusive right to use, in connection with their corporate title, their securities, their operations and by way of advertisement of their business, the title "United States Registered" or any convenient abbreviation thereof. The commission may require, should such a thing be necessary, any registered corporation so to readjust its securities or assets as to create no overcapitalization, the penalty for failure on the part of any corporation to make such correction being revocation of its license, and the issuance of an order that such corporation shall not thereafter engage in interstate commerce. Provision is also made for the re-registration of any corporation which may have violated any order of the commission, afterwards repenting and requesting forgiveness.

The five bills referred to form part of the appendix of this report.

Other measures on committee calendars—some calculated to arouse controversy, and some certain to promote argument and laughter—are lightly sketched for the information of members who have no acquaintance with the bill files at the Capitol, and who are not devoted readers of the Congressional Record.

### PHYSICAL VALUATION

Physical valuation will have prominent place in any discussion affecting transportation agencies. Three bills propose to require the Interstate Commerce Commission to value the properties. Those introduced by Senator La Follette and Representative Madden call only for present values, but that presented by Representative Adamson provides for inquiry into every detail or original cost and all facts pertaining to capitalization, no matter how remote.

Representative Macon, however, does not propose to wait until the Interstate Commerce Commission could complete the stupendous task of valuation. He insists that "it shall be unlawful for any company, corporation, organization or association engaged in interstate or foreign commerce to use the mails, the telegraph or telephone lines or the railroads within

\*Abstract of report read at the convention of the American Electric Railway Association, October 9-13, 1911.



the jurisdiction of the United States of America for purposes of interstate or foreign commerce without first having filed with the Interstate Commerce Commission an affidavit duly subscribed and sworn to by the chief agent or officer thereof clearly setting forth that the aggregate value represented in and by the stocks, bonds or other securities of the company, corporation, organization or association represented by said agent or officer does not exceed the aggregate physical value of the property and the reasonable value of the business, privilege or franchise that said stocks, bonds or other securities were issued to represent. Any company, corporation, organization or association violating any of the provisions of this Act shall be deemed guilty of a misdemeanor, and upon conviction thereof shall forfeit to the United States of America a penalty equal in amount to the difference between the aggregate value represented in and by said stocks, bonds or other securities and the aggregate physical value of the property and the reasonable value of the business, privilege or franchise that said stocks, bonds or other securities are intended to represent; and each day's failure to comply with the provisions of said Act shall constitute a separate offense, and any agent or officer of any company, corporation, organization or association violating any of the provisions of this Act, or who shall knowingly swear falsely concerning the value of anything mentioned herein, shall be deemed guilty of a felony, and upon conviction shall be punished by a fine of not less than \$10,000 and imprisonment in the penitentiary for some period of time not less than ten years."

The other valuation bill is by Representative Lafferty, who goes all the way (leaving nothing for those who may follow after) by seeking to enlarge the jurisdiction of the Interstate Commerce Commission by giving to that body the power to fix reasonable rates, based upon physical valuations, to be charged by railroad, express, telegraph and telephone companies and all other common carriers, in the transaction of interstate business, and also giving to said commission the power to fix reasonable prices to be charged by persons or corporations when found to be exercising a monopoly in the interstate sale of any commodity.

#### RESTRAINTS AND MONOPOLIES

Desire to protect trade and commerce against unlawful restraints and monopolies found form in many legislative suggestions. These are interesting to us because it is generally provided in each bill that all interstate or international transportation of the products of lawless combinations is prohibited. Occasionally there is no effort to prevent the loading of tabooed products, but when they cross a State line or are being shipped to a foreign country it is laid down as a necessary principle that the goods "shall be forfeited to the United States, and may be seized and condemned by like proceedings as those provided by law for the forfeiture, seizure and condemnation of property imported into the United States contrary to law." The strong arm reaches out also for the responsible individuals. Any natural person who is an officer, director, agent, trustee, receiver, lessee, or any person acting for or employed by such corporations \* \* \* or who shall aid or abet therein, or who shall participate therein, or who shall suffer or permit any act required by this Act to be done or not to be done, or who shall aid or abet any such omission or failure, etc., shall be deemed guilty of a felony with eight years in the penitentiary as a resultant, "and in addition to each imprisonment shall forever be disqualified from acting as trustee, director, agent, manager of any national banking association or of any corporation engaged either in interstate or in foreign commerce, or both, and shall be disqualified to hold any public office whatsoever." Resentment at recent opinions of the United States Supreme Court is frequently displayed in bills which insist "that every contract, combination in form of trust or otherwise, or conspiracy in restraint of trade or commerce of any character whatsoever \* \* \* is hereby de-

clared to be illegal and unreasonable" or as another court-directing measure has it, "shall be presumed, construed and adjudged to be unreasonable." The Act, of course, is a statutory command which will compel the courts to declare unreasonable not only those contracts which are reasonable but also those which, from every point of view, save that of the would-be-destructive politician, are mutually advantageous to the contracting parties and to the public.

The author of one House bill deems it insufficient to prohibit. He would forbid "the purchase of any stock in a corporation engaged in interstate commerce by another corporation engaged in interstate commerce doing a competitive or similar business."

In a similarly-designed measure the author seeks to destroy the last hope of the individual who is in any sense party to a merger or a contractual understanding. "It shall not," provides this bill, "be deemed a valid defense in behalf of such officer or members of the board of directors that they had no knowledge of or were ignorant of the facts constituting the offense charged." Heavy fines and long terms are, however, evidently insufficient. One section of one bill read as follows: "That every person engaged in any business any portion or all of which constitutes a violation of this act shall forfeit by reason of such violation any and all rights which such person may have to protection under or right to damages for infringement upon any patent right held or owned by such person, whether directly from the United States or under purchase, assignment, or otherwise; and the right to the free manufacture and use of any and all articles, devices, or machines so held under right of patent by the person who shall have violated any of the provisions of this act shall thenceforth be open to all."

In the extremely important matter of security issues but one proposition—by Representative Miller—has been submitted. It will be found in the appendix. The Congressional disposition is to await the report of the Hadley Commission, which body has not yet reached any definite conclusions.

Just at this point our Manufacturers' Association should become personally interested, for a bill introduced by a member of the House who is most conspicuous in Steel Corporation research says: "No person who is engaged as an individual or as a member of a partnership, or as a director or other officer or an employee of a corporation, in the business, in whole or in part, of manufacturing or selling railroad cars, or locomotives, or railroad rails, or structural steel, or mining and selling coal shall act as a director or other officer or employee of any railroad company which conducts an interstate-commerce business."

It must not be imagined, however, that every legislative proposition looks toward the repression of all organized effort. Always there is a fine vote-bidding discrimination, such for instance as is shown in the proposed amendment to the Sherman Act, which amendment blandly provides: "That this Act shall not be construed to apply to any arrangements, agreements, or combinations between laborers made with the view of lessening the number of hours of labor or increasing their wages, nor to any arrangements, agreements, or combinations among persons engaged in horticulture or agriculture made with the view of enhancing the price of agricultural or horticultural products."

#### WORKMEN'S COMPENSATION

All members of Congress are not inclined to wait for the findings of the Employers' Liability and Workmen's Compensation Commission before there is any serious framing of legislation.

A comprehensive and drastic measure of fifty-two pages has been introduced by Representative Sabath, which plans to raise revenue from persons engaged in and carrying on occupations subject to the regulative powers of Congress, to create a fund to pay compensation to employees and public servants injured on post roads and mail routes and to change existing general law as to the recovery for personal injuries.

Under the terms of this bill there is to be a new board in the Department of Commerce and Labor, the chief of which board is to be known as the "Commissioner of Injury Awards." The Commissioner will have great latitude in procedure. It is proposed that the commissioner will have power to make general regulations or orders making effective the provisions of the Act, and he may award to any beneficiary or annuitant—after hearing or rehearing—such compensation or amended compensation as he may deem proper in accordance with a schedule which is set forth in minute details. With respect to the injury records and accounts of all common carriers and carriers transporting mail he will specify a form of accounting records and memoranda for carriers and has, as to injuries to employees, authority which is parallel to that of the Interstate Commerce Commission and subject to the action of the United States Circuit Courts and the Supreme Court of the United States.

The projected method of operation is that upon being notified by any corporation or natural person subject to his jurisdiction that an employee has been killed or injured, the commissioner will "promptly notify the person injured, or his widow, personal representative, or next of kin, of their right to compensation" under the act, and shall take all proceedings necessary or proper to make the law effective; which means that in accordance with the table of damages there will be an award by the commissioner of the sum to which the beneficiary is alleged to be entitled. That sum will be paid by the carrier if the carrier accepts the provisions of the act, and that payment will stop any action at law contemplated by the person compensated. Avoidance of the terms of the act by any contract, agreement or device relating to the employment or re-employment of the servants of a carrier is to be made impossible by the declaration that such a contract, agreement or device shall not be valid or enforceable. The funds which are to be at the disposal of the Commissioner are to be secured from taxes levied as follows:

1. Ten cents on each \$100 face value of all securities issued by corporations or persons subject to the commissioner and the same tax on all sales or agreements to sell or transfers or memoranda of agreements to secure the future payment of money or for the future transfer of stock, of, if the evidence of transfer is shown only on the books of the company, the stamp shall be placed on such books.

2. One cent for each \$1000 value of freight, express, messages or money-orders sent; stamps to be attached to bills of lading, manifests of other memoranda of messages by telegraph or duplicate thereof.

3. An excise tax of \$60 per vehicle per year on every locomotive and tender and every other vehicle used on the lines of every common carrier by steam railroad, and on each and every motor, trolley or electrical vehicle used by any electrical railway, when any such vehicles are used on a mail route or on a post road.

4. An excise tax of \$5 per mile on every mile of its single wire mileage within the United States by every telegraph company operated along the line of or connected with any telegraph line built, constructed or maintained along the line of any railroad telegraph line to which the United States has granted subsidies, or which telegraph line shall have accepted the provisions of Title 55, Revised Statutes.

Exemption from the foregoing taxes may be had by accepting and abiding by the provisions of the projected statute.

For those corporations or carriers that decline to accept the provisions of the act, trouble in large quantity is provided as follows:

(1.) The Postmaster-General is forbidden to enter into any contract with them for the carriage of mail.

(2.) It shall be unlawful for them to transport any passenger for hire over any line of railway heretofore made and declared to be a post road or by this act said to be a mail route, "and no court of the United States shall entertain a bill or bills for injunctive relief on the ground that the car-

rier, or any person directly or indirectly suing on its behalf, is engaged in interstate or foreign commerce, or that it is operating on or over a mail route, when its employees shall have started to impede its hauling freight or the mails or shall have entered on a strike," and all laws and regulations in conflict with that sentence shall be deemed to have been suspended until the carrier consents to be governed by the act.

(3.) The doing of business with the United States Government is rendered impossible by a section which forbids the Comptroller of the Treasury from auditing or permitting the payment for any service for the carrying of the mails or for transportation of any kind or for travel in sleeping cars or for charges for express matters or any cable or telegraph or telephone service by any company "that shall not have accepted the clauses of this act by a certificate in form to be prescribed by said comptroller."

It is a most remarkable measure. It invites the voluntary co-operation of the carriers and then assures them that if they will not volunteer they will be put out of business. It reminds us of a South American situation when two nations were at war and when "volunteers" were brought into the training camps roped together in squads of ten. The military authorities invited an alcalde in the mountains to send them additional "voluntarios," to which he responded, "Send me more rope and I will send you more 'voluntarios!'" Which seems to prove rather conclusively that the legislators of this supposedly civilized and highly intelligent land are not above the crude but somewhat effective methods of those who are alleged to be more nearly savage than we.

The Sabath bill, and other measures, the details of which may be deemed worthy of careful study, will be found in the appendix of this report.

In dealing with an important feature of damage suits Representative Clayton has put in bill form a court-instructing proposition which comes home to all of us. That bill provides that in any actions hereafter brought in or removed to Federal courts for negligence causing personal injury or death, questions of negligence and contributory negligence, shall be for the jury. It shall be reversible error for the trial court to refuse to submit these questions to the jury, and no case shall be reversed by the appellate court because these questions are left to the decision of the jury.

With respect to the Employers' Liability and Workmen's Compensation Commission, it may be enough to say at this time that the commission has held many hearings and is considering a number of briefs. If it be practicable your committee will endeavor to see that member companies are supplied with the volumes of testimony and argument published and to be published.

#### ARBITRATION

A number of men prominent in national administrative and legislative life, who have been much interested in the more conspicuous phases of the labor problem, are, since the recent strikes in England, more intent than ever on bringing into existence some board or court which will have authority to search out the inwardness of each troublesome situation and at the same time bring about a reasonable degree of harmony between the employer and the employed. No one of the measures which will be carefully considered, and perhaps pushed vigorously next session, contains even an intimation of compulsory arbitration, but all are strong with respect to investigating powers, and one—by Representative Foss—provides that the "National Arbitration Tribunal" may require of each of the parties to a submitted controversy an indemnity bond to abide by the decision of the tribunal.

#### LABOR

The House Committee on Labor has a few measures waiting consideration. These deal with the hours of labor; with the number of men who must be assigned to duty with each switching locomotive; with prohibition of the transportation of wares manufactured wholly or in part by con-

vict labor or in any prison or reformatory, and with prohibition of the transportation of the products of any factory, mine or mill in which are employed children under the age of fourteen.

#### RATES

With respect to rates there is practically nothing to be considered save some unimportant measures which would amend the Hepburn Act by giving free or reduced transportation to bona fide members of the Grand Army of the Republic, the Women's Relief Corps and the Ladies of the Grand Army of the Republic whenever attending annual encampments; authorizing the interchange by carriers and publishers of newspapers and periodicals of transportation for advertising and printing, and permitting railroad companies to grant free transportation to agents, emissaries and employees engaged in the Co-operative Farm Demonstration work, carried on under the jurisdiction of the Department of Agriculture of the United States. The latter clause is interesting principally because a department of the United States Government (which government is legislatively and oratorically opposed to any form of discrimination) practically asks that there be discrimination in its favor.

#### MISCELLANEOUS

Efforts of the miscellaneous sort present some interesting pictures of the legislative mind. One bill requires interstate carriers to adjust and pay all claims for overcharges on freight and for loss and injury to property committed to their care within ninety days from the date of the filing of claims. Another forbids the transportation of any sheet and plate iron and steel which does not conform to a standard gage (set forth in nine tabulated columns) which it is proposed to establish. Another would divest whiskey of its interstate commerce character in certain cases, these cases, however, not being cases in which the whiskey is packed. Another would make mileage tickets practically universal in character.

With respect to safety devices there is practically nothing new, although block system operation is demanded in three bills. Clearance between cars and structures is the subject of one measure; the transportation of explosives is dealt with; the use or production of acetylene on cars is sought to be prohibited; and a good deal of stress is several times laid on the substitution of steel for wood in the construction of all passenger-train rolling-stock.

Perhaps the most important bills relating to safety are the two which provide that the American Railway Association shall be authorized to frame and report to the Interstate Commerce Commission a standard code of rules for the operation of trains. Your committee recommends that the president of this association, either in person or by committee, be authorized to confer with the American Railway Association as to this or any other matter which may be of mutual and common interest to the end that such rules, should they be framed, be suitable for electric railway use.

#### CONCLUSION

Your committee would most emphatically urge member companies to take deep, practical interest, local and general, in tentative legislation by Congress. It is that body which establishes precedents for rulings by state commissions. On Congressional propositions and debate there should be a concentration of association and individual thought and action, for out of them must necessarily come the issues of national health and disease.

A petition will be presented to Mayor Fitzgerald of Boston and the City Council, signed by citizens of Boston, asking the Mayor and Council to take favorable and speedy action on the legislative act that will make possible a plan for the improvement of transportation facilities between South Boston and the city proper.

## THURSDAY MEETING OF THE ACCOUNTANTS' ASSOCIATION

President Forse called the concluding session of the Accountants' Association to order at 10 o'clock yesterday morning.

Mr. Forse spoke of the proposed amendment of the constitution of the Accountants' Association on the subject of associate membership which, in accordance with the constitution, was submitted to members by mail thirty days in advance. This amendment was framed to enlarge the scope of the membership of the Accountants' Association by providing for associate members, who have not heretofore been admitted to that organization. In speaking of the proposed change Mr. Forse said he believed that the association should widen its sphere. The association and the industry were growing and should measure up to the fullest responsibilities of the times. The merits of the plan should be given the fullest consideration.

W. F. Ham, Washington Railway & Electric Company, thought that it would be wise to make clear in the amendment just whom it was proposed to include in the privileges of associate membership.

President Forse said that the amendment followed closely the one on this subject adopted by the Claim Agents.

#### REMARKS OF MR. BRADY

During the discussion on this subject President Arthur W. Brady, of the American Association, entered the hall. The discussion was suspended and President Brady was asked to address the members. He stated that no one of the associations had done more hard work than the Accountants', the results of which were seen most prominently. He said that he was familiar with the work of the association owing perhaps to his close connection with the president and his knowledge of its activities regarding the standard classification.

Referring to the subject of associate membership Mr. Brady said that it was his conclusion after several years of connection with the association that a vast amount of work was ahead of the industry. The association had a great deal to do if it did what the industry demanded. The work would have to be done on broad lines, the immediate effect of which might not be seen at the moment. Every public service corporation was confronted at the present day by a number of widespread heresies which had been preached to the public. A position had been taken that was absolutely detrimental to the foundations of the electric railway industry. The questions of rate of return, the value on which it should be computed, regulation, taxes and various exactions and burdens imposed upon the properties were exceedingly prominent before the people. In the past undoubtedly there had been acts on the part of the public service corporation that should not have been done. Some wrong had been done and arrogance had existed in some quarters, but there was no question now about the fact that the industry was on a sounder basis and in its public relations was characterized by an increasing desire to do justice. The properties were bearing their share of taxes and many burdens that were oppressive.

The main reason for the attitude of the public, Mr. Brady said, was that the case of the electric railways had not been presented fully and frankly before the public. The companies had done very little to offset public criticism. He knew that it was not possible to deal, as the railways do, with hundreds of thousands of human beings without rules and regulations that might run counter to the desires of some. It was highly important to the industry that the companies depart from the policy of silence that they had maintained in the past and let the public know something about the difficulties of the situation.

The electric railways had greater difficulties than other public service corporations. Every transaction was on a

very small scale, five cents being the unit in most cases, and in every one of these transactions there was a personal element involved on the part of both the public and the corporation. The situation was different with the electric lighting and gas properties, whose customers came in contact with the company not oftener than once or twice a month. The companies must lay their side of the case before the public in order that these difficulties might be appreciated. The people who had done so much to create a false opinion had been able to spread their doctrines through the magazines or newspapers or by agitation on public platforms. In order to overcome the effects of agitation the companies must organize on the right scale and regard that object as the main purpose for which the organization existed.

Taking up the question of associate membership Mr. Brady said that the work of the association would be broadened if the great body of men who were really connected with the industry throughout the country became actively identified with the settlement of the problems. Men should feel stimulated and really interested in the question of seeing that public sentiment, so far as it related to the public service corporation, was founded on a correct basis. The scope of the association should be enlarged so as to include as many of the men interested in the railways as possible. The association should have several thousand associate members.

P. S. Young, Public Service Railway of Newark, said that he felt that the time had come when the association should open the door to accountants generally. In addition to that associate membership in the association would educate the younger men in the industry.

C. N. Duffy, Milwaukee Electric Railway & Light Company, said that at the time of organization of the association it was untried and it was felt to be wiser to limit the members to companies. He heartily concurred with Mr. Brady as to the necessity as well as advantage of now widening the scope of the association. Mr. Duffy referred to the attendance of representatives of the association at the National Association of Railway Commissioners and thought that the association should be in touch with public accountants.

F. E. Smith, Chicago Railways Company, thought that the association work should be broadened and public accountants admitted. This would help the industry. The association had nothing to conceal and the closer the accountants got in touch with the work of the companies the better it would be for all.

C. L. S. Tingley, American Railways Company, thought that any associate members acceptable to the executive committee of the American Association ought to be acceptable to the Accountants' Association.

Henry J. Davies, Cleveland Railway Company, said that the association ought to take a position in accordance with the recommendations of Mr. Brady. He believed that by the adoption of the amendment more would be done for the association than could be accomplished through the extension of the privilege of associate membership in any of the other associations.

Mr. Ham offered an amendment. The amendment as amended was thereupon adopted, and is as follows:

#### AMENDMENT TO ARTICLE III OF THE CONSTITUTION

"The membership of this association shall consist of two classes:

"(A) Active members, consisting of active members of the American Electric Railway Association. Each active member shall be entitled to one vote, which shall be cast by the properly accredited representative of the accounting department.

"(B) Associate members, consisting of those associate members of the American Electric Railway Association who may be employed in the accounting departments of its ac-

tive member companies, or who are regularly engaged in accounting work in the accounting departments of other urban or interurban railways or electrified sections of steam railways, or such other associate members of the American Electric Railway Association whose application for associate membership in this association shall be approved by the executive committee of this association as may desire to ally themselves with this association. The privileges of the associate members shall be similar to those of active members excepting that they shall not be qualified to vote or hold office."

#### OVERHEAD CHARGES

Dean M. E. Cooley, of the University of Michigan, then presented an address on the subject of "Overhead Charges." An abstract of this address will be published in a later issue.

Professor Cooley supplemented his paper by a discussion of additional points. With the physical structure complete it was necessary to add other overhead charges before the property could be changed from an inactive to an active position. It was necessary to have working capital, a sum to buy not only stores and supplies but also to pay bills until the property began to earn for itself. Then there would be a long period when a property would fail to earn any adequate return. After a period of ten or fifteen years, or in some cases it might be a shorter time, the earnings would be sufficient to take care of the requirements and the property would be self-sustaining. He had preferred to think of overhead charges, not as a part of the going value, but as a part of the cost of establishing the business. Then, if the property was purchased it had a going value for which the purchaser could well afford to pay. The cost of procuring the going value would be a part of the cost which the new purchaser would have to pay if he started business.

Professor Cooley believed that all these necessary costs were properly to be classified as overhead charges. He did not pretend to say that they should be included in the debt represented by bond issues. Some believed that they should be so treated and others believed that the charges should be carried as a debt and wiped out gradually. While he was not prepared to express an opinion on that point, money absolutely had to be raised to meet these expenses, if the property was to exist. It was altogether necessary that these charges should be taken into consideration in rate-making. There was also an element of value which disappeared in the inventory.

Professor Cooley added that if the property had incurred all the expenses outlined the cost of financing had to be met. Whether discount on bonds was included or eliminated it was impossible, except in exceptional cases, for a company of the nature under discussion to dispose of its bonds at anywhere near their par value. An allowance had to be made, but the proper amount was a subject for consideration. He had found that some new steam roads had disposed of securities around 60 per cent of their par value. In the best case that he had known 92 per cent was secured. A compilation had been made from the reports of the New York Public Service Commission, Second District, showing the principal data bearing on this subject relating to the issue of securities by established companies. On \$63,000,000 bond issue, authorized in 1908 by the commission, the average interest rate was 4.29 per cent. The annual interest was \$2,700,000. The mean amount for which the bonds were sold was 88. In 1909 \$39,000,000 bonds were authorized at an average price of 87.6 per cent. It therefore appeared, assuming that the experience in New York was like that which would be found in other places that at least 10 per cent should be allowed. Notwithstanding these conclusions the attitude of the average person toward this subject showed that it was necessary to undertake a campaign of education so that all could comprehend the real nature of the problems.

The cost of the property, Professor Cooley said, should be considered in the determination of rates. The value for purposes of taxation, however, did not include all elements that should be allowed in most cases. It was always necessary to obtain the cost of building the property before an accurate determination could be made as to the present value of the property. It was necessary to determine what elements had depreciated and what elements could be transferred from cost to value column without any change because of the fact that they had not undergone any depreciation. Among the items which did not depreciate Professor Cooley mentioned development charges, organization and legal expenses; cost of acquiring rights-of-way and property consents, which could not depreciate and might appreciate; insurance, interest and taxes during construction, stores and supplies, working capital and cost of establishing the business. In the 1900 valuation of the properties of steam railroads in Michigan the value remaining after the properties were subjected to depreciation was about 82 per cent of the cost. That included such overhead charges as were allowed then. Some overhead charges were generally allowed now that were not recognized then as elements of value. He had found that the value of electric railway properties had extended from 77 or 78 to 88 per cent of the cost new. For maintenance in condition where satisfactory and economical service could be given this value should stand around 85 per cent. There was a point in the value beyond which it was impossible to go with economy. Electrical properties, particularly hydro-electric plants, averaged higher percentages of value than electric railway properties.

In some cases Professor Cooley had found that the value of hydro-electric plants was 95 per cent of the cost new. This was apparently owing in part to the fact that the properties were new. In valuations electric railways should show a higher percentage of the cost new than steam railways because of the inclusion of copper, which did not depreciate like other elements of value.

The Accountants' Association and accountants generally could do more than anyone else to disseminate the needed information. They could prepare facts from their records. Precise facts were stronger evidences in court than opinions. The public must have the information regarding the results of the companies. In conclusion Professor Cooley stated that he knew that both the public and the public service corporations were coming out on top at the end, but that it would be the same to you.

C. N. Duffy, Milwaukee Electrical Railway & Light Company, in beginning the discussion on the paper stated that Professor Cooley was the first man to be able to demonstrate the fundamental principle of going value and how it could be applied in the valuation of a public utility corporation. Mr. Duffy said that proper publicity was part of the business of the electric railway official. The companies had continued on the assumption that the public knew about as much about the business as the officials themselves. The fact that this was not so had been brought home forcibly to Mr. Duffy in the fare case pending in Milwaukee. During the presentation of the testimony in the case the invariable criticism of the newspapers when facts were brought out by the company was, "Why didn't you tell the public your story?" The company since then had prepared and published a series of educational advertisements. The full series had been bound in book form for presentation to the Accountants' Association. Mr. Duffy said that he was afraid that officials had been too much engrossed usually with the practical side of the business and, as Professor Cooley had pointed out, had failed to realize their full duty in the matter of placing facts before the public so that "he who runs may read." Nine of the educational advertisements had been reproduced in the time-table issued by the company.

Professor Cooley had referred to the compilation of two

sets of figures for valuation purposes, one for taxation purposes, the other for the purpose of rate return in the investment. Speaking entirely from a personal standpoint and not as representing the company Mr. Duffy said that he believed that it was absolutely inconsistent to have two sets of values used. Why should not a public utility corporation be willing to pay taxes on the full value of the property or on the full capitalization and then demand recognition of the capitalization and a fair return thereon? The company was entitled to a fair return on the cost of the property and so far as the Milwaukee company was concerned this was less than the capitalization. The stocks and bonds outstanding were issued under authority of the law of the state for a consideration.

Mr. Duffy also referred to the reference by Professor Cooley to the advantage of presenting facts instead of opinions in cases in court. He knew of one item, the cost of making the foundations of a power plant, which the books showed, cost \$300,000; the total expense of the construction of the power plant was \$2,500,000. It would have been exceedingly difficult to locate this item after the completion of the property unless it had been set forth specifically on the books.

In reference to the important amount which overhead charges sometimes reached Mr. Duffy referred to a notice sent by the Milwaukee company to the heads of departments to guide them in cases where work was done for allied companies or outside interests. The subject was considered at one of the weekly meetings of the fourteen department heads and was referred to a committee of three, consisting of two engineers and the treasurer. This committee worked out a schedule which is followed. The following percentages are added for overhead charges: For labor without hand tools, 10 per cent; for labor with hand tools, 15 per cent; for shop work without machine tools, 70 per cent; for shop work with machine tools, 100 per cent. To the material 5 per cent is added. These percentages are used when the transactions are between constituent companies, but if a profit is to be charged 25 per cent is added to that.

To demonstrate how errors had been made Mr. Duffy referred to the valuation of the property of the allied Milwaukee companies located in the city of Milwaukee. The cost of property and plant of the Milwaukee Electric Railway & Light Company, the Milwaukee Light, Heat & Traction Company and the Milwaukee Central Heating Company, as of Dec. 31, 1909, aggregated \$36,571,000. The physical value of the properties as determined by the joint engineering staff of the Railroad Commission of Wisconsin and the Wisconsin Tax Commission, was \$23,877,000. The percentage of present value to cost new was approximately 78 per cent. The percentage of physical value to the book cost new was 64 per cent. The assessed value of the property for taxation purposes was 86 per cent of the cost new. In discussing the discrepancy in these percentages Mr. Duffy said that the reason lay largely in the fact that the figures of cost on the books included no overhead charges and represented the bare productive cost of labor and material used in the construction of the property. No contractor could have produced the property for anything like the cost made possible by the fact that the company did its own work.

Referring to percentages of allowance above physical cost, Mr. Duffy said that the joint engineering staff of the commissions allowed as details of the overhead charges 12 per cent, made up of engineering and superintendence, 4 per cent; organization and legal expenses, 2 per cent; interest, 3 per cent; contingencies, 3 per cent.

Henry J. Davies, Cleveland Railway Company, stated that in the valuation made by Judge Tayler of the United States Circuit Court in the Cleveland case, an allowance was made for specific and overhead charges, which was equal to about 21 per cent of the Goff-Johnson valuation. The Tayler valuation of the physical property averaged about \$80,000 per mile of single track.

Mr. Davies asked Professor Cooley a question in relation to the Cleveland franchise.

Professor Cooley, in response, said that the public should be educated on the subject of franchises. It should know that a perpetual franchise was the best possible thing for the public and that the shorter a franchise was the more expensive it was to the public. If a short term franchise was given it was necessary to wipe out in the capitalization everything that the public insisted should disappear and to do that it was necessary that the rate of fare be sufficiently high to provide for all the charges.

A. B. Bierck, general auditor Long Island Railroad, was unable to be present to read his paper on the subject of "Statistics of Cost of Electric Operation on Steam Railways." The paper was read by title and an abstract is published elsewhere in this issue.

#### COMMITTEE ON LIFE OF RAILWAY PHYSICAL PROPERTY

Robert N. Wallis, Fitchburg & Leominster Street Railway, chairman of the committee on life of railway physical property, read the report of this committee. An abstract of the report follows:

"The object of the work of the committee is to make available for members of our association the information on this subject in its various branches, but with no attempt to formulate anything of the nature of fixed rules or methods of procedure.

"The committee broadly divided the work into two parts:

"(A) A bibliography of the subject.

"(B) The assembling of such original material as member companies and others are able and willing to furnish.

"Proceeding on this basis, the committee has made a beginning and finds a mass of data accumulated, largely in the last few years, but absolutely no available compilation or digest. The person who desires to proceed intelligently in solving any of the various accounting problems related to, and depending upon this subject, will be obliged to go over a broad field without guide or help, and each, if at all thorough, must cover the same ground. It is the aim of the committee to supply this help and to so compile and arrange that the accountant can supply his study needs without almost prohibitive labor.

"Your committee was fortunate in securing the assistance of a gentleman who traveled abroad recently and was in an excellent position to secure us reference lists if any existed there. He found a notable absence of any such bibliography, although he was told, while abroad, that in Germany—where he did not go—he might have found one.

"It will not be to our credit as an association if commissions and individuals accumulate a fund of information on this important subject properly compiled, abstracted and digested, while we are idle, until some pressing need of our members cannot be filled for lack of time to secure the necessary data.

"Many of our accounting problems hinge materially upon the question of the life of railway physical property. For the railway accountant to meet these problems intelligently, a careful study of the probabilities and certainties of railway physical life as indicated or demonstrated by actual experience is essential. We cannot become too soon or too well posted in this matter and our association can well serve us by assembling available data from numerous sources.

"The committee has first set to work to secure a reasonably complete bibliography of the subject. This is to be obtained by a scrutiny of various public and private libraries and from references in the technical press.

"From these sources the committee has already gathered over 400 references with more to come. Not only have public libraries been drawn upon, but help has been given or promised from Stone & Webster; Ford, Bacon & Davis; J. G. White & Co., Inc.; Prof. D. C. Jackson; ELECTRIC RAILWAY JOURNAL, and others.

"These lists of references, and others which will be secured, are to be classified and sufficient digest made of the more important to indicate their contents. This will, of course, necessitate some expense for research and compiling.

"So far as possible, it would seem best to have in the association's files such pamphlets, papers and articles as most directly bear upon the subject so far as they can readily be obtained. A start in this direction has been made. This information, including the abstracts, should be properly indexed.

"Concerning the second division of our work, it is apparent to the committee that a wealth of valuable material can be obtained from individual sources where it reposes as yet unwritten and unpublished. Many, and especially those who have been long in the industry, engaged in studying the development of its physical features can contribute data of great value. For this purpose, we have been in communication with manufacturers, such as the General Electric Company, Westinghouse Electric & Manufacturing Company, J. G. Brill Company, and Pennsylvania Steel Company, who, as well as the engineering firms mentioned above and others, are quite ready to aid the committee.

"The committee has not yet systemically taken up the matter of securing the co-operation of member companies in furnishing data. This should be done and the universal willingness to assist (which the committee has so far found) may be confidently expected. But your committee finds that every request for information touches at some point the work of our engineering brethren for reasons which are obvious. Realizing that an engineering view point is necessary to the work, we have suggested the Engineering Association be requested to associate with this committee representation from that association. Your president has indorsed the request and referred it to the president of the Engineering Association. We have endeavored, therefore, not to cover any ground which, in event of such representation being assigned, would have to be gone over again.

"There has been prepared under direction of the committee a tentative chart of its work in securing original material, in order to cover the ground thoroughly and completely. From this chart it is proposed to make assignments of subjects to those best qualified to furnish the information. It is our intention to ask these authorities to furnish for the committee's work and the association facts and figures with which they are familiar or which their experience qualifies them to give.

"The work of the committee does not concern the question of decreasing values alone but equally the appreciation and conservation of value. We must give ample emphasis to the things that preserve or increase the value of physical property—to the things that ward off depreciation. To this side of the question, so far as material can be found, careful attention will be given.

"The committee feels that the work just begun should continue and, if you are of a similar mind, invites your suggestion and the expression of your ideas for its guidance."

After the presentation of the report, W. B. Brockway, New York, suggested that the committee should recognize in its work that anything included in the scope of the investigation should be continuous. In the bibliographical feature alone of the report, articles and books would always be published that might be included in a record. He suggested that the work be continued from year to year or from one committee to another.

Mr. Wallis said that it was the plan of the committee to so conduct the investigations and prepare its report that provision would be made for future work on the same subject.

In response to a question from Mr. Ham it was stated by President Forse that the committee was a standing committee. The report of the committee was accepted.

Mr. Ham presented the report of the committee on stand-

ard classification of accounts and the committee representing the association at the convention of the National Association of Railway Commissioners. Mr. Ham is chairman of both of the associations. Abstracts of the reports of these committees follow:

"Unfortunately, for some years past this association has not been represented by a full delegation, and at the last convention the writer was the only delegate of this association in attendance. I cannot lay too much stress upon what seems to me the desirability of this association having a full attendance of delegates at the conventions of the National Association of Railway Commissioners. It is a great privilege to attend their conventions. The matters discussed cover a wide range, and, while our association is directly interested only in the matter of accounts and statistics of electric railways, we are vitally interested in many of the subjects which come up for discussion. Particular attention is called, in this connection, to the report of the committee on safety appliances, which contained specific reference to the operation of electric interurban railroads.

"Unfortunately, the convention of the railway commissioners this year is called for Oct. 10 to 13, inclusive, thereby conflicting with the dates of our convention and again interfering with the proper representation of our association at their convention.

"I hope that this conflict may not occur again, and that in the future our association may be represented by a full delegation of three members, and would further suggest that this delegation be appointed sufficiently in advance of the convention to make necessary arrangements for attendance."

#### REPORT OF COMMITTEE ON STANDARD CLASSIFICATION OF ACCOUNTS

"All inquiries received by the Interstate Commerce Commission or by this committee have been carefully considered and decisions have been rendered. By the courtesy of the Interstate Commerce Commission the committee is able to present to this convention a printed pamphlet containing the decisions. Discussion and criticism are invited by the committee in the hope that the decisions may be taken to represent the views of the association as a whole.

"The committee regrets that it has been impossible to place these decisions in the hands of the members at an earlier date in order that the members might have a better opportunity to consider them.

"It is unnecessary to state that in the consideration of these cases a vast amount of correspondence has been required. Our working arrangement, however, with the commission has been so satisfactory that very little time has been lost, and the decisions have been rendered as promptly as could be expected under existing conditions.

"The committee is pleased to state that the relations of this association with the Interstate Commerce Commission are most harmonious and that the plan now being pursued ought to lead to a system of accounting satisfactory alike to the companies and the several regulating commissions."

The reports of both committees were accepted and filed.

#### CONVENTION COMMITTEES

F. A. Healy, chairman of the committee on resolutions, presented the report of this committee. Thanks were extended to Professor Cooley for his extremely able and timely address. The officers and committees were thanked for their work during the year, and appreciation of the work of those who prepared papers was expressed. The management of the Chalfonte Hotel was thanked for the courtesies extended.

Mr. Brockway, chairman of the nominating committee, presented the report of the committee. The secretary was instructed to cast one ballot for the new officials nominated by the committee. The new officials are as follows: President, P. S. Young, Public Service Railway of Newark; first vice-president, L. T. Hixson, Terre Haute, Indianapolis & Eastern Traction Company; second vice-president, Elmer M.

White, Coney Island & Brooklyn Railroad; third vice-president, N. E. Stubbs, United Railways & Electric Company of Baltimore; secretary and treasurer, H. E. Weeks, Tri-City Railway, Davenport, Iowa; executive committee, the officers and James Adkins, United Railway Company of St. Louis; E. D. Gault, Mahoning & Shenango Railway & Light Company; R. Morrison, Jr., Michigan United Railways; M. W. Glover, Mobile Light & Railroad Company.

The newly elected officials who were present were called upon and spoke briefly to the association. The annual meeting was adjourned at 1.15 p.m.

#### CHICKEN FEED

Schütte & Koerting Company, Philadelphia, Pa., has an attractive exhibit at space 151, where it is displaying a full line of its products, which includes all its different types of valves.

J. C. Raymond, Ackley Brake Company, New York, N. Y., was noticed around the exhibition hall wearing a big smile, caused by a cable order in his pocket for 180 Ackley Brakes, received from Japan.

William A. J. Koenig, New York, and wife traveled recently from Syracuse to St. Louis by trolley in five days, traveling only in the daytime. The fare for this trip of approximately 1100 miles was \$19.05 for each person.

Nelson Valve Company, Philadelphia, Pa., located at spaces 123, 125, Machinery Hall, is exhibiting a full line of the valves which it manufactures. Among these special attention has been given to rough steel castings, which have been cut off so as to show the excellent steel work.

The National Association of Railroad Commissioners, in session in Washington, has elected officers for the ensuing year as follows: President, Charles F. Staples of Minnesota; first vice-president, O. P. Gothlin of Ohio; second vice-president H. Warner Hill of Georgia; secretary, Wm. H. Connolly of North Dakota; assistant secretary, William Kilpatrick of Illinois.

Motor-driven concrete mixers deliver from 1½ cu. yd. to 2½ cu. yd. of mixed concrete per kw.-hour consumed. The figure will be found to vary slightly with the length of motor-operated conveyor used, but as the mixer is the principal load and the hoisting is intermittent, the average consumption recorded in mixing concrete for conduits, wall footings, tunnels, etc., has been found by a large user of motor-driven mixers to be about ½ kw.-hour per cu. yd.

Escalators will be installed in the London subway stations where elevators are now used. A contract has been awarded the Otis Elevator Company for two escalators to be placed at the Earl's Court station of the London Electric Railway and four at the Liverpool Street station of the Central London Railway. The London tubes are much deeper underground than those of New York City, and the problem of getting passengers from the platform level cannot be solved by elevator service.

McCord Manufacturing Company, Chicago, Ill., is distributing circular matter illustrating its adjustable metal sash, weather stripping, gravity wedging sash locks and other car equipment-hardware specialties. The devices sold by this company include a number of important improvements especially designed to meet requirements of modern car construction. This company's catalog and blue prints should be in the hands of everyone having in charge the designing and making of specifications for car equipments.

## REPORT OF THE COMMITTEE ON BUILDINGS AND STRUCTURES\*

MARTIN SCHREIBER, CHAIRMAN; F. F. LOW, VICE-CHAIRMAN;  
F. G. SIMMONS, GEORGE WESTON, G. H. PEGRAM, C. H.  
CLARK, J. H. FRANK, C. G. YOUNG, M. H. BRONSDON

Your committee was instructed to consider the following topics: (1.) Economical Maintenance. (2.) Proper Facilities for Employees. (3.) Proper Installation for Fire Protection of Carhouses and Terminals, including Open Yards.

### ECONOMICAL MAINTENANCE

The committee thought it advisable to take up only a limited number of questions, arising in connection with this subject, that are of importance to constructors and operators.

### CONCLUSIONS

The conclusions and recommendations of your committee relating to the general subject of economical maintenance are as follows:

1. Best and most acceptable method for maintenance of buildings and structures is systematic repairs with working force of operating company.

2. Regular inspections and reports should be made out at stated intervals, preferably once a month, on blanks prepared especially for the purpose.

3. Heating systems recommended:

(a) For carhouses, a blower system, where the air is blown over steam coils and through the building.

(b) For large car shops, the blower system, except in the paint shop, where direct steam radiation is advised. For the small shop, either direct steam or a hot water heating system.

(c) For isolated waiting rooms, only practical to heat if attended—generally, standard coal stoves are advisable. If waiting room is large and pretentious, steam or hot water heating system may be used.

(d) For unisolated waiting rooms. Direct steam or hot water system is generally advisable.

(e) Small isolated ticket booths and the like may be satisfactorily heated with the ordinary electric car heater.

NOTE.—For direct steam heating system, if plant is large enough to justify it, the addition of vacuum return is good practice.

4. Roof covering for railway buildings preferably should be some form of built-up roofing with felt, pitch and gravel. Copper flashings are recommended in all cases and counter-flashings of either copper or lead. Gutters should be formed, if practicable, away from the wall.

5. Floor construction:

(a) Carhouses. Concrete floor with cement finish is best for permanent construction. Otherwise crushed stone and screenings or ashes is advised.

(b) Car shops. Concrete floor with cement finish is recommended, except in machine shop, in which if floor is subject to heavy service, creosoted wood blocks on a concrete foundation should be installed.

(c) Power houses. For engine room, concrete with cement or tile finish is advised. For boiler room, concrete and cement finish or a floor of brick laid on edge in cement mortar is recommended.

(d) Offices, employees' rooms, etc. Maple or combed-grain yellow pine wearing floor should be used. If wearing floor is supported by sleepers embedded in concrete, it is always best to install a false floor underneath the wearing floor.

(e) Toilet and locker room floors should be of concrete with cement finish, and connected with sink and trap to drain, so that the floor may be conveniently washed and scrubbed.

(f) For waiting rooms or shelters and platforms, floors of concrete and cement finish are recommended for permanent

structures. Rolled broken stone and screenings or ashes may be found satisfactory for cheap open shelters for temporary construction.

6. (a) For large carhouse doors, swinging and sliding wooden doors are preferable where there is sufficient clearance, on account of the low first cost and the ease of repair.

(b) Rolling steel doors should be used for all other large openings, but the power-operated doors, so far, have not given general satisfaction.

7. For effective results paint should only be applied to clean surfaces, and should be put on under careful and intelligent supervision, using first-class materials. Frequent drawing of the sashes will greatly prolong their life. Cold-water paint is recommended for use on the inside walls of buildings for keeping them light and clean, except near the ground, where oil paint should be used.

### PROPER FACILITIES FOR EMPLOYEES

The committee offers the following suggestions and recommendations which appear to represent the best modern practice regarding facilities for employees:

1. In designing a carhouse, power house, or car shop, proper facilities for the comfort and convenience of employees and a design that will bring out the highest efficiency of the men should be given very careful consideration.

2. Assuming a carhouse with a capacity of 100 cars, the following schedule of floor areas is offered as meeting the average requirements:

(a) Superintendent's office, with anteroom.....	400 sq. ft.
(b) Depotmaster or starter .....	120 sq. ft.
(c) Clerks and receivers .....	300 sq. ft.
(d) Men's room .....	1,200 sq. ft.
(e) Locker room (200 lockers), double tier.....	320 sq. ft.
Locker room (200 lockers), single tier.....	700 sq. ft.
(f) Toilets—8 closets, 8 urinals .....	400 sq. ft.
(g) Assembly room, isolated .....	3,000 sq. ft.
If connected with men's room .....	2,000 sq. ft.

3. Ordinarily it is recommended to have operating offices, toilets and men's rooms on the first floor and the assembly room on the second floor.

4. The advisability of equipping carhouses with lunch rooms or barber shops, or both, is a question that largely depends on local conditions.

5. Some amusements should be provided for the men. The most generally popular games are pool and billiards and bowling.

6. The men's room in connection with the carhouse terminal, where reports may be made out, bulletins posted, and where men may convene while awaiting orders, is a requisite. The assembly room, where employees may hold meetings for entertainments, lectures, and the like, is rapidly growing in favor with the larger companies. There should be at least one assembly room on each property, and many companies are including them in all of their modern terminals.

7. All of the offices, employees' room, men's room, toilets, etc., should be arranged for comfortable heating and ventilation. Any portion of the carhouse used exclusively for shop purposes should be heated. In the carhouse proper generally the cost of heating is not justifiable, but often it may be arranged to place a few steam coils in the pits, where, in the coldest weather, cars can be stored and thawed out while the men are making regular inspection and minor repairs.

### PROPER INSTALLATION OF FIRE PROTECTION FOR CARHOUSES AND TERMINALS, INCLUDING OPEN YARDS

It is believed that if the question of the value of an efficient fire protection plant were more carefully studied by the managements of properties, as regards reduction of insurance rates, loss through interruption of service, as well as the actual losses from property burned, it would be realized that better fire equipment would be justified than is now generally found. Convenient means of quenching small fires with sand and water buckets and chemical extinguishers should always be abundant.

\* Abstract of paper read before the American Electric Railway Engineering Association, at Atlantic City, N. J., Oct. 9-13, 1911.



It is necessary that the worst conditions should be anticipated in providing equipment. Eternal vigilance is necessary, but long periods of immunity lead to lapses, and so the automatic sprinklers, which never sleep, and standpipes and other prominent installations which suggest ready use have great value.

Fire drills and test alarms at unexpected times should also be practised. Attention is called to the report of the Committee on Insurance, page 188, Proceedings of the American Street and Interurban Railway Association, 1910, relating to standpipe fire nozzles.

The committee submits the following recommendations:

1. Automatic sprinklers are to be preferred as the best possible protection in inclosed places. This applies to all buildings. The very fire itself which is sought to be extinguished sets in operation the means which extinguishes it. There should always be two sources of water supply; city water with adequate pressure; elevated tank, pressure tank; underwriter fire pumps.

(a) Sand pails, chemical extinguishers, and water pails should also be provided.

(b) Small hose lines are advisable for reaching sparks and flames in places not reached by water from the sprinklers.

2. For open spaces, including yards, the available methods of protection are:

(a) Universal nozzles on standpipes.

(b) Standard fire hose and nozzle.

(c) Open sprinklers set in operation by human agency.

(a) Universal nozzles on standpipes are the best protection. There is no possibility of delay during a serious fire through the bursting or cutting of hose. The nozzle should be not less than 1½ in. or more than 1¼ in., if ample water supply and pressure can be had. Since the operator cannot move such nozzles bodily to the place of the fire, the range of the nozzle should not be more than 100 ft. in order to secure the greatest degree of efficiency, which distance will necessitate as high a pressure as can be safely maintained. High water pressure is advisable for the further reason that the operator may place water upon the fire from a safe distance. This condition applies to nozzles on hose as well.

The universal nozzle should be located at a height of from 10 to 12 feet above the tops of cars. The pressure at the nozzle should be 100 lb., if possible. For this pressure the discharge for 1¼-in. and 1½-in., 1¾-in. and 2-in. nozzle will be, respectively, 466, 671, 904 and 1,194 gallons per min.

It is believed the most effective way to extinguish a fire, especially one which has gained much headway, is to concentrate heavy streams of water upon one particular car in the yard and maintain it there until its effect is shown. This can be readily accomplished with a standpipe and universal nozzle.

Pumps should be provided to supply at least two nozzles at one time. Nozzles should be located so that their range circle will overlap safely.

Universal nozzles are the best protection for practical installations where cost is considered; certainly to be preferred over standard hose and nozzle in yards where the cars are stored.

Universal nozzles should be supplemented by water pails, chemical extinguishers and small hose and nozzles for getting at sparks and flames not accessible to the stream of the universal nozzle.

(b) Standard fire hose and nozzles are the next best protection available. 2½-in. hose should be used ordinarily. Nozzles to be 1½ in. or larger. Pressure should not be too great, probably 40 lb. to 60 lb., because men who are not professional firemen cannot handle the nozzles under great pressure.

(c) Open sprinklers operated by human agency are probably a very effective means for checking an early fire, and perhaps for extinguishing a fire which has gained more or

less headway, but the cost appears to be too great for general use, although for small installations, where the sections are not large and where the controlling valves can be operated by hand, the cost may warrant the use.

3. Auxiliary fire alarms should be installed wherever practicable.

#### INSTRUCTION TO EMPLOYEES FOR FIRE PROTECTION

The committee recommends the following rules for the instruction of employees:

1. The general plan posted in several locations about the property shows the layout of fire protective apparatus and it is required that each employee acquaint himself with the location and workings of the various appliances.

2. It is the special duty of all employees of this company to use every precaution to prevent a fire starting and to co-operate in protecting the property should a fire occur.

3. If a fire occurs first turn in city alarm. To operate an auxiliary fire alarm which has the same effect as turning in an alarm from regular city station, break glass and pull down the ring. The signal has satisfactorily operated if a buzzing sound is heard.

4. Chemical fire extinguishers should be placed conveniently and judiciously about the property. Where the temperature may be freezing the non-freezing type of extinguisher should be used, or the extinguishers must be placed in heating compartments. Extinguishers must be tagged with a record of charging. When not in service for nine months extinguishers are to be recharged.

5. Fire pails to be arranged in pairs and to be painted red so that the word "Fire" stenciled in black letters is always in sight. It is important that the pails be used only for fire purposes. In freezing season salt is to be added to water, or sand substituted for water. For open yards the safety fire pails may be substituted for the ordinary buckets.

6. Fire hydrants to have wrenches always in place, or a permanent wheel may be substituted for the wrench. Hose and nozzle to be kept attached to hydrant and properly folded. Yard hydrants to be complete with standard hose house and equipment.

7. Inside standpipes and stand connections are to be guarded against freezing by turning off water below the ground line. Standpipes are to be connected with hose stored on a reel attached to a wall or post.

8. All hose and hydrant equipment must be tested at least twice a month, after which the equipment is to be carefully drained and restored to its original position.

9. Smoking is forbidden except in rooms set aside for the purpose. "No Smoking" signs should be judiciously displayed about the premises.

10. Oils and oily waste and all inflammable materials are to be stored in a fireproof oil house. No oils or oily waste are allowed on the property except in small quantities before or after immediate use.

11. Any clothing not worn is to be stored in regular lockers, and even in lockers the clothing should not be retained for a long period; store only such wearing apparel as is regularly used.

12. An ample supply of waste cans is to be provided. Also a large metal box with cover for reception of newspapers, etc., taken from the cars as they enter the barn and yards. Oily particles of waste scrap and car sweepings are to be promptly placed in a waste can. No debris is to be left lying about the property.

13. It is very important to keep boiler rooms clean and tidy and permit no ashes to accumulate. Ashes should not be left under grates until the burnt fuel comes in contact with bottom of grate bars. Steam pipes to be free from woodwork and supported by metal hangers.

14. Car fires must be started outside of the building. When a car enters the terminal it should have the fire drawn before coming into the house and the refuse placed in waste cans.

15. *Wiring for trolley and lights* should be examined so that no live circuits are uninsulated or in contact with any inflammable material. No portable incandescent lamps are allowed except in pits where only standard elevator or armored cable is to be used.

16. *Trolley poles* must be pulled off wire as soon as cars are placed in the house. Trolley wires should always be supported so that in case of a break the wire will not reach the ground.



Fig. 1—Buildings and Structures—Steel Viaduct Inclosed in Concrete

17. *Sprinkling system* to be systematically inspected every day. Records kept on file of air and water pressure of dry valve, height of water in tank, temperature, etc., so that the entire system will be regularly and carefully maintained.

18. Watchman's clocks are to be carefully examined each morning. Cards should be checked and filed.

19. *Official head in charge* of property is to conduct a systematic fire drill at least once a month.

20. A *systematic inspection* of all fire appliances and other matters pertaining to fire risks to be made at least weekly by a responsible party. The report is to be retained and kept on file for reference and records. It is important that a clear space be left around the fire protection apparatus so that ready access may be had in case of emergency.

#### RECOMMENDATIONS FOR REPORT OF 1912

1. Standard general specifications and form of contract for railway structures.
2. Review of standard car house construction, with recommendations.
3. Proper waiting rooms and shelters for electric railways.

#### REPLIES TO FORM LETTER

NOTE: The committee obtained answers from fifty-two companies to the following questions; only the answers of the majority are reprinted here:

(1.) Are buildings and bridges maintained by your working force or by contract? By own force, 45.

(2.) Are regular inspections and reports made at stated intervals? No, 24.

(3.) What is the most satisfactory heating system for:  
(a) Carhouses? Steam 25, none 10; (b) Car shops? Steam 22, none 9; (c) Waiting rooms? Steam 19, none 9, stoves 8.

(4.) What is the best roof construction for railway buildings? Reinforced concrete 19, steel 10, no reply 14.

(5.) What floor construction is recommended? (a) Carhouse? Concrete 39; (b) Offices, men's room, etc.? Wood 27; (c) Car shops? Cement 39, wood block 12; (d) Power house? Cement 34; (e) Waiting room or shelter? Concrete 15, wood 15.

(6.) Do you prefer rolling steel doors or swinging doors? Rolling doors 29, swinging doors 15.

(7.) What type of closet and urinal do you recommend? Self-flushing 6, slate, enamel and porcelain 3 each.

(8.) Have you used cold-water paint, and with what results? Have used—good 7, bad 1; have not used 8; no reply 36.

#### ECONOMICAL MAINTENANCE AND CONSTRUCTION

BY MARTIN SCHREIBER

It has only been in recent years that systematic maintenance of buildings and structures has been given very serious thought, and many properties still offer an excellent field for improvement. A certain amount of attention is absolutely required by the line, track and equipment of the railway to keep the cars operating, but it is not uncommon to see structures in a shocking state of preservation. We have all seen steel bridges and structures left unpainted until the effect of rust is quite sufficient to impair seriously the strength of the members, and so that renewals are required long before the possible life of the structure is obtained.

It is fortunate that the modern trend towards permanent construction and the efforts of the insurance interests greatly simplify the maintenance problems of our successors.

Fig. 1 shows a street railway viaduct that is being completed. Note the absence of joints and details which require painting and regular maintenance.

One road has just built offices and carhouse shops, for which it was desirable to keep the first cost low; so instead of the building being constructed with corrugated iron, it was built of asbestos-covered metal, which only increased the cost over ordinary corrugated iron by 9 per cent. It requires no painting and has a considerable advantage from a fire risk standpoint. One electric railway company is now constructing a storage carhouse with the asbestos metal for sides and roof. The building will house one hundred 50-ft. cars. It may be of interest to state that the cost of this carhouse is approximately only 30 per cent of the standard brick wall and mill construction type. The standard constructions for carhouses, either the reinforced concrete roof or mill construction roof, or both, are types conducive to low maintenance. Fig. 3 shows the type of carhouse that

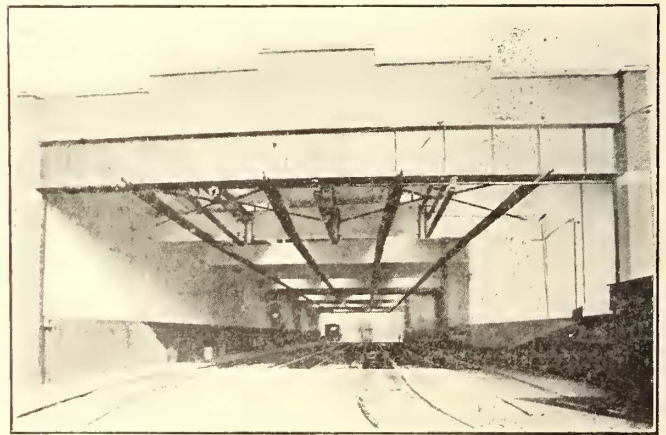


Fig. 2—Buildings and Structures—Carhouse of Mill Type Construction

is representative of mill construction. This building contains four-track bays, has covered steel roof trusses 16 ft. from the floor, and tar and gravel roof, supported by 3-in. splined plank and 6-in. by 12-in. purlins. The trusses are arranged to pitch in one direction for each bay, thus simplifying the number of roof gutters and the entire drainage system. The pits are open, with the rails supported on creosoted wood blocks anchored to reinforced concrete piers. The design is simple and there is no waste space or fancy trimmings.

METHODS AND ORGANIZATION

The methods pursued by the different railway companies in maintaining buildings depend somewhat on the scope of the work. A small company with only a few buildings,

carhouses or terminals, for thorough competition by reliable contractors is generally a means of reducing the cost below what it could be executed for by the company's own men.

One of the principal requisites for good results is systematically to take care of the maintenance and not wait for forced repairs or to cultivate emergency repairs. For example, the proper time to go over and put heating plants in shape is during the summer. The introduction of monthly inspection trips, together with annual inspection by head of departments, recorded and reported to the management, is productive of systematic maintenance.

A shop is provided for the building superintendent of one street railway. Here the machine work is done (to keep the cost of labor at a minimum) which generally is required in the field. In this shop the mechanics spend their time economically when outside repairs do not demand attention; and when repairs are required, the material that is always useful is ready.

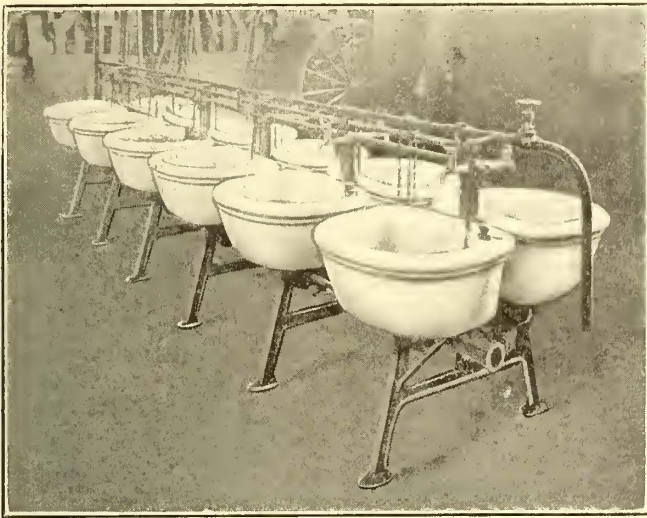


Fig. 3—Buildings and Structures—Shop Wash Basins

trestles or bridges could not afford to employ men for building work alone, particularly where so many special artisans are required. However, even in this case, it may be ar-

HEATING AND PLUMBING

Probably heating and plumbing cause the most trouble for the building department. Fig. 3 is a view of shop wash-basins. Generally, toilet rooms should have floors of cement and be connected to drains, in order that the floor may be washed down with a hose.

For a large shop or extensive areas a blower system of heating is recommended, except in the paint shop, where the ordinary direct steam or hot water coil is desirable. The blower system has the advantage of centering all the heating apparatus at one location; it gives good distribution

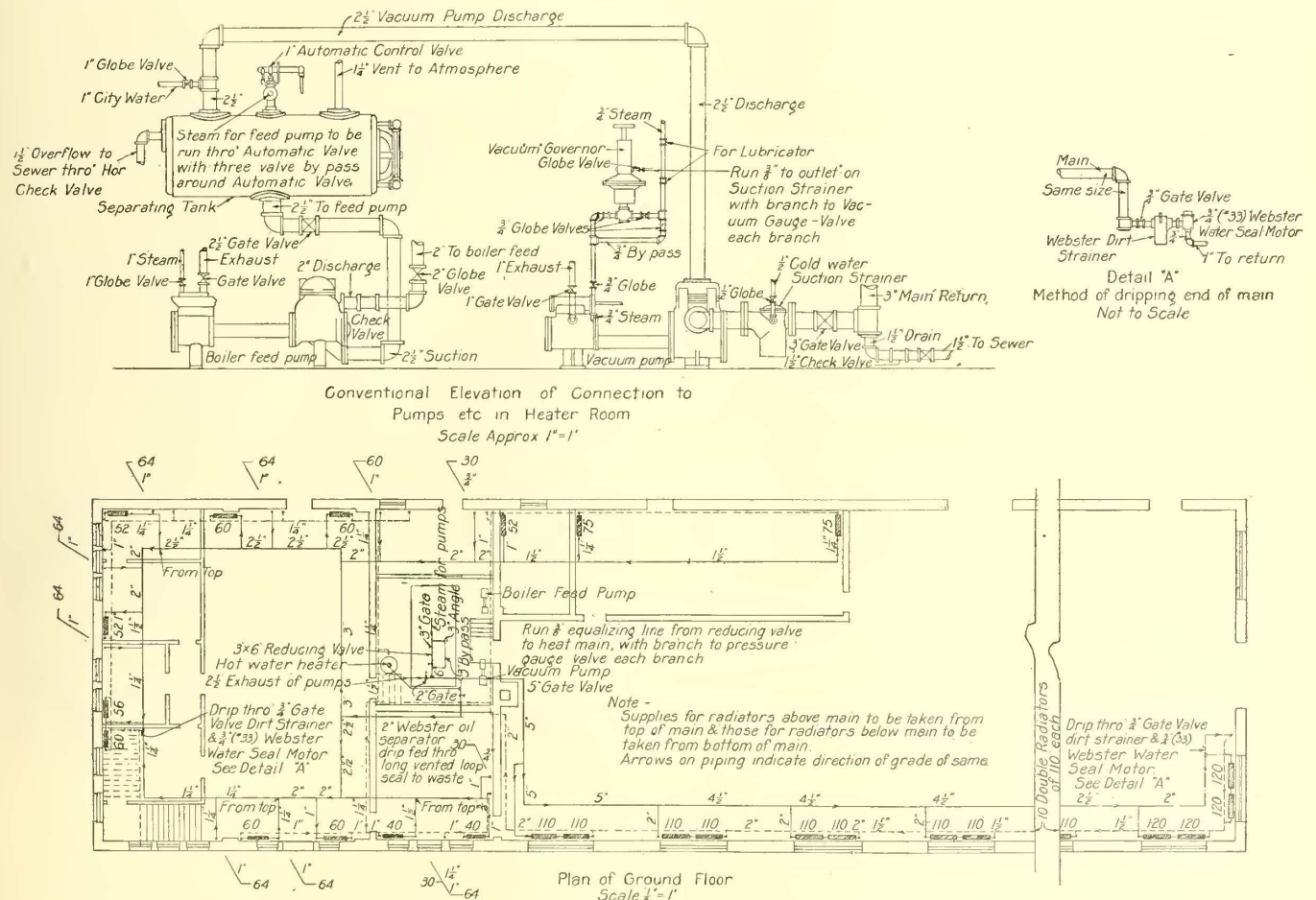


Fig. 4—Buildings and Structures—Direct Steam Heating Layout for 100-Car Terminal

ranged to have men regularly employed detailed to do whatever repairs present themselves. The large companies now concede that using their own working force is very desirable, this plan being cheaper and more satisfactory. This, of course, does not apply to the construction of large

and has a low first cost. With a forced draft only one-third to one-fifth of the heating coils or surface is required as compared with that necessary with natural draft; besides the blowers may be operated in the summer months, producing air circulation throughout the building. If the source

of steam supply is at a considerable distance from the fan and heater, or if there are several equipments receiving steam from the same source, it is best to deliver the steam at high pressure and send it through a reducing valve before it enters the different installations. Also, long return pipes work more satisfactorily and economically if motor valves are put on the coils or radiators and a vacuum system is employed.

For operating offices, men's quarters, etc., a gravity return system or hot water system is generally the best and most

subject to excessive wear, the creosoted wood block on a concrete foundation is preferable. The wood block will wear better and is more easily repaired. On account of the difficulty of satisfactorily repairing cement floors, it is important that the installation be carefully made.

Wood or plank floors should be avoided wherever possible except for offices. They are the most costly type to maintain, bad fire risk, and deteriorate rapidly.

#### ROOF CONSTRUCTION

The engineer is most concerned about the type and con-

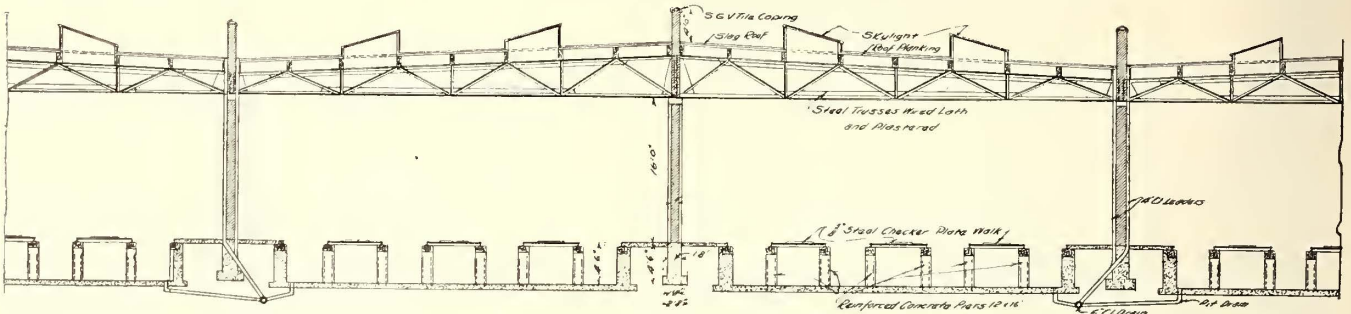


Fig. 5—Buildings and Structures—Section Across Car House with Mill Construction Type of Roof

economical arrangement. In the gravity return, it is important that the main steam pipe be taken from the boiler and brought up at once as high as practicable. The supply pipes should be at least 2 ft. above the water line of the boiler and pitch down approximately  $\frac{1}{2}$  in. in 10 ft., to enable the steam and water to flow in the same direction. For the return pipe, a pitch toward the boiler at about the same angle is required. The boiler should have a capacity of at least 50 per cent more than the nominal heating surface required. Boilers in a small plant may be of the cast-iron sectional type. These boilers have the advantage of allowing additional capacity to be added if the size of the system is ever increased. If there is any question about getting proper pitch to the return for the low pressure gravity heating system, and if the size of the installation will justify it, the plant should be changed to a vacuum system. The vacuum system is not only more economical but absolutely reliable, and generally will give even heat in all the radiators or heating coils, even where there are long runs.

Fig. 4 shows the heating layout for offices and shops in connection with a one hundred capacity carhouse that is now in the course of construction. This plant will generate steam at high pressure. By the use of reducing valves the pressure is reduced before it enters the radiators and coils, a vacuum pump returns the water of condensation to a receiver, where it is pumped back into the boiler by the boiler feed pumps. With the long runs, the advantage of this system is obvious.

The open-tank hot water heaters have advantages for isolated offices, men's quarters, etc., where it is not practicable to place steam boilers low enough to have the water line of the boiler below the bottom of the radiators or coils.

It may not be out of place to call attention to the new Harrison system of heating. A big advantage is claimed for this system in both economy of first cost and maintenance. This is a modified blower system—the air is blown directly over the furnace tubes, eliminating steam piping.

On suburban roads, with small isolated stations or waiting rooms, satisfactory heating may be obtained by means of standard pot stoves. About three sizes of stoves will generally meet all the conditions that arise in practice.

#### FLOOR SYSTEM

Proper floor construction has an important bearing on the economical maintenance of permanent buildings, particularly carhouses, power houses, car shops, waiting rooms, toilet rooms and locker rooms. Concrete floors, with cement finish, probably are the most desirable. For portions of the machine shop, such as the wheel room and the smith shop, which are

struction of the roof covering proper, the details of gutters, flashings and leader connections. Leaky roofs are most annoying. For any railway structure, where the roof is reasonably flat and simple, a built-up covering of felt, pitch and gravel—taking first cost and up-keep cost into consideration—is the most satisfactory.

Fig. 5 shows the general arrangement of an approved carhouse roof. The gutters are all formed by parapet walls. As the trusses pitch in one direction, only one gutter is required per bay and only one leader connection occurs every 40 ft. along the length of the building. All flashings around the skylights, gutters and conductors are 16-oz. copper. The cap flashing laps over the base flashing not less than 6 in. in order to bring the edge of the cap flashing to within 2 in. of roof line. The base flashing, in all cases, laps not less than 6 in. on the roof. The cap flashing extends into the



Fig. 6—Buildings and Structures—Wooden Swinging Doors for Carhouse

brick work not less than  $1\frac{1}{2}$  in.; the back edges are turned out at least  $\frac{1}{4}$  in., and are held with lead wedges not over 8 in. on centers and joints between the metal and the walls, and are thoroughly cemented with elastic slater's cement.

#### ENTRANCE DOORS FOR CARHOUSES

The maintenance of carhouse doors has always been a bugbear to the operator, and the repairing of doors is a constant source of expense and annoyance. At present two types of doors are mostly used—the ordinary wooden door, of

either swinging or sliding design, and the rolling steel door. It is practicable satisfactorily to take care of the trolley wire for either type by introducing a wooden circuit breaker at the door opening.

Fig. 6 illustrates a type of swinging door with a frame hung on cast-iron eyelets built into the wall. The doors shown cost per opening 10 ft. by 16 ft., complete with up-bolts and fastenings, about \$105. Probably \$165 would have been required if rolling steel door had been used. These wooden doors have been in service seven years and are still in good condition. Notwithstanding cost, rolling doors take a minimum space to operate, which is often the controlling factor.

#### PAINTING

Proper and timely painting is one of the most effective ways of keeping building and structure maintenance at a minimum. Yet how often is painting neglected. Moreover, more painting is ruined by poor application than any other way. The paint is often thinned with cheap, worthless oils and japsans.

In painting metal, the paint should not be applied at various degrees of temperature and moisture, or over rust. One part of iron becomes approximately 400 parts of rust. So it may easily be understood how this great increase in volume will force off a protective coating when rust forms

inside walls and roofs of the carhouses and shops. It is desirable, however, to have the walls finished 6 ft. from the floor line with a dark oil paint.

A good, cheap wash for concrete surfaces was used in the Philadelphia subway. This consisted of lime, cement and water. A bushel of lime is used, and while slacking a pail of salt is added; care is taken not to burn the lime, and it is kept covered. The color is determined by the amount of cement used, and the wash is thinned by water.

#### APPENDIX C. SPECIFICATIONS FOR ROOF COVERING

The Milwaukee Electric Railway & Light Company, by F. G. Simmons, engineer of way, furnished for this report detail specification for the roof covering for its new Cold Spring shops as prepared by R. H. Pinkley.

These specifications include the furnishing and placing of a complete roof covering to be placed on the concrete slab roof, consisting of approximately 96,000 sq. ft. of roof having a pitch of about 1 in. to the foot and approximately 70,000 sq. ft. of roof having a steeper pitch mainly of saw-tooth construction. All roofs having a pitch of less than 3 in. to the foot are to be classed as flat roofs. Roofs on saw-tooth parts of buildings and on other parts where the pitch is greater than 3 in. to the foot are to be classed as inclined roofs. The flat roofs are covered with four-ply composite

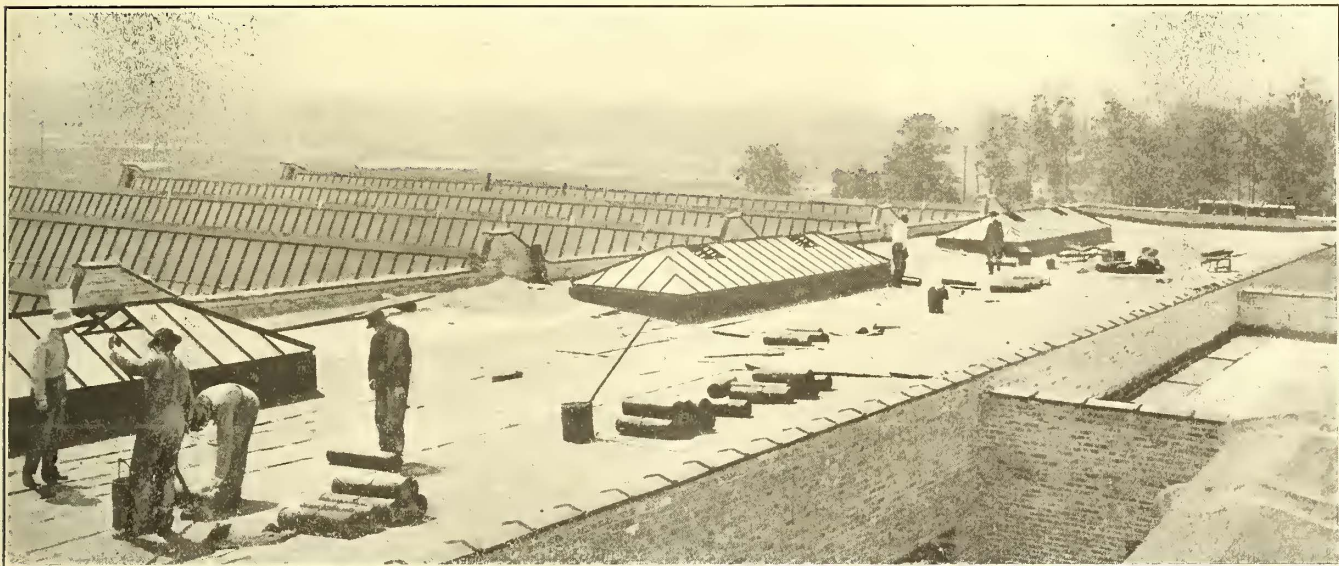


Fig. 7—Buildings and Structures—Application of Felt Roofing to Shop Buildings at Milwaukee

under the surface of the coating. If we paint over a rusted surface we are covering over a large percentage of moisture, often 30 per cent, which has a tendency to take up more water and form more rust, and finally break through the paint. In painting steel bridges, trestles and the like, it is important that all metal surfaces before paint is applied be completely cleaned of all scale, rust, dirt, grease, or paint with scrapers, wire brushes or sand blast. The cleaning should proceed each day over an extent that can be given the first coat of paint on the same day. Round bristle brushes should always be used for painting structural work, as these will remove the air, and so the paint may be thoroughly brushed in all cracks and crevices.

Paint materials should always be obtained from reliable dealers. Paint is better if mixed as required. If it is not possible to grind the pigment, better results may be obtained from unmixed paints made from first-class materials than from the ordinary run of prepared paints.

One of the best methods to clean and freshen the inside of an old building is by the use of cold-water paint. The cold-water paint may be applied at a small cost with a spraying machine. Cold-water paint is well adapted to finish the

asbestos cap sheet roofing, consisting of pure coal tar saturated wool roofing felt, weighing between 14 lb. and 16 lb. per 100 sq. ft., single ply.

The inclined roof surface is covered with three-ply composite asbestos cap sheet roofing, consisting of pure coal tar saturated wool roofing felt, known as No. 1, and weighing approximately 25 lb. per 100 sq. ft., single ply. An accompanying illustration (Fig. 7) shows the roof surface being covered with the materials mentioned.

#### APPENDIX E. PROPER FACILITIES FOR EMPLOYEES

A summary of replies to inquiry letter on this subject gave results substantially as shown in our recommendations.

#### APPENDIX F. FACILITIES FOR EMPLOYEES OF THE PUBLIC SERVICE RAILWAY COMPANY.—BY N. W. BOLEN

The manager of the modern railway recognizes the value of providing proper facilities for the comfort of employees, and this present day view of the matter is reflected in the plans of practically all new carhouses and power stations. Locker rooms, toilets, crew rooms and assembly rooms so far have proved most efficient in providing for the employees' comfort.

The Public Service Railway Company early recognized the

need of such conveniences for its employees, and has amply provided for making the surroundings of the employee pleasant and comfortable. At all carhouses and stations toilets of substantial construction and of sufficient number are installed in well-lighted and ventilated locations. At the various carhouses crew rooms are maintained where men coming off and going on duty may rest, make up reports, write letters, or engage in the games provided.

Locker rooms are in well-lighted locations and are fitted with sufficient lockers of the full ventilated type to provide each employee with a separate compartment. These lockers are made of expanded steel, of ample size to accommodate rubber coats, extra clothing and other personal effects of the employee. Lockers are subject to inspection at frequent intervals by officers. Depot receiver's offices are fitted with all needed conveniences for prompt dispatch of business. Large counters surrounding the receiver's office facilitate the work of conductors turning in at the window.

In all the facilities provided for the comfort of employees of the Public Service Railway Company the importance of accessibility has been kept in mind. Wherever possible, lavatories, locker rooms, crew rooms and depot offices are located on the first floor near the front of the carhouse, in order that the time lost in going to or from a carhouse may be reduced to a minimum. No attempt at ornateness or lavish

the amount of money the road is willing to spend (not only for first cost, but for maintenance) are all factors.

"In addition to the provision of suitable lockers for the protection of the men's clothing, it might be advisable to arrange heating apparatus in such a way as to furnish a convenient place for the drying of wet clothing.

"Railroads everywhere are giving consideration to the question of providing ways of taking up their men's time when off duty. The cardinal principle in carrying on work of this kind, which must be followed in order to be really and permanently successful, may be summed up: Do not *give* the men anything. Do not expect to build a room and put in billiard tables, bowling alleys, baths, etc., and then let the place run itself with the men free to do what they please, for if you do your scheme will prove a failure.

"The question thus arises: How can we provide facilities of this kind and have them enjoyed and appreciated, self-maintained and always kept up in first-class condition? The essential feature is to have everything self-supporting after being once installed, and while small games may be free, there should be a charge for the use of billiard tables and bowling alleys. Where baths are provided, bathing should be regulated to insure proper care of the apparatus and premises.

"In some cases a club organization might be resorted to,

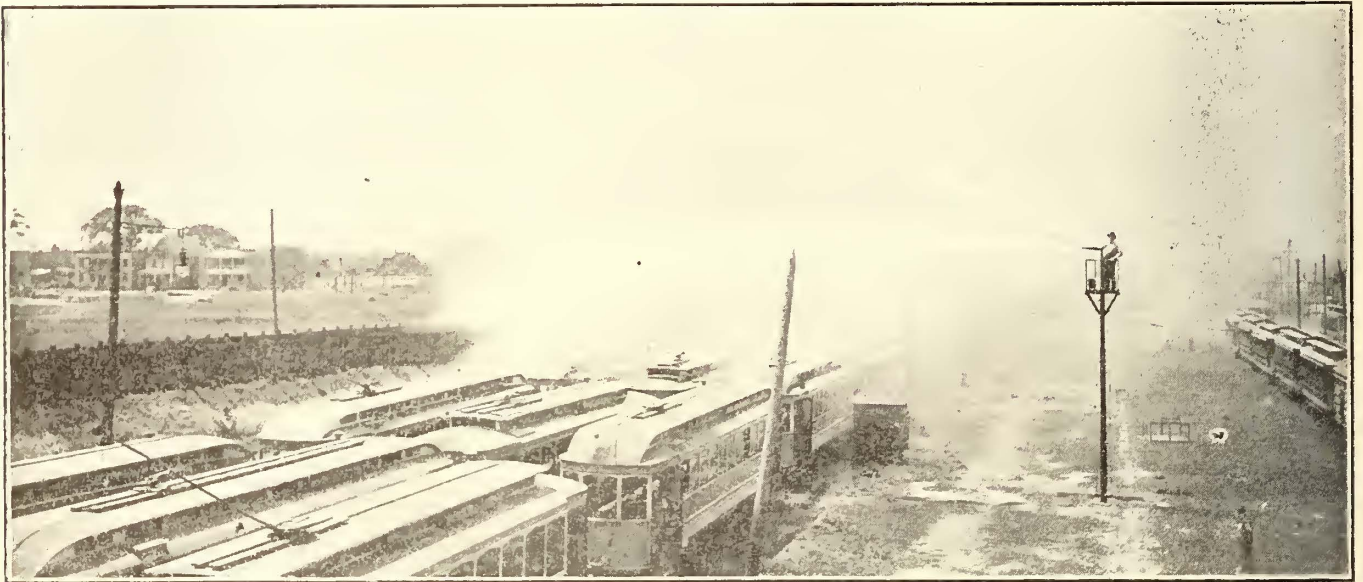


Fig. 8—Buildings and Structures—Monitor Nozzles Protecting Car Yard of Cleveland Railway Company

decoration has been made, but plain, durable, sanitary lines have been followed with a view to providing quarters for the employee that are attractive, comfortable and easy of access.

EXTRACT FROM LETTER OF F. F. LOW ON PROPER FACILITIES FOR EMPLOYEES

"Whether such features cause men to stay longer with the road is an important point, as we all know that the constant changing of help is a cause of accident and possibly figures could be obtained to show the expense of breaking in new motormen and conductors, as possibly a road could afford to spend several thousand dollars a year to make the accommodations more pleasant if the result is gained of having men stay a certain length of time longer.

"In designing a building the first thing to be considered is the extent of the accommodations which will be required, and the space required for the various purposes. It is an easy matter to decide whether there will be accommodation for superintendent, roadmasters, station master, starter, clerks and similar offices, but when it is thought desirable to have something more than a plain lobby for the men, with space for lockers and toilet adjoining, then a problem arises. The temperament of the men, nature of surroundings and

allowing men to elect their own officers and manage their affairs themselves, the company providing the premises, paying the initial cost of fitting up, to a greater or lesser extent.

"A great deal of what has been done up to now has been restricted by the space available, but in designing new buildings the question has to be taken up in a broad way, exactly what should be provided depending largely upon local conditions."

The subject of Appendix G, proper installation for fire protection of carhouses and terminals, including open yards, is largely summarized in the committee's conclusions and recommendations.

#### APPENDIX H. AUTOMATIC SPRINKLERS.—BY C. H. CLARK

Railway officials are realizing that the destruction by fire of rolling equipment, be it but a few cars, is an inconvenience and loss of traffic income for months; that the delay in obtaining new cars invites undue criticism from an impatient and not altogether friendly public; so it will be seen that there are at least two favorable propositions before the electric railway people to encourage this protection for their property, viz.:

1. The protection against fire offered to cars.

2. Prevention to delay of traffic for an indefinite period, thereby satisfying the public.

In consideration of the all-gain proposition offered by sprinkler protection, there should be no obstacle to providing efficient protection against fire. The car storage houses and car shops of the Cleveland Railway Company have been provided with a standard automatic sprinkler equipment during the past five years. I have given personal attention to this equipment and have watched with much interest the efficiency of this plan of protection.

I can unhesitatingly recommend automatic sprinkler equipment for car storage houses, car shops and terminal stations as the most efficient, most scientific and most reliable means of extinguishing fire known to-day. Before entering into contract for the protection of the car storage houses, machine shops and car shops an experimental equipment was installed. Actual fires were started in the cars and the automatic sprinkler in every instance extinguished the fire. The remarkable features of these tests were that in no case were the cars on the adjoining tracks injured in the least. The automatic sprinkler formed a water curtain and thus prevented spread of the fire.

The officials of the Cleveland Railway Company were so favorably impressed with the efficiency of the sprinkler equipment, as demonstrated in these tests, that contracts were entered into for the protection of eleven car storage houses, machine shops and car shops at a cost of over \$120,000.

#### PROTECTION RESULTS

The following results were obtained through this plan of protection :

1. The safeguarding of the property against a large fire loss.

2. The reduction of the rates of insurance to a point where the savings made from the rates formerly charged enabled the Cleveland Railway Company to pay for the entire cost of the equipment in less than four years.

I consider automatic sprinkler equipment for traction properties a good financial investment, on which large returns are made for the money expended. The cost of the maintenance of the equipment has been small during the past five years. There has been a slight difficulty in operation of the cars on account of automatic sprinkler equipment.

The automatic sprinkler equipment needs the ordinary care and attention that would be given to any machine that is constantly in operation. Through regular inspections of the equipment made by one of our own employees the sprinkler equipments have been kept in constant working order.

The rules and requirements for the installation of automatic sprinklers in car storage houses, machine shops and repair shops, adopted by the National Fire Protection Association (embracing all the leading stock and mutual insurance companies), should be observed.

#### PROPER FIRE PROTECTION OF CARS IN OPEN YARDS

The Cleveland Railway Company in 1910 installed a system of standpipes with monitor nozzles in its Woodhill car yards. This system has been tested by prominent engineers of traction companies as well as insurance companies, and I can heartily recommend this system for the use of members of this association. The accompanying Fig. 8 illustrates the actual installation.

#### APPENDIX I

The open yard sprinkler equipment of the Interborough Rapid Transit Company at One Hundred and Fifty-ninth Street and Harlem River, New York City, was described by George H. Pegram. [The same subject was described and illustrated in the *ELECTRIC RAILWAY JOURNAL* for Aug. 12, 1911, page 277, and therefore is not presented again.—Editors.]

Appendix J consists of fire protection specifications for the Springfield Avenue carhouse of the Public Service Railway Company.

## REPORT OF THE COMMITTEE ON TAXATION MATTERS\*

BY CALVERT TOWNLEY, CHAIRMAN; C. L. S. TINGLEY, VICE-CHAIRMAN; G. E. TRIPP, J. H. PARDEE, J. B. M'AFEE, C. L. HENRY, G. L. ESTABROOK, A. E. LANG

A letter of inquiry was sent to one company in each state asking for a short résumé of the tax laws of that state. Replies were received from every state except Connecticut, Idaho, Iowa, Nevada, New Mexico, South Dakota and Wyoming. The deficiency as to Connecticut was supplied from the report of the Commissioner of Corporations, United States Department Commerce and Labor, so that every state of any importance, with the exception of Iowa, is represented in this report. The committee regrets that the report is not more complete, but the time remaining after the replies had been received and collated was inadequate to make good the deficiencies in the replies. Considerable correspondence should be conducted to supply the omissions and correct the misunderstandings which have arisen.

The reports of the Commissioner of Corporations covering the states of Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, Connecticut, New York, New Jersey, Pennsylvania, Delaware, Maryland, District of Columbia, Ohio, Indiana, Illinois, Michigan and Wisconsin, have been freely consulted and some of the findings are worthy of note. To quote from the letter of submittal covering the New England States, bearing date of May 17, 1909, we find the following: "The taxation of individuals is substantially the same throughout New England. Corporate taxation, on the other hand, shows wide diversity, both in theory and practice. Individuals are taxed on property. Corporations are taxed on property, or on income, or on a combination of both, or on capital stock, either par or market value, or occasionally, as in the case of telegraph and telephone companies, on mileage or number of instruments. Administration ranges from a system highly developed handled centrally by state officials with large powers to no centralized administration whatsoever." This comment of the commissioner will apply throughout the entire country. Another notable utterance is: "Railroads are among the largest taxpayers. Public service corporations, such as street railway, telegraph, telephone, express car, gas and electric companies, are most often brought under special and new systems of taxation. Taxation of public service corporations on gross receipts is growing in use."

The report of the Commissioner of Corporations above referred to discloses that in the State of Maine practically 49 per cent of the revenue of the state is derived from special taxes upon corporations; in New Hampshire 27 per cent, in Vermont 56 per cent, in Maine 35 per cent, Rhode Island 40 per cent, Connecticut 84 per cent, New Jersey 92 per cent, Pennsylvania 72 per cent, Delaware 62 per cent, New York and Maryland 32 per cent, District of Columbia 16 per cent, Wisconsin 71 per cent, Ohio 52 per cent, Indiana 19 per cent, Illinois 34 per cent and Michigan 45 per cent.

In order that the data already collected may be brought up to date and made available at all times, your committee would recommend that the committee on taxation matters be enlarged so that it shall be composed of one member from each state, whose duty it shall be to bring the data up to date, and from time to time as changes are made in the tax laws or practice of the state to epitomize such changes and forward them to the New York office for file. By this method the secretary's office will be kept in close touch and the member companies seeking information may always have it available upon short notice. To copy fully the replies from the various states in their present incomplete form would be unprofitable, but the committee has endeavored to epitomize briefly the replies from each state.

[The committee submitted a digest of state tax laws.]

\*Abstract of report read before the American Electric Railway Association at Atlantic City, N. J., Oct. 9-13, 1911.

## REPORT OF THE COMMITTEE ON WAY MATTERS\*

J. M. LABNED, CHAIRMAN; C. B. VOYNOW, VICE-CHAIRMAN; M. J. FRENCH, R. F. KELKER, R. C. CRAM, C. L. CRABBS, C. S. KIMBALL, H. F. MERKER, E. E. TILTON

The committee has not been able to devote the necessary time to collect data for or consider the subject of "Nosing of Cars," and is, therefore, not in a position to report thereon. With reference to the other matters under consideration, your committee begs to submit the following report:

### RAIL SECTIONS—REVIEW OF PREVIOUS REPORTS

The committee on way matters of 1907 made substantially a progress report and submitted a number of sections for consideration.

The committee on way matters of 1908 made no report on girder rail.

The committee on way matters of 1909 confirmed the report of 1907 as follows:

"When the traffic is so confined to the railway strip, or is so congested that the strip is continually used by vehicles, a rail or girder section should be adopted, preferably sections following closely the lines of the Tribby rails, recommended by the committee on way matters of 1907."

The committee on way matters of 1910 confirmed the report of the committee of 1907 and also submitted other sections of lighter weight.

None of the sections submitted have been given the final approval of our association.

### WORK DURING 1911

Your present committee, in its design of a rail section, has been guided by the following principles:

1. The performance of rail sections at present in use with a view to embodying the features that have given good service and eliminating defects that may have developed.
2. The redistribution of metal to give the maximum strength at the critical points.
3. An outline of section and distribution of metal that would permit easy rolling without sacrifice of essential characteristics.
4. The possibility of combining in one rail all essential requisites that are necessary in a standard.

The results of its work have been embodied in the section illustrated and in the detailed analysis of this section, which follows:

#### I. ACCOMMODATION FOR WHEELS

(a) The total width of head is made 3 in. The width of the head in girder rails is determined primarily by the area necessary under the head for splicing purposes. A track subject to heavy vehicular travel should not have the level of the paving above the rail head; therefore it should not matter if the wheel treads overhang the head. The additional width of head over the amount necessary for tractive and electric contacts should be beveled off to gain economy in metal and avoid false treads when narrow wheels run on the track.

(b) The tread is made a plane, inclined to the gage. The wear of all mechanical parts indicates that straight lines and plane surfaces should be avoided. Worn rails show rounded heads. A flat head would get less work or compression in rolling, and therefore would be of less dense texture on the wearing surface. Worn rails show also the tread inclined at some angle to the gage. From the above it seems desirable to make the tread of a curve of some radius, but the difficulty of grinding joints on a rounded head and also the added difficulty in rolling, pointed out by the manufacturers, determined the design of the tread, as shown.

(c) The top fillet of the head is made  $\frac{1}{4}$ -in. radius. This fillet should be of small radius. Worn-out rails, on tracks

where excessive car swaying did not exist, show a small radius corner in the head. The originally proposed standard sections of the A. S. C. E. required a  $\frac{1}{4}$ -in. fillet; this was afterwards increased to  $\frac{5}{16}$ -in. radius. The A. R. A. standard sections propose  $\frac{3}{8}$ -in. radius, with a proviso that the  $\frac{3}{8}$ -in. fillet shall be retained as long as the M. C. B. wheels are used. Our standard wheel has a smaller radius fillet between wheel tread and flange than the M. C. B. From the above it could be drawn that a  $\frac{1}{4}$ -in. radius fillet would be advisable to use in our standard rail.

(d) The gage side of the head is made a small angle. An angle is made for better alignment with a guard-rail, and on account of the positive statements of the representatives of manufacturers that a vertical head would be impossible to roll.

(e) The depth of groove is made  $1\frac{3}{8}$  in. and designed so that when the allowable wear in the thread is reached the flange is about to touch the bottom of the groove. This groove will accommodate M. C. B. wheel flanges.

(f) The groove is made  $2\frac{1}{8}$  in. wide; the angle 37 deg., with a view to self-cleaning. The arguments stated above in "(e)" apply also to the width of groove. Recently built tracks show substantial flange cutting on the tram side of the groove. The "nosing of cars" is the primary cause of this wear. The angle of the groove should be such as to allow dirt, ice and snow to be pressed out and cleaned by the flanges.

(g) The tread is made  $2\frac{1}{8}$  in., which seems to be ample for city railway purposes. Even for steam roads, with heavier wheel loads, this tread is seemingly sufficient; the extra width provided is to an extent a function of splicing. In case of city railways the loads are lighter.

#### 2. VERTICAL STABILITY

(a) The 9-in. section was proposed for the reason that 9 in. is an even figure, providing for all possible irregularities of block paving. While from the standpoint of supporting car loads a smaller depth would be sufficient, there are other important and vital considerations which must govern us in deciding upon the depth, not the least of which is the capital invested in permanent substructures, fittings, paving, etc., which in renewals could provide only for a 9-in. section. Other reasons for a deep section will appear under "Joints," "Distribution of Loads," etc.

(b) The center of web is located  $\frac{3}{4}$  in. from the gage line. While the centrally located head is theoretically the best for vertical stability, the section has the advantage of larger splicing accommodations, and also provides for such permanent substructures as have been installed for rails having a  $\frac{3}{4}$ -in. distance from the center of the web to the gage line.

(c) With first-class timber for ties becoming scarcer and more expensive, tie plates are necessary for a narrow base. A  $6\frac{1}{2}$ -in. base it is thought will not require tie plates. For concrete construction without ties the maximum width of base possible to roll should be demanded. The width of the base is also an essential factor of stability.

#### 3. PERMANENCY OF JOINTS

(a) On electric railways in paved streets it is of the greatest importance to have the joints permanent. Since the opening of the paving for joint repairs is expensive, the heads of the rails are permitted to be considerably hammered before such repairs are undertaken. The depth of section is the greatest factor in obtaining permanency of joints. For welded or riveted joints a less depth may be satisfactory from the standpoint of joints only, but for a bolted joint, when the joint is designed strong enough transversely, the depth is of paramount importance.

(b) A 10-deg. angle is provided for splicing. This angle is primarily for economy in weight.

(c) The splicing space under tram side of rail has been made wide enough for a concealed bond.

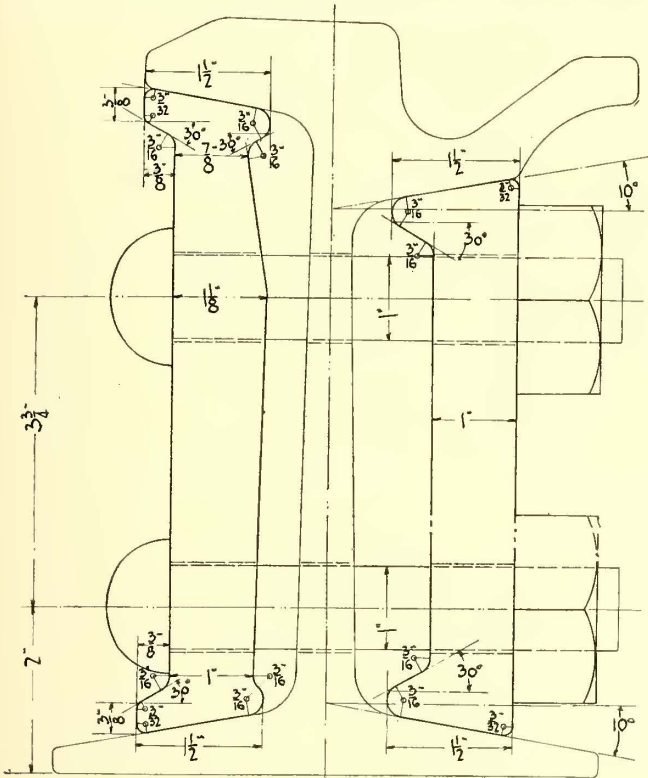
\*Abstract of paper read before the American Electric Railway Engineering Association, at Atlantic City, N. J., Oct. 9-13, 1911.



4. HORIZONTAL STABILITY

(a) The location of the web, as shown, is advantageous for horizontal stability.

(b) The web is made  $\frac{1}{2}$  in. thick under the head and  $\frac{3}{8}$  in. thick at base. When the cars sway from side to side or in case of heavy wagon loads on the tram the web acts as a cantilever, and the stability is directly proportional to the cube of the cross-section at the base. The web shown



Way Matters—Recommended Bolted Joint for 136-lb. Grooved Girder Rail

has about two and one-half times the stability of a straight web  $\frac{9}{16}$  in. thick, yet it contains about the same weight of metal.

(c) The fillets at web are made  $\frac{1}{2}$ -in. radius. Large fillets are desirable under head, tram and at base, so that the head will not have a tendency to bend over the web or the web over the base; the fillets are limited by the area necessary for splice bars.

(d) Provided the web is properly designed for the transmission of horizontal stresses, the width of the base is the next factor of horizontal stability.

(e) The total width of tram is  $2\frac{7}{8}$  in., the tram being designed to accommodate wide tires and the heaviest vehicular traffic.

(f) While the depth of the section is a negative advantage, nevertheless as the rail is buried in the paving and has the web and other elements well designed, this seeming defect would be fully overcome by the greater advantages mentioned under "Vertical Stability," "Joints" and "Distribution of Loads."

5. DISTRIBUTION OF LOADS ON FOUNDATIONS

(a) The width of the base is of the greatest importance, whether for wooden ties or concrete substructures, as has already been mentioned under "Vertical Stability."

(b) A deep rail will carry the loads over defects, keep the track in alignment and surface, and help to keep the paving in good condition.

6. ACCOMMODATION FOR PAVING

(a) The depth of section is necessary to accommodate deep paving, and is also an important factor in keeping the paving in true surface.

(b) The tram of the rail takes the wear of the vehicular traffic and prevents ruts from being formed along the rail. The steel trams, under certain severe conditions of vehicular traffic, show as much wear as the head of the rail. For this reason the thickness of the end of the tram is increased.

7. ACCOMMODATION FOR VEHICULAR TRAFFIC

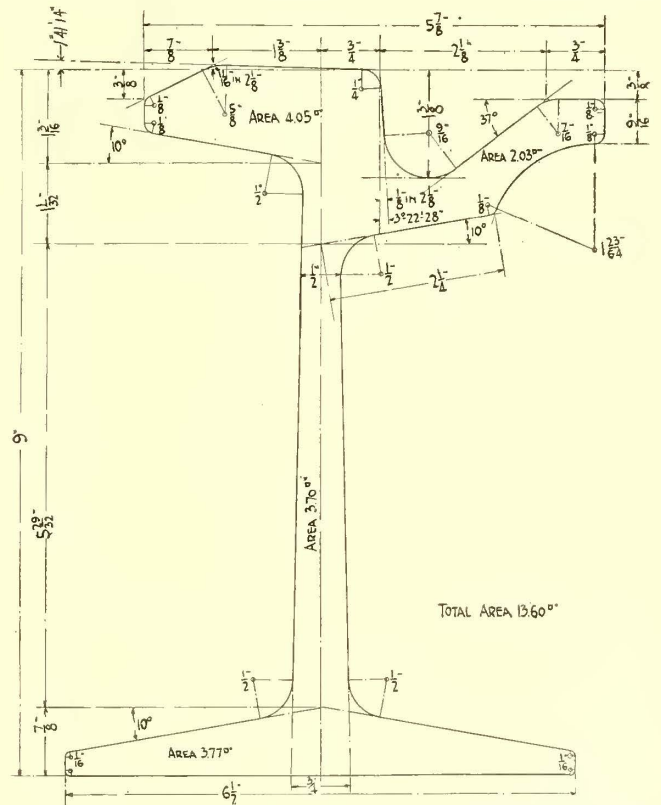
(a) The tram is made  $\frac{3}{8}$  in. below the head. Such difference in height will form an insignificant obstruction to vehicular traffic, while the advantage of saving in metal, both in width of tram and decreased thickness at the bottom of groove is obvious. Also where vehicular traffic is not very heavy the head will wear more rapidly than the tram.

(b) The width of the tram at the end is made  $\frac{3}{4}$  in. The width as well as the thickness must be considered in connection with wear by wagon wheels.

(c) The width of groove is made  $2\frac{1}{8}$  in. Any groove presents an objection for narrow-tired wheels. The narrower the groove the fewer wheels will enter it. The width adopted was influenced by the angle of the tram for self-cleaning and the clearance for flanges of the car wheels. The outline is such that narrow-tired wheels will readily turn out.

8. LIFE IN SERVICE

(a) The head is designed for  $\frac{1}{2}$ -in. to  $\frac{5}{8}$ -in. wear. When the life of the rail is not dependent on the life of the joints, this wear is sufficient for 15 to 18 years of average heavy service. There are no satisfactory data available as to the proportion of wear to traffic, and we have assumed from



Way Matters—Recommended 9-in. 136-lb. Grooved Girder Rail

the performance of former sections that  $\frac{1}{2}$ -in. to  $\frac{5}{8}$ -in. metal is sufficient.

(b) This depth is made such that the flange will not cut the groove until the head is practically worn out.

(c) The end of tram is made of substantial thickness to stand the wear of wagon wheels in heavily traveled streets.

(d) In designing the rail for a certain length of service, the life of the substructure will have to be considered.

9. WEIGHT

(a) The sections have been carefully considered as to distribution of metal; the head for maximum amount of

wear; the web for maximum of stiffness and strength; the base for best bearing and spiking accommodations.

#### 10. MANUFACTURE

(a) The head, tram, web and base have such distribution of metal as will permit the entire section to be rolled without difficulty. In this matter, as well as with the details, etc., we have conferred with the manufacturers.

(b) The fillet forming the bottom of the groove connecting the side of the head with the angle of the tram is made one continuous radius to facilitate rolling. The end of the tram is also formed to facilitate rolling and compacting of metal. The fillet under the tram at the end of the splicing area is made of small radius, to provide the maximum area for the support of splice bars, and allow the use of concealed bonds without thickening the tram. The fillets at the base of the rail are made of as small a radius as practicable to insure a good vertical contact for spikes, also to avoid sharp corners which would cut the spikes.

#### JOINT PLATES

Your committee also submits herewith a design for joint plates which embodies the following features:

The plates are set out, and especially the inside plate, leaving maximum room for bonding. The inside plate is flush on the outside, permitting maximum vertical spacing between bolts, and grip on the plates. This design of plate also allows the nuts to be placed on the inside of the rail with sufficient room for a wrench without projecting into the paving.

#### RECOMMENDATIONS

The 9-in. girder-grooved (Tribby) rail, 136 lb. per yard, outlined in the above report, is recommended as standard.

The consideration of a 9-in. girder guard rail and 7-in. girder-grooved and guard rails, embracing the principles outlined in this report on girder rails, should be referred to the 1911-12 committee on way matters.

The rail joint presented in this report should be referred to the 1911-12 committee on way matters for consideration and further development for use with concealed bonds on the 9-in. girder rail, recommended as standard in this report.

#### ORGANIZATION AND RULES FOR THE PROPER GOVERNMENT OF THE WAY DEPARTMENT

A uniform code of rules for the government of employees of the way department has not heretofore been under consideration by this association, and the work of your committee has, therefore, been, in a measure, along original lines. The American Railway Engineering Association have had this subject under consideration for some years, but have not taken any final action.

In compiling book of rules, such rules as are applicable to the way department or with which way department employees must be conversant, contained in the standard codes of the American Electric Railway Association, have been incorporated or modified to meet way department conditions, but the spirit and intent of such rules have not been changed. The committee has not thought it necessary to propose two books of rules, one for interurban and one for city service, as way department work and conditions of service upon the two classes of roads differ but little.

The proposed chart or diagram of organization is designed for properties of large size and may be reduced for smaller properties by cutting out blocks until only one important official is left, depending entirely upon the mileage.

The titles "way department" and "engineer of way," for the head of the department, were selected by the committee because they seem to describe correctly the scope of the department, which under many of our organizations is responsible for construction as well as maintenance.

The committee has made no attempt to define the scope of a book of rules, though it has held that a uniform and standard code should only contain such rules as are applicable to all companies.

#### RECOMMENDATIONS

In conclusion, your committee recommends as follows:

1. That the book of rules be adopted as "recommended practice."

2. That the secretary be requested to call the attention of all member companies to the book and, should they make use of it, request them to advise him of any changes they have found necessary with the reasons therefor, and of any improvements or additions which its use may suggest from time to time.

3. That a member of each future way committee be designated to examine into suggested changes and additions and bring the same to the attention of the committee.

4. That the way committee of 1911-12 be given as one of its topics for consideration a revision of this book and an investigation of methods and systems of operation and illustrations of standard installations, with a view to incorporating in the uniform code such additional instructions and rules relating thereto as may seem desirable and their adoption as standard.

[On account of this being the first presentation of the way rules for consideration they are not reprinted at this time. —Editors.]

### STATISTICS OF COST OF ELECTRIC OPERATION OF STEAM RAILWAYS\*

BY A. B. BIERCK, CERTIFIED PUBLIC ACCOUNTANT AND GENERAL AUDITOR LONG ISLAND RAILROAD

The adoption of electricity as a motive power on divisions of steam railways where the traffic was, or promised to be, sufficiently dense to indicate that it could be more economically moved by electric power than by steam locomotives was generally begun in the year 1904, and has since increased very considerably.

As a natural consequence, statistics of costs have been demanded, and have been necessary as guides for future installations, as well as proofs of economies effected.

Consideration was given to this condition in the preparation of the classification of operating expenses prescribed by the Interstate Commerce Commission, effective on July 1, 1907, accounts having been provided under the general account "maintenance of way and structures" for electric power transmission, under the general account "maintenance of equipment" for electric locomotives, electric equipment of cars and power plant equipment, and under the general account "transportation expenses" for motormen and purchased power, all of which pertain specifically to maintenance and transportation charges in connection with electric operation.

Subsequently a classification of operating expenses for electric railways was prescribed by the Interstate Commerce Commission, which became effective on Jan. 1, 1909, providing a more comprehensive classification, which may be used by steam roads where it is desired to amplify the accounts provided in the classification of operating expenses prescribed for steam roads. Ample provision has been made, therefore, in a general way, in the classifications provided by the Interstate Commerce Commission and the state commissions for the necessary accounts required by reason of electric operation.

#### DIVISION OF COMMON EXPENSES

Supplementing this foundation of statistical costs is the more difficult problem of the accurate division of expenses between steam and electric service where items are common to both classes of service.

In order not to burden the general accounts with the detail required in the separation of costs between electric

\*Abstract of paper read before the American Electric Railway Accountants' Association, Atlantic City, N. J., Oct. 3-13, 1911.

and steam service, statistical records in this connection may be kept entirely separate, and expenses incurred solely on account of the one or the other separated in accordance with the facts.

Where expenses are common to both classes of service, they may be divided on a percentage basis which will vary according to the nature of the work covered by the charge. These arbitrary divisions may be based on car and ton miles.

The factor "electric car miles" represents the sum of motor and trailer revenue car miles; the factor "electric ton miles" is determined by multiplication of the car miles made by each class of electric equipment by the weight of the equipment, using averages for the weight of motor cars and trailer cars used in electric service. The same method is used in the determination of "steam car miles" and "steam ton miles."

The majority of charges to maintenance of way accounts may be accurately divided between steam and electric operation according to the sections of the road electrically equipped or not so equipped.

Where steam and electric trains operate over the same tracks, a division of maintenance charges may be made, based on the volume of traffic, except in special cases affecting specific accounts, where an arbitrary division may be made, based on the ratio which the total maintenance charges for steam and electric operation bear to each other.

Maintenance of equipment items may be divided accurately, based on the class of service in which the equipment is used.

The cost of maintaining the two classes of motive power, i. e., the electric locomotive and the electric motor car, may be accounted for accurately, and while no definite conclusion has been reached as to the effect on the track of the operation of these two classes of equipment, it is felt that the division of maintenance charges based on the volume of traffic is fairly accurate, as it allows for the weight of the equipment, although the wear on the track through the use of the electric locomotive and motor car is understood to be greater than through the use of the ordinary steam locomotive and coach.

Maintenance of equipment expenses common to both classes of service, such as machinery and tools, may be prorated to steam and electric operation in proportion to the total maintenance of equipment charges made to steam and electric operation.

Traffic expenses may be divided on the basis of passenger car miles, unless specific charges applicable to either one or the other class of service may be determined.

Transportation expenses may be divided accurately in accordance with the nature of the services performed, where such data are obtainable, and accounts common to both classes of service may be divided on the basis of car miles run.

General expenses may be divided on the basis of train miles run—steam and electric operation.

#### CAR-MILE RESULTS

Having determined the division of operating expenses between electric and steam operation, a statement may be prepared showing car miles run in electric service, car miles run in steam service, ton miles electric service, and ton miles steam service; and these factors, used in connection with the expenses, determine the cost per car mile steam service, cost per car mile electric service, cost per ton mile steam service and cost per ton mile electric service.

Statistics may then be prepared showing the number of passengers carried, divided between electric trains and steam trains, and the number of passengers carried one mile by both classes of service; and these factors, used in connection with the expenses, give the cost per passenger and the cost per passenger mile of each class of service.

Statistics showing the number of passengers carried cannot be obtained by the ordinary methods where electric service supplements or is used in connection with steam service, since a single passenger may use both classes of service in one journey, and hence becomes one passenger for each class.

It is therefore necessary to obtain accurate reports of the actual number of passengers carried from conductors and apportion the revenue and expenses to determine gross earnings and expenses per passenger and per passenger mile.

The usual statistical units of cost, however, are the car mile and the ton mile. These may be supplemented by determination of the seat miles, that is, the seating capacity of cars multiplied by their mileage, and comparison of the result with passenger miles, the comparison revealing the average train load, by units.

#### SEPARATION OF PASSENGER AND FREIGHT EXPENSES

It is, of course, understood that in the separation of passenger expenses between electric and steam service, there must be a separation of total expenses between passenger and freight service, and this division is made in the following manner:

All maintenance of way expenses common to both classes of service are divided on the basis of total train miles made in passenger and freight service.

Repairs, renewals and depreciation of locomotives are divided on the basis of locomotive miles made in passenger and freight service respectively.

Other maintenance of equipment expenses, when not definitely assignable to either passenger or freight service, are divided on the basis of the ratio of charges to repairs to passenger and freight equipment.

Yard expenses are divided on the basis of actual expense incurred in the operation of passenger and freight yards.

Other expenses in connection with locomotive service are divided on the basis of locomotive miles made by road passenger and freight locomotives.

All other transportation expenses, when not definitely assignable to either passenger or freight service, and also general expenses, are divided on the basis of total train miles.

Electric costs of operation may then be summarized by accounts showing the cost per car mile and the cost per train mile. As similar statistics are kept for steam service, a comparison of the two may be made.

These summaries may be grouped into the principal factors which they contain, and shown in graphic form, providing a ready reference chart for the operating and executive officers.

It has been demonstrated by a study of the results given by the use of these bases that they are reasonably accurate and permit a comparison of the costs of each service.

Where required, the comparison might be carried farther by a division of taxes and fixed charges based on the value or cost of property used, but to my knowledge no attempt has been made by any company to determine these results.

The statistics, of course, may be used for many purposes in addition to those mentioned, and form the bases for studies by departmental heads of costs of operation under particular conditions, making it possible to effect economies in operation which, without a reasonably correct knowledge of costs, would be impossible.

U. S. Metal & Manufacturing Company, New York, N. Y., has arranged an attractively decorated booth in Aquarium Court for the entertainment of its customers and friends. The Diamond tapered steel trolley pole is exhibited, otherwise no efforts have been made to display the various products handled by the company. It has a full complement of representatives present, including A. B. Hegeman, Jr., C. C. Castles, J. J. Ross and H. A. Hegeman

## REPORT OF THE COMMITTEE ON FARES AND TRANSFERS\*

BY M. R. BOYLAN, CHAIRMAN; F. T. WOOD, T. C. CHERRY, E. D. HIBBS, BRUCE CAMERON, J. V. SULLIVAN

In an effort to perform the duties imposed upon it your committee sought certain information which it believed would be of value if compiled and disseminated. Its labors met with indifferent reward. Not in a spirit of faultfinding, but rather with a sense of regret, your committee directs attention to what appears to be a lack of co-operation on the part of many of the members in furthering the interests of this organization and fulfilling the purposes for which it exists. If we are to profit by the experiences of others, it is essential that we know what those experiences have been. If the sum total of knowledge covering matters with which we are directly concerned is to be made available for individual use, the first step, it seems to your committee, is to gather and compile that knowledge in such a way as will make it readily accessible. This, at least, is the view your committee took in approaching the task assigned to it. To this end there was distributed data sheet No. 80.

This data sheet was developed in such a way as to demand a minimum of time in filling out the answers. Your committee, however, has been very much disappointed that the information provided has not been complete enough to warrant an exhaustive study of the subject or the formulation of a report that would show results and examples of actual practice more nearly in line with the importance of the subject taken up.

While hardly necessary to do so, we would direct attention to the almost supreme importance of this matter of fares and to the necessity for substantial progress in methods of collection and registration. It is surprising that a matter so vital to the welfare of the operating companies should have shown so little progress in methods employed and that no really scientific basis, such as is applied to so many other branches of our work, has been devised to insure accuracy of records and returns from the passengers carried on electric railway lines.

Your committee has no recommendation for proper, correct and safeguarding practice, but feels that there is much incentive for the development of some plans, devices or systems for the proper collection, registration and accounting of fares in general such as would make this department of operation more nearly approach the excellent standards established in other branches. Your committee appreciates that considerable progress has been made in the last few years, but still feels that there is room for improvement and submits the subject as one well worthy of consideration not alone by those having to do with transportation and accounting but by the mechanical and engineering departments.

The work carried on this year has not been developed with the idea of formulating any definite recommendations at this time. It has been conducted with a view to developing information, statistical and comparative, that would be an aid to our members.

### TRANSFERS IN CONNECTION WITH PREPAYMENT CARS

Perhaps the first thing that impressed the committee in its investigation of this topic is the extent to which the prepayment car has come into use, it being shown from the replies received that practically two-fifths of the 135 companies reporting use this type. This seems to be a confirmation of the opinions expressed in the preceding section and seems to show that the railway companies are on the lookout for perfected methods or plans of fare collection and registration.

\*Abstract of paper read before the American Electric Railway Transportation & Traffic Association, Atlantic City, N. J., October 9-13, 1911.

But one company reports the use of mechanical devices for issuing transfers on prepayment cars. This company states that the device was applied successfully. The device is operated by the passenger. The issuance of transfers by mechanical action on prepayment cars offers a fertile field of investigation.

Investigations concerning the effect of the issuance of transfers on the time required to load prepayment cars, where such transfers are issued at the time the fare is paid, develops the fact that in a large majority of cases some delay is occasioned. Generally, however, the delay appears to be slight. In one case it is stated that one-third more time is required to load. In still another case the statement is made that the delay is considerable. In nine cases out of thirty-three answers it is claimed that no delay occurs. Some of the companies issue transfers at destination and in at least one case delay in unloading has been remarked. No information is given which would lead to the supposition that in any case has it been found necessary to increase the running time.

Many questions have arisen whether, in prepayment car operation when transfers are issued at the time the fare is paid, there would be an increase in the acceptance of invalid transfers and also as to the effect on the correct punching of transfers issued by conductors. In thirteen instances there has been an increase in the acceptance of transfers that were not good, while in two other cases a decrease has been shown. Other companies responding have observed no difference whatever. The second question brings out the fact that in one case only has there been any increase in the number of transfers incorrectly punched by conductors, while nine companies report a decrease in such errors.

### THE 1910 REPORT.

The committee calls attention to the desirability of reviewing the work of the previous year and of endeavoring to ascertain the extent to which recommendations have been utilized by the member companies. With this in mind your committee requests information as to which, if any, of the 1910 recommendations have been adopted. The result of the inquiry follows:

Not adopted	18 companies
Not applicable	4 "
Partially adopted	1 company
Wholly or in part already in use	5 companies
Wholly adopted	1 company
Will adopt	1 "
No answer	108 companies

The committee suggests the advisability of placing in the hands of member companies a brief résumé of all recommendations approved at each annual convention.

### INVESTIGATION OF TRANSFER LAWS

At the 1910 convention and in connection with the report of this committee, Lefferts S. Hoffman presented a suggestion for a standard transfer law. Your association approved this and forwarded it to the American Association, with the recommendation that it be approved. The parent body expressed its approval and transmitted the suggested law to member companies.

Your committee has made an effort to ascertain the result of this action and inspection of the replies shows that this protection against transfer abuses has been passed and approved by the Governor of one state at least. In six other states the enactment of the measure has been agitated; without success as yet, however. In some instances present laws are thought to be adequate.

A study of the measures taken by member companies to stop the abuse of the transfer privilege shows some fairly active work during the past year, eleven companies stating that they have more or less vigorously conducted campaigns; one company conducts a continuous campaign, while another feels itself helpless in the absence of proper laws. Abstracts of the answers are interesting; for instance, one company states, "Arrests made and fines imposed stopped abuse to

some extent;" another, "We believe a good effect has been accomplished;" another, "By watching passengers leaving cars and using p. m. coupon transfers stopped number of abuses;" still another, "Obtained approximately eighty arrests in ten months—penalties slight;" a fifth, "Have been successful in discovering abuses and prevented their continuance;" and last, "Wilful misuse has been prosecuted in the police court and fines imposed."

COLLECTION AND REGISTRATION OF FARES OF ALL KINDS

In considering the general subject of fare collection, your committee took up three subdivisions: ordinary type of cars, prepayment type of cars and interurban service. A summary of the material collected follows:

ORDINARY TYPE OF CARS

The question was asked, "Do you register passengers as they board car and before fare is paid?" One hundred and ten companies reply, "No" as against two which say "Yes."

The committee inquired whether passengers are registered at the time the fare is paid, and of 117 companies responding, 116 answer "Yes."

The next question had to do with the registration of free passengers riding on tickets, and of a total of 120 companies responding, 108 state that such free passengers are shown on the register.

The next query was as follows: "Do you use coupon books or card form with numerals to be punched by conductor for free passengers?" The following indicates the practice: Coupon books, eighty-six companies; books punched by conductor, one company; cards, nine companies; coupon books and cards, eight companies; tickets, seven companies.

Various methods have been utilized to account for passengers riding on badges or uniforms, such as employees, policemen, firemen, etc. By fifty-six companies no record whatever is kept. By nine the number of the badge of the passenger is reported. By fifty a record is kept on the trip sheet or day card. By one a record is kept of all riders except employees. By two companies employees are registered. By three companies free riders of this description are required to fill out pass forms; one of these companies registers such passes.

The practice of covering the totalizer on registers and permitting only the trip total to show, in other words operating a "blind" register, seemed to the committee to be a subject meriting some attention and several questions were framed to bring out the actual working of this plan. It develops that fifteen out of 116 companies follow this practice on all or a portion of their lines; five of these fifteen companies operate city lines and the balance interurban lines, collecting maximum trip fares of more than five cents; one company states that it had this plan in effect for a number of years, finally discarding it as possessing no advantages; another company advises that the system was tried as an experiment with little success. It is interesting to inspect the variation in results as to overages and shortages under this plan. Twenty-six companies report that overages exceed shortages. Thirty-three report that shortages exceed overages. One states that overages exceed shortages in cash but not in tickets. Twenty-six report an equality in errors of this nature.

Rules with regard to the returning of overages and the collection of shortages when "blind" registers are used vary greatly as will be noted from the following summary:

	No. of Companies
Do you return overages?	
No answer	33
No answer	1
No	2
No	10
On cash but not on tickets	2
Yes	21
In exceptional cases	1
No	1
No	8
If claim is made	2
No answer	2
Yes	1
Do you collect shortages?	
Yes	33
Over 50 cents	1
Not under \$1.00	2
Yes	10
Yes	2
Yes	21
In exceptional cases	1
Over 25 cents	1
No	8
No	2
No	2
No answer	1

Overages exceed shortages by the following percentages: 2, 3, 19, 20, 20, 30, 50, 50, 53, 470. Shortages exceed overages by the following percentages: 30, 33, 50, 50, 50, 75, 75, 80, 81, 89, 95, 147, 614. The wide differences in results on different lines are rather startling.

PREPAYMENT CARS

The first thing that naturally suggests itself is the use of fare boxes, and the committee finds that twenty-six companies have fare boxes in use on prepayment cars and that one company will soon adopt them, out of a total of sixty companies reporting the use of prepayment cars. Five of these boxes automatically register fares and in each case show the number of fares equivalent to the coin deposited, as, for instance, a registration of two when 10 cents is inserted, etc. Receptacles show different styles of construction as to the kind of coins that may be deposited; for instance, five boxes will take 1-cent, 5-cent, 10-cent, 25-cent and 50-cent coins; one will take 5-cent, 10-cent, 25-cent and 50-cent coins; one will take 5-cent, 10-cent and 25-cent coins; three will take 1-cent, 5-cent and 10-cent coins; two will take 5-cent and 10-cent coins; fifteen companies reply that the boxes in use will take any coin or ticket; seventeen companies reply that an ordinary register is used in connection with the fare box; eleven companies state that registers are not used.

One of the questions suggested by a member company was as to whether cash deposited in fare boxes should be left accessible to the conductor. Your committee finds, out of twenty-six replies, that in twenty-one cases the cash deposited by passengers is not thereafter handled by the conductors, while in five cases the conductor may utilize the cash for change.

There is an equal division of sentiment as to whether fares collected should be held available for change, as out of thirty companies responding fifteen state that money received for fares should be available for use by the conductor, while fifteen claim that the locked fare box is more desirable.

In those cases where the conductor is not permitted to handle fares paid, we find the following provisions as to the sum of money the conductor is required to have when starting work: Two companies require \$2; one requires \$3; eight require \$5; eleven require \$10; six require \$15; one requires \$20; one requires \$25; one varies according to run; one requires no cash; eleven furnish conductor with this change, while twenty do not do so.

Passengers frequently through accident deposit in fare boxes coins of larger denomination than is required for fare or fares to be paid. In one case the conductor returns the excess; in one case the conductor returns the excess if not more than twenty-five cents; in two cases the conductor refunds and obtains signature and address of passenger; in sixteen cases the conductor gives passenger an order on the treasurer; in two cases the conductor takes the name of passenger and deposits a slip in the box, stating the amount deposited by the passenger; in one case the conductor makes out duplicate slips, one of which he deposits in fare box, handing the other to the passenger for presentation at the general office; in one case no provision is made for the return of the excess and the passenger loses the amount.

A query was made as to whether the locked fare box is satisfactory and economical. Seventeen companies replied that it was and seven that it was not.

When fare boxes are used conductors should inspect closely all coins tendered, in order to guard against the deposit of counterfeit or mutilated pieces. Your committee, realizing that lax treatment of this matter might lead to large returns of bad money, inquired as to whether conductors are required to pay for such losses. Thirty-seven companies respond that they are required to do so, while fifteen companies say they are not.

The use of a turnstile on cars was referred to, and your committee advises that four companies out of fifty-five re-

sponding report the use of a turnstile. Three of these companies claim that it has been successful in operation, while one company thinks otherwise. Two companies claim that it has retarded operation, while another states it has had a slight effect in this direction, the remaining company claiming that it has had no material effect. As to accidents, it does not appear that the installation of turnstiles has been responsible for any serious cases, though one company states that it has caused a few minor accidents.

There do not appear to be available statistics to show results in the matter of increased receipts due to the operation of prepayment cars, and while your committee attempted to obtain data on this subject, it regrets to report meagre results, certainly not sufficient to warrant comment.

#### INTERURBAN SERVICE

The collection and registration of fares in interurban service is another new topic. Sufficient time has not been available to go exhaustively into the merits of any of the plans in use, but for information and possible guides, your committee feels that a tabulation will prove valuable to operating men engaged in interurban work. The compilation is submitted with the request that interurban operators discuss the subject not alone for the benefit of the members represented, but as well for the guidance of future committees.

[The committee report then gives the tabulation. It shows the system of fare collection in brief, whether through fares are collected at the first collection or collection is made as each fare zone is entered; whether city fares are collected separately from interurban; whether the interurban tickets have city portions; whether the fares are registered as 5-cent fares or registers are used to show different classes of fares; whether ticket receipts are given when the fare is paid on the car and whether these are collected and turned in by the conductor; whether hat checks are used and collected. It also shows whether ticket agents are employed; whether the conductor is charged with tickets issued and when settlement is made by the conductors for the fares collected.—Editors.]

#### SHOULD TRANSFERS BE REGISTERED?

The committee asked two questions under this heading. They were, first, "If so, why?" and second, "If not, why not?" The answers have brought out arguments as follows: Those who find the registration of transfers desirable claim that it makes conductors more careful in handling transfers and that it affords an opportunity for checking that would not be possible otherwise. Those who claim that transfers should not be registered state, among other things, that such registration consumes too much time, that it is not feasible and, finally, that it is objectionable because of the office expense of checking the registration and collection of transfers and the difficulty of obtaining clerks who can do so accurately.

#### CONCLUSION

In conclusion your committee calls attention to the fact that this is not in any sense to be regarded as a report of conclusions, but as one of attempted progress in the gathering of useful information.

The only electric railway of importance in Peru is the Empresas Railway, Light & Power Company of Lima, which has the monopoly of the railway, light and power utilities for Lima, Callao, and their suburban towns. There is no important interurban system in Peru outside of these cities and vicinity on account of the topography of the country. The street railway in Arequipa, in southern Peru, with 40,000 to 50,000 inhabitants, is, however, to be electrified and extended to Tingo, and possibly to one other small town. The original steam road to Callao was electrified in 1910 and is now used almost exclusively for fast freight between Lima and Callao, funerals to the Bellavista cemetery and transporting troops.

## REPORT OF ELECTRIC RAILWAY DICTIONARY SUPERVISING COMMITTEE\*

BY H. H. ADAMS, CHAIRMAN; PAUL WINSOR, RICHARD M'ULLOCH

Your committee appointed at the 1908 convention to supervise the publication of the Electric Railway Dictionary by the McGraw Publishing Company, of New York City, is pleased to report that the compilation of the book was completed and the first copies ready for delivery on May 1, 1911. A copy of the dictionary is presented to the association herewith as part of this report.

Your committee wishes to call the attention of members of this association to the scope of the contents of the dictionary and its value to electric railway companies. The publishers have spared no pains or expense to make it the most complete reference work on electric railway cars and their equipment which has ever been compiled. The dictionary contains 355 pages, consisting of 63 pages of clear and concise definitions of more than 2200 terms and names of parts used in electric car building, together with 292 pages of illustrations.

The illustrations, 1987 in number, include floor plans and exterior and interior views of more than 200 representative types of cars for city, suburban and interurban service, dimension drawings for car framing, illustrations of all types of trucks, motors and every kind of modern car and truck equipment parts.

The definitions are arranged in alphabetical order as in standard dictionaries, and are followed by the illustrations, which are grouped in six general classifications, as follows: General views and floor plans of cars, car framing, car body details, trucks, truck details and electrical equipment. Wherever a part or term defined is capable of illustration a reference is given in the definition to the figure number assigned to the illustration in the following pages.

The primary purpose in compiling and publishing the dictionary was to assist in bringing about standardization of the terms used in electric railway car building and maintenance. In the past the lack of standardization of terms has resulted in much confusion in ordering parts from manufacturers and in interpreting communications between departments of the same company or between different companies.

The dictionary undoubtedly will be of very great assistance in bringing about standardization of names and terms as time goes on. It is a useful and valuable book for electric railway companies in other respects. It contains data and information constantly required for reference by the officials and employees in almost every department. The purchasing and stores department, for example, should find the illustrations and definitions of great assistance in identifying material specified on requisitions and in ordering from manufacturers. The mechanical department can make use of the dictionary as a comprehensive and complete reference work on car construction and equipment when designing new cars or rebuilding old cars. The executive, operating, auditing and claim departments likewise will find in the dictionary a large amount of valuable information of which daily use can be made.

Your committee desires to again express its appreciation of the work of the editor of the dictionary, Rodney Hitt. His task was laborious, and it was only due to his untiring efforts and past experience in work of this character that the volume was completed at the date it was.

In presenting this report your committee bespeaks for the dictionary widespread use by member companies to the end that the terms and names of parts defined therein shall become the standard of the industry.

\*Abstract of report read before the American Electric Railway Association, Atlantic City, N. J., Oct. 9-13, 1911.

**REPORT OF THE COMMITTEE ON CONSTRUCTION OF SCHEDULE AND TIME TABLE\***

BY N. W. BOLEN, CHAIRMAN; J. J. DOYLE, TIMOTHY CONNELL, F. L. HUBBARD, J. H. VAN BRUNT, I. H. McEWEN, F. I. HARDY, B. E. MERWIN

The membership of the committee was increased this year in order that special attention might be given to interurban schedules and time-tables, and to this end four of the members, Messrs. Doyle, McEwen, Hardy and Merwin, were appointed a sub-committee to study interurban practice.

**DEFINITIONS**

Your committee submits herewith definitions of terms which, though in every-day use, vary in meaning according to sectional location.

*Run*—A group of trips shown on the time-table which constitutes a day's work for a car crew.

*Run number*—An arbitrary number assigned to a run.

*Run guide*—An index of the on and off time and the total working time of each run.

*Train number*—Arbitrary number or symbol used to designate one trip or a given group of trips.

*Patch*—A substitute for a portion of a time-table in effect applied in such a way as to cover parts of the table for the purpose of increasing or decreasing the service.

*Assignment sheet*—An index of the names of car crews assigned to each run.

*Trip*—One trip or a group of trips shown on the time-table for regular operation, but not assigned to regular crews.

*Extra*—A trip, or a group of trips, put out to supplement existing service as required, but not shown on any time-table.

*Block number*—The committee has not attempted to define this and would recommend that its use be discontinued.

**DIVISION OF WORK AMONG EXTRA MEN**

A letter of inquiry concerning the extent to which the revolving or rotating extra list is in use has developed the following facts:

A total of 144 companies responded. Of these ninety-eight report that they use the revolving extra list method, which is that an extra man after completing an assigned day's work is not again assigned work until every other man on the extra list has had work assigned to him. While a majority of the companies do not comment upon the point and the committee is not certain whether the plan is in effect on such roads, a large percentage state that an extra man does not fall to the bottom of the extra list until he has had an opportunity to work a certain specified number of hours (which range from four to nine) or has earned a given amount of wages. Some companies state that when an extra man is assigned to the run of a regular man who is to be absent for more than one day the extra man retains the run until the regular man returns to work. With other companies such a run is included as a part of the total extra work to be distributed daily and a reassignment to extra men is made each day.

Thirty-six companies reply that the practice of the revolving extra list is not in force and in most of such cases the seniority rule applies; that is, that the man who has been on the extra list the greatest length of time has first call for work each day. A considerable number of these companies, however, state that an effort is made to divide equally the hours of work available, in which case, of course, neither the revolving method or the seniority rule prevails absolutely.

Ten companies reply that extra men are used as shop men, electrical workers, etc., when not required on the cars. In this way the company is able to provide the extra men with

a satisfactory number of hours of work, which in most cases, especially if the road is small, would not be otherwise possible.

Your committee recommends the use of the revolving extra list as being a plan which provides a more equitable division of work, as tending to create more satisfactory conditions with regard to new employees and as affording substantial increased inducements to individuals desiring to enter this branch of electrical railway service. But the plan should establish a certain number of hours as a day's work for extra men, and such extra men should not be forced to fall back on the extra list until they have had an opportunity to obtain such stated number of hours of work. By this the committee means that a man who works a short one trip should not by accepting this work relinquish his place on the list and possibly permit those lower down to obtain work of longer duration which it might be possible to assign to the extra man working the one trip mentioned.

**RE-ROUTING**

The committee recommends that companies, when developing traffic counts, trend of transfer movement, etc., also consider the matter of possible re-routing to the end that their lines may form routes best adapted to the current of traffic.

**INTERURBAN SCHEDULES AND TIME-TABLES**

The committee received replies from forty-four companies operating 3041 miles of single track, or an average of about 70 miles per company. Practically every section of the country was represented. The mileage of the smallest company reporting was 64, while that of the largest one was 508. The average regular headway on the lines reporting is approximately 40 minutes. As a matter of interest and as indicative of the wide difference in the service provided by electric interurban and steam railroad operation, the committee adds that, from figures available, the average regular headway on steam railroads throughout the United States appears to be about 3½ hours.

**SURPLUS CARS**

The following table shows the number of cars owned by interurban companies and those actually required by the schedules:

Class.	No. of cars operated.	Cars required by schedule.	Cars owned.	Surplus per cent.
A.....	1-9	103	208	102.0
B.....	10-24	154	286	85.7
C.....	25-49	137	230	67.9
D.....	50-75	177	277	56.5
Totals.....	.....	571	1,001	75.3

**SIDINGS, CROSS-OVERS AND SPEED STATISTICS**

The committee found a wide variation in the practice regarding the location of sidings on single track and cross-overs on double track. Sidings vary all the way apart from 0.52 mile to 5 miles, cross-overs from 1 mile to 3 miles. The average for all companies is 2¼ miles between sidings and slightly over 2 miles between cross-overs. The committee also found a great disparity on most roads between schedule speed, even on limited service, and maximum free running speed. Some roads reported a limited train speed of considerably less than one-half of the free running speed, while in other cases there is a difference of only 10 per cent. It appears desirable to call attention to this ratio in view of the possibility that a considerable expenditure might be made in the purchase of unnecessarily high-powered motor equipment and heavy rolling stock, or that lighter motors might be geared to uneconomical speeds. Either of these conditions would, of course, detrimentally affect operating costs.

Average of maximum free running speeds, 43.0 m. p. h.

Average schedule speed, local trains, 22.12 m. p. h.

Ratio average of maximum free running speeds to average schedule speed, local trains, 1,944.

\*Abstract of report read before the American Electric Railway Transportation & Traffic Association, Atlantic City, N. J., Oct. 9-13, 1911.

Average schedule speed, limited trains, 32.34 m. p. h.

Average schedule speed, local trains, on lines which also operate limited service, 23.74 m. p. h.

Average of maximum free running speeds of roads operating both local and limited service, 50.6 m. p. h.

Ratio average of maximum free running speeds to limited service average schedule speeds, 1.503.

Ratio average of maximum free running speeds to average schedule speeds of local trains on roads which also operate limited service, 1.811.

Ratio average schedule speed, limited service, to average schedule speed, local trains, 1.362.

#### STANDARDIZATION OF TERMINAL LEAVING TIMES

Your committee wishes to recommend the practice of standardizing terminal leaving times, in order that trains may meet at the same sidings in all trips, as one conducive to greater safety in interurban operation. Of 38 companies reporting, 31 follow this plan.

#### SHOWING FREIGHT TRAINS ON TIME-TABLES

Of 36 companies reporting, 26 companies run freight trains as extra trains, 8 show them on the time-table and 2, in some instances, show them on the time-table and, in other cases, run such trains as extra.

#### SUPPLEMENTS OR NEW TIME-TABLES

Your committee recommends the plan of substituting new time-tables when changes of any character are made in old tables and that the practice of issuing supplements to old tables to provide information concerning such changes be discontinued. In the opinion of the committee, this will tend to greater safety in operation. Of 40 companies responding, 36 issue entirely new time-tables in such cases and 4 companies issue supplements to old time-tables to cover changes made.

#### NEW TIME-TABLES ON DIFFERENT COLORED PAPER

Your committee also found that 27 companies do not print succeeding time-tables on different colored paper; 8 companies do change color of paper for succeeding time-tables; 1 company shows a different colored number, this number always being of large size; and 3 companies utilize a different colored cover.

The committee recommends that new time-tables be printed on a paper different in color to that used in the time-table superseded or that a different colored cover be used.

#### DETENTION REPORTS

Thirty-six companies require the making of daily detention reports; 5 companies do not. Twenty-four companies make a report segregating causes of detentions; 14 companies do not do so.

Thirteen companies develop monthly summaries of detentions, 24 companies do not, and 1 company makes a daily summary of this kind.

#### RECORDS OF PASSENGERS CARRIED

The committee recommends that all interurban railway companies make daily records of passenger business by trains, feeling that such records are necessary statistics, not alone for the proper construction of schedules and time-tables, but as well for purposes of comparison with past results and as essential factors in developing estimates of future operation. Twenty-eight companies make records of this character either in the form of reports or charts; 1 company makes a similar record in loose-leaf form; 1 company reports such records made at irregular periods; and 9 companies develop no records of this sort.

#### STANDARD INTERURBAN TIME-TABLE

The committee's deductions as to a standard for interurban working time-tables are as follows:

A single-sheet form of folder appears most satisfactory and economical. Preferably it should be in book form, with time-tables on separate sheets.

The time-table should be folded in convenient form, should have ½-in. columns, should be folded to 3 in., thus giving

six trains to the fold and, assuming from twenty-four to thirty trains in each direction, would require four or five folds. If the sheet was 6 in. deep, the folder would be of a size convenient for a coat or waistcoat pocket.

Where regular meets are shown by continuous rows of black-face figures, guide lines should be inserted midway between such rows, and where the meets are irregular, guide lines should be inserted between every fifth and sixth row.

The schedule should appear on one side of the sheet and special instructions on the reverse side.

The title should be printed on the first page as folded, and the table should be folded so as to open at the center where station names are shown.

The foregoing is for single track operation.

The same form of folded sheet may be utilized for double track operation by folding once across and printing the time of the trains in opposite directions on the two exposed faces, special instructions to be printed in the last fold of the table.

The use of heavy-face type for p. m. trains is considered objectionable, for the reason that it interferes with the full-face type required by the code of rules.

Care should be taken in all cases to conform to the rules in respect to proper clearances of trains at meeting and passing points.

Station names should be printed in the center. Such companies as have an unusually large number of trains may provide an additional list of stations at either end.

In discussing the question of whether more than one class of train should be indicated, the committee calls attention to the possible desirability of showing the time of inferior class trains in at least one direction. In this case they should be placed at each end of the time-table and separated from the first-class trains by a heavy line. This would be an aid in maintaining satisfactory speed and would reduce the number of train orders required if trains were operated in both directions as extra trains.

Where the stations are shown in a single column, the time of trains in one direction should read down and in the other direction read up. Where separate tables are used for trains running in opposite directions on double track and station names are repeated in each table, the names should read down.

The distance of each station from one terminal should be shown in a column on one side of the list of stations and the distance in reverse direction from the other terminal should be shown in a column on the other side of the list of stations. These distances should be expressed in decimal hundredths of a mile. In the opinion of the committee it is not necessary to show distances between stations on the time-table.

Where the cars of one company operate over the tracks of another, the time of such cars should be shown in italics, for information only.

The committee decided to recommend that Sunday or Saturday and Sunday service, when it varies materially from that of other days, should be shown on the schedule with the proper designation at the head of column, as "Sunday only" or "Saturday and Sunday," in heavy black type, these trains to be shown in the regular order of leaving times. The committee does not approve of the use of red type, except where a new schedule is used for Sunday, in which event the use of red ink in printing this Sunday schedule is recommended.

The committee disapproves the practice of using typographical symbols for designating service, as \*—Sunday only; †—Saturday only; etc., etc.

As regards the numbering of trains, the committee recommends that north-bound and west-bound trains be given odd numbers and east and south-bound trains be given even numbers. This is the usual practice on steam railroads. The committee also recommends that the numbers start at midnight as No. 1, west-bound, and No. 2, east-bound,



each succeeding train to be given the next higher number in the order of terminal leaving time; that a different series of hundreds be assigned to each division, and that the trains of foreign companies be given distinctive numbers. Inferior class trains should have a higher series to distinguish them from first-class trains.

In so far as may be possible, the maximum schedule should be considered in numbering trains, and when trains are withdrawn the numbers and spaces should be left blank so that if trains are subsequently added to take the place of those withdrawn the same number will apply to such substituted trains. This will provide practically a standard of train numbers for specified hours and be useful as a means of identification for accounting and other purposes.

A light, first-class bond paper should be used for working time-tables.

Another subject discussed by the committee was whether schedules on electric interurban lines should space trains at regular intervals, such as hourly or half-hourly, or irregularly to meet traffic demands, connection requirements, etc. A difference of opinion exists among the members, but all feel that the adjustment of leaving times to fit volume of business is a matter worthy of careful study on the part of each individual company, and the committee is of the opinion that there is a strong possibility for increased revenues and decreased operating expenses, including material reduction in non-productive lay-over time in irregular spacing, though recognizing that regular hourly or fractional hourly leaving times are convenient to the public and, where long used, perhaps difficult to disturb.

#### TIME-TABLES FOR PUBLIC USE

The question of the proper form of time-table for public distribution was taken up, and it was the opinion of the committee that a small folder provides the best form of time card for public use.

#### CONCLUSION

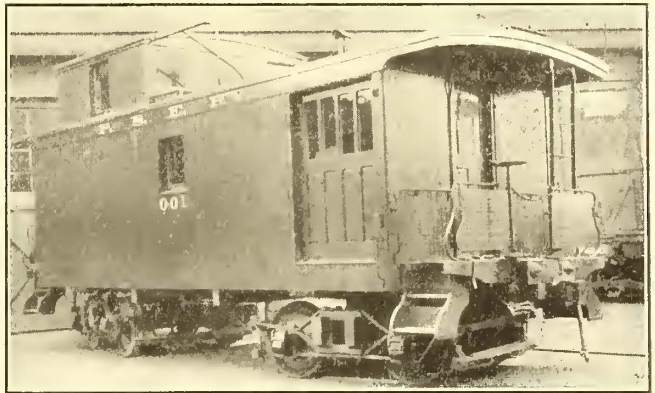
In conclusion the committee desires to recapitulate the various recommendations included in this report as follows:

- (1) Definitions published above.
- (2) The use of the revolving extra list modified to establish a certain number of hours of work as a day's work for extra men, such extra men not to fall back on the extra list until they have had an opportunity to obtain such stated number of hours' work.
- (3) That the advantages of possible re-routing of lines be investigated.
- (4) That the ratio of free running speed to schedule speed be investigated with a view to possible economies.
- (5) That terminal leaving times be standardized.
- (6) That the plan of substituting new time-tables when changes are made in old schedules be adopted and the practice of issuing supplements to show such changes be discontinued.
- (7) That new time-tables be printed on a paper different in color from that used in the time-table superseded.
- (8) That daily records of passenger business by trains be made.
- (9) The adoption as standard of the forms of single track and double track working time-tables submitted as a part of this report.

At the annual meeting of the stockholders of the Boston & Maine Railroad on Oct. 11, 1911, the nineteen directors who served last year were reelected. Later the directors elected Lucius Tuttle chairman of the board and Charles S. Mellen president. Herbert E. Fisher was re-elected treasurer and E. A. Ryder clerk. President Mellen in addressing the stockholders said that he saw a year of hard work ahead. He expressed great confidence in the future of Boston & Maine and he hoped to be able to maintain the present rate of dividends and within about three years to return the stock to a 6 per cent. basis.

## CAEOOSE CAR OF THE PUGET SOUND ELECTRIC RAILWAY

The Puget Sound Electric Railway recently put into service four new cabooses built to conform to the requirements of the State Railroad Commission. An illustration of one of these cabooses is presented. They were built at the shops of the Tacoma Railway & Power Company. The general dimensions are as follows: Length over all, 30 ft.; width,



Caboose Car for Puget Sound Electric Railway

9 ft. 3 in.; length between bolster centers, 16 ft.; length of body, 24 ft., and height of rail to the upper deck, 14 ft. 7 in.

The bodies of these new cabooses weigh 16,400 lb. each and are constructed largely of wood. They are mounted on diamond-frame trucks with 33-in. wheels and 5-in. axles having 4-in. x 7-in. journals. The cabooses completely equipped weigh 27,600 lb. each. They are fitted with Tower M. C. B. couplers, Westinghouse air brakes and are painted the company's standard green color.

## BASEBALL TEAM OF MANILA ELECTRIC RAILWAY

The accompanying illustration of the baseball nine of the Manila Electric Railroad & Light Company, Manila, P. I., is another proof of the saying that baseball, like trade, follows the flag. It is well known that since American influence became predominant in the former Spanish colonies the natives of the latter have become enthusiastic players of the



Manila Railways Baseball Team

American national game. The Manila team has had such a successful season that C. B. Graves, general manager of the company, is so optimistic as to believe that in another year it will be seasoned enough to visit the United States for a series of games with high school and college nines. The Manila company is one of the properties for which J. G. White & Company, New York, N. Y., act in the capacity of general managers.

## REPORT OF THE COMMITTEE ON INSURANCE

BY H. J. DAVIES, CHAIRMAN; A. H. FORD, S. L. TONE, F. A. HEALY  
AND A. W. M'LIMONT

In 1905 figures were presented to the association, compiled from reports of more than 400 street and interurban railway companies, showing that fire losses had been less than one-third of premiums paid for fire insurance. The reports were the result of an attempt to collect fire insurance statistics for the previous ten years. While few of the reports contained figures for each year, and the data, therefore, did not give the experience of all of the 400 companies for the full period, it was believed that the companies that had sustained the largest losses made reports for all or a part of the ten years, and that if all companies had made complete reports the percentage of loss would not have exceeded the ratio shown by the incomplete returns. As the reports covered the payment of more than \$6,000,000 in premiums, they furnished a sufficient basis for an argument in favor of a reduction in rates. The amount of insurance carried for these premiums was not reported, and it is impossible now to determine what the average rate was during the ten years, but it is safe to say that it was not less than \$1.25 per \$100 of insurance.

Similar figures were compiled by this association in 1907, 1908 and 1909 and are recapitulated in the following table:

	1905.	1907.	1908.	1910.
Insurance carried ...	\$848,000,000	\$342,893,377	\$54,958,494	\$192,364,228
(Est.)				
Premiums ..	6,049,641	3,724,835	446,861	1,354,068
Losses ....	1,971,806	2,152,696	8,821	261,982
Recoveries .	1,673,336	1,587,623	7,264	182,738
Ratio of losses to premiums	32.59 p. c.	57.7 p. c.	1.97 p. c.	19.3 p. c.
Ratio of recoveries to premiums ..	27.66 p. c.	42.6 p. c.	1.63 p. c.	13.5 p. c.
Premiums per \$100 of insurance ....	\$1.25	\$1.08	81c.	70c.
Losses per \$100 of insurance ..	41c.	63c.	1.6c.	13.6c.
Recoveries per \$100 of insurance	35c.	46c.	1.3c.	9.5c.

### RELATIONS WITH INSURANCE BUREAUS

In our last report we set forth at length our correspondence with the Central Traction & Lighting Bureau in regard to a joint meeting of our insurance committee and that body. The Central Traction & Lighting Bureau was organized by the old-line insurance companies as a result, in part, at least, of the efforts of your committee to confer with them, and its purposes have been stated in previous annual reports of this committee. The bureau has been at work for several years on what the insurance companies call a "universal schedule" of rates to be applied to traction properties.

### INCREASE IN RATES

So far as your committee has been able to ascertain the insurance companies have not been called upon to pay one dollar on account of a fire in any carhouse or other building equipped with automatic sprinklers in the past year. In spite of this the old-line insurance companies are increasing the 15-cent rate they made six years ago on carhouses equipped with automatic sprinklers. Your committee believes that the experience of those years justifies a decrease, rather than increase, in rates for the insurance of those protected carhouses. We have constantly insisted, however, that it is more important to prevent a fire than to collect a loss, and we still believe, notwithstanding the present rates and the threat to increase them, that carhouses should be protected in the best possible manner against loss or damage by fire.

In last year's report your committee recommended the protection of cars in open yards by standpipes surmounted by universal nozzles. One car yard has been so equipped. The rate of insurance on cars in that yard has been reduced \$1.15 per \$100. On \$336,000, the value of the cars in the yard, this is a saving in one year of \$3,864. The equipment, complete, cost less than \$6000. This form of protection was designed and installed by your insurance expert, Mr. Staats, as was the aisle-line automatic-sprinkler protection described in our report to the 1906 convention.

The facts and figures here given indicate that we have made progress—that rates have been reduced, and that properties have been improved. Can we go further? Yes. Gratifying as is the reduction in rates from an average of \$1.25 or more to 70 per cent, the lessening of losses from 41 cents to 13.6 cents per \$100 of insurance is much more pleasing. It indicates that the railway companies are earnestly, vigorously, intelligently and scientifically taking care of their properties. But thirty-six fires in a single year are too many. Our losses ought not to be a quarter of a million dollars a year. Notwithstanding the reductions indicated in the loss ratio, there should be fewer fires. Notwithstanding the reduction in premiums, our rates are still too high. They should be reduced, or we should carry our own insurance, as a few of our members are doing. The ratio of losses to premiums and to insurance carried shows that we can safely do this for a much smaller sum than the amount we are now paying.

Of the thirty-six fires that occurred in 1910, it should be stated, three occurred in park properties and one in a dwelling house, which, of course, are not a necessary part of the equipment of an electric railway, and several others upon premises not used in railway operation.

It will be possible, if our records are kept up to date, as they can be if all members of the association will furnish the figures called for by the association's blanks, to determine what the rates ought to be. If then the insurance companies decline to make the rates that the history comprised in these records indicates to be reasonable, it will be perfectly safe for the railway companies to carry their own insurance individually or collectively through their own insurance organization.

### INSURANCE EXPERT

At your last meeting your committee recommended that you appoint an insurance expert, with authority to employ assistants, whose duty it should be to give advice to members on all subjects relating to fire insurance, the insurance expert and his assistants to be the inspection and survey bureau of the association; the expenses of the bureau to be paid by the association and to be collected from the members in the proportion in which annual dues are collected, or in accordance with the value of the services rendered. The recommendation was referred by the convention to the executive committee, with authority to act upon it. In June the committee appointed Henry N. Staats, of Cleveland, without salary, but with the understanding that he should receive compensation from such companies as retained him at the following rates:

From companies having annual gross receipts of \$500,000 or less, a payment of \$50 per year, payable quarterly, plus railway fare; from companies having annual gross receipts of more than \$500,000, a payment of \$10 for each \$100,000 gross receipts, payable quarterly, plus railway fare.

Mr. Staats has also been appointed insurance expert of the Street Railway Association of the State of New York, and of the Central Electric Railway Association.

Your committee is still of the opinion that, as the work of the expert and his bureau will benefit every member of the association, the expenses, or at least a considerable part of them, should be borne by the association; but it is entirely willing that this question be referred to and determined by the executive committee.

\*Abstract of report read before the American Electric Railway Association at Atlantic City, N. J., Oct. 9-13, 1911.

## TWO-CAR TRAIN OPERATION FOR CITY AND SUBURBAN TRAVEL\*

BY C. J. FRANKLIN, GENERAL SUPERINTENDENT PORTLAND (ORE.) RAILWAY, LIGHT & POWER COMPANY

Where traffic conditions are favorable, two motor cars coupled together, operated and controlled by one motorman, have decided advantages over single-unit operation and are especially advantageous when two-motor equipment is so utilized.

The rapid extension of residence districts has produced a startling growth in suburban travel, and with this growth a demand has come for better facilities and quicker transportation. On single track suburban lines nearly all turnouts are being used during the rush hours for single-car operation; the old method of doubling up the cars and running them as "double-headers" has been found to be impracticable on account of the increased number of units operated and consequent multiplicity of delays. With the present insufficient track facilities, increasing the number of single units, instead of relieving the situation, complicates it to such an extent that patrons do not reach home as quickly as before such increase was provided. In the center of the city, where cars operate on both city and suburban lines, the traffic is necessarily congested during the rush hour periods and track space is particularly important. Single car operation does not permit of the maximum use of the track, as an increase in headway between cars means a gap in the service.

The advantages of two-car train operation are not by any means confined to suburban or city lines operating on single track. Single-unit operation requires four men to two cars—two-car train requires three men to two cars, thus effecting a saving of 25 per cent in platform time and expense. In single-track operation there is a limit to the number of units that can be moved, for example on a single-track line operating ten single cars, it is impossible to operate closer than a six-minute headway.

A line in Portland was operated with a 10-minute service with single cars, which were overloaded. The situation was relieved by running a 15-minute service with two-car trains, which increased the carrying capacity two cars per hour, or 33½ per cent, at no increase in platform time and expense. The running time on the line being 90 minutes for the round trip with 10-minute service required nine cars, and the same running time for the two-car trains with a 15-minute service required six trains. In the former instance eighteen men were required to operate the nine single units, whereas in the two-car train operation, there being but six units with three men to the train, the same number of men were required.

In the operation of cars reliance must be placed largely on the human agency, which is not infallible, and the chances of accident are less with ten motormen than with twenty.

The increased number of stops required per train, as compared with single-car operation, in practice does not work to the detriment of the plan. The running time is much more easily made with two-car operation than with the same number of cars on the line operating as single units.

The question to where two-car train operation is most desirable, where it can be applied and under what conditions it is not desirable, must be left entirely to the judgment of the local operator. Attention is called to long lines operating through the sparsely settled outskirts of the city. It will be found profitable, local conditions permitting, to run a short line of single cars to a point where the travel warrants, in addition to two-car trains which run to the end of the line. Train operation has proved particularly suitable in handling large crowds to and from a race track, country club,

county fair, amusement park, etc., where traffic is mostly of a through nature and stops are not made as frequently as in regular traffic in the congested part of the city, even although operated over city streets. In outlying districts, where the travel is increasing, but not to the extent of demanding more frequent service, two-car train operation has been found to give entire satisfaction by increasing carrying capacity without increasing expense in proportion.

It is hardly necessary to compare two-car train operation with a motor car and trailer. Two-car train operation is much smoother in every respect, has increased acceleration and permits of more rapid operation and regularity of schedule than trailer operation. It lessens the danger of the switching required to run around the trailer at the end of the line. This consumes time, frequently to such an extent as to interfere with schedules, to say nothing of the accident risk involved.

### EQUIPMENT

The standard gage city cars used for train service by the Portland Railway, Light & Power Company are of Brill manufacture. They are of the closed type, 44 ft. 9 in. long, equipped with Brill double trucks; the total weight is 44,500 lb., and the seating capacity approximately forty-four to the car, eighty-eight to the train. Both two-motor and four-motor equipments are used. The four-motor equipments are GE-81 motors; the two-motor equipments are GE-210 motors. The brake equipment is straight-air with emergency feature and automatic with graduated release.

The control on both the two-motor and four-motor equipments is the type M, having two cable jumpers between cars, one a single-point jumper for the trolley circuit and the other a nine-point jumper for the motor and control circuits.

The difference in cost between the type M multiple-unit control for two-motor equipments and the K-28-F control is approximately \$450 per car. The type M control can be used for two or more cars and is capable of handling motors of high power such as are used in interurban work, whereas the K-28-F control is adapted only for two cars of two motors, each of a maximum capacity of 40 hp per motor.

The narrow-gage cars used for train service are of Brill manufacture. They are of the closed type, 41 ft. 4 in. long, equipped with Brill double trucks. The total weight is 36,580 lb. The seating capacity is approximately forty to the car or eighty to the train. Only two-motor equipments are used, the motors being of the GE-58 type. The brake equipment is straight-air with emergency feature. The control is the K-28-F type having three cable jumpers between cars, one a single-point jumper for the light and heat and the other two seven-point jumpers for the motor and control circuits. The operation of this control is practically the same as that of a single four-motor equipment.

When it is considered that the difference between equipping two cars with two motors each with the K-11-H control to operate as single units and equipping two cars with K-28-F control to operate in multiple unit is approximately \$150 per car, the advantages obtained in having a flexible equipment which can be used either as single units or in two-car trains certainly more than warrants the expenditure.

Two-motor, two-car train operation may also be obtained by having a car equipped with K-28-F controller and a car equipped with the K-11-H control, using a seven-point jumper between cars, but the train can only be operated from the car having the K-28-F controller. This operation is desirable where loops are provided at each end of the line and of course is half as economical again as equipping two cars with the K-28-F controllers.

Pay-as-you-enter cars are being used in some of these two-car trains. When used in this manner the forward car of the train is used the same as in single car pay-as-you-enter operation. The forward platform doors of the second car are locked and the passengers board the car and alight via the rear platform. This operation has proved successful.

\*Abstract of paper read before the American Electric Railway Transportation & Traffic Association, Atlantic City, N. J., October 9-13, 1911.

## REPORT OF THE COMMITTEE ON COMPENSATION FOR CARRYING UNITED STATES MAIL\*

BY EDGAR S. FASSETT, CHAIRMAN; H. A. NICHOLL, C. H. HILE, C. L. S. TINGLEY, A. R. PIPER, J. K. CHOATE, J. M'MILLAN

At the annual mid-year meeting of the executive committee of the association, held in New York in January, 1911, we submitted the following report, which was accepted by the executive body:

"The committee on compensation for carrying United States mail would respectfully report that, having gone over the data which had already been compiled by previous committees and after a free discussion in relation to the same, it has decided to recommend the following rates of compensation:

"For pouch service, from one to three pouches handled on passenger cars a minimum of 3 cents per car mile; for each additional pouch 1 cent per pouch per mile.

"That the rate for railway post office service on city lines be 1½ cents per-linear foot per car mile.

"That the rate for railway mail service on interurban lines be the maximum compensation given to steam railroads for like service.

"That a conference be asked with the committee on compensation for carrying United States mail of the American Railway Association (short-line railroads) with a view of co-operating with it."

In accordance with the above recommendation, the chairman of your committee had a conference with Mr. Ralph Peters, vice-chairman of the committee on railway mail pay of the short-line railroads. While Mr. Peters was very courteous and very much interested in the subject, he thought that there is such a wide divergence between our respective lines that practically nothing could be accomplished by joining forces, although we could work in harmony by exchanging such data and other matters concerning the mails as the two committees might gather.

Your committee is indebted to Gen. George H. Harries, second vice-president of the association, for his able assistance and advice in connection with its work. In co-operation with General Harries, a meeting was arranged in Washington for Aug. 9 between the committee and General Harries, and the acting Second Assistant Postmaster General and the superintendent of the division of miscellaneous transportation. At this conference the recommendations formulated by the committee as to the rates for mail service were presented to the post office officials, and they seemed to be impressed with the fact that the electric railroads were not properly taken care of, and agreed to bring the matter before the Postmaster General at an early date, letting us hear from them in connection with the same in sufficient time for the committee to make a report to the association at the annual convention. We have now been informed that since the date of our conference the time of the Second Assistant Postmaster General has been almost entirely taken up with the work of the investigation of the department, and for that reason he has been unable to give our matter attention. We are assured, however, that it is the intention to take up our case at the earliest opportunity, and we shall be advised when the same is done or when another conference can be arranged.

While the committee feels that it has not been able to accomplish much, yet a start has certainly been made with the post office authorities and our desires have been brought to their attention; but, as General Harries aptly says: "Slow business, this dealing with the United States government when the government is in the debtors' class; if we were the debtors and the government was the creditor things would move much more rapidly."

\* Abstract of report read at the convention of the American Electric Railway Association; October 9-13, 1911.

## COMMITTEE ON DETERMINING THE PROPER BASIS FOR RATES AND FARES\*

BY FRANK R. FORD, CHAIRMAN; C. S. SERGEANT, JOHN I. BEGGS, H. J. DAVIES, WILLIAM J. CLARK, H. G. BRADLEE, HON. JAMES F. SHAW, WILLIAM NORTHROP, E. C. FOSTER

Your committee appointed last winter has given consideration to its subject and reports as follows:

*First:* We believe that there exists a widespread need of increased fares if adequate service is to be furnished and capital secured to provide for the continued growth of the industry.

*Second:* Practical methods of securing increased rates for city systems may be summarized by the following:

(A.) Retain present 5c flat rate, but eliminate free transfers.

(B.) Retain 5c rate, but charge 1c, 2c, or 3c extra for transfers.

(C.) Increase 5c rate with (1) free transfers, or (2) without transfers, or (3) with extra charge for transfers.

(D.) Establish straight European zone system without transfers.

(E.) Establish zone system where a 5c fare is charged from outlying districts to central business district, but require a 10c fare from outlying district across business district to opposite outlying district, eliminating such transfers as would defeat this object.

(F.) Establish zone system with 5c fare for a large central zone and 3c extra fare, making 8c through fare to smaller outlying zone, either with (1) free transfers or (2) a charge for transfers, the local fare in outlying zone being 5c.

From analogy with the past history of the industry and from practical considerations we would in general recommend Method F as the most feasible of the above plans. Local conditions, topography and customs are, however, different in each city, and would modify any general conclusions on this subject.

*Third:* Various members of this committee have prepared memoranda on this problem which are hereto appended. (Not reprinted.)

*Fourth:* We believe that this subject is deserving of the most careful study by the association and we therefore recommend that this report and accompanying memoranda be printed and circulated among the members of the association, and that a full discussion thereof be had at its next winter's meeting.

### PRESENTATION TO MR. McCONNAUGHY

A feature of yesterday afternoon was the presentation to H. G. McConnaughy by the executive committee of a solitaire diamond pin in recognition of his work as chairman of this committee during the convention. The gift was presented to Mr. McConnaughy at his own booth, that of the Dearborn Drug & Chemical Company, about 5 o'clock by all of the members of the committee. Mr. McConnaughy had many congratulations during the evening over the gift.

A consular report from San Sebastian, Spain, states that an electric railway is being constructed from San Sebastian to Hendaye, the frontier town. An electric railway is also being constructed from Tolosa to the frontier. Belgians and Germans are supplying the construction material.

Otto Conrad, Berlin, Germany, a prominent steam railroad contractor in Germany and electric railway contractor in Sweden, arrived in San Francisco recently on a tour of the world to study railroad and transportation methods.

\* Abstract of report read at convention of American Electric Railway Association. Atlantic City, N. J., Oct. 9-13, 1911.

## Among the Exhibits

Fred Atwater, of the Columbia Nut & Bolt Company, Bridgeport, Conn, is at the convention booming the "nut that won't come off."

\* \* \*

The booth of the Dearborn Drug & Chemical Works, as usual, is a haven of artistic beauty. It is located near the main entrance to the Pier.

\* \* \*

In addition to other representatives of the National Lead Company already here, E. A. Mueller and M. L. Shoemaker are among the late arrivals.

\* \* \*

Watson-Stillman Company, New York, N. Y., are showing a full line of their products. A feature of this exhibit is a turbine pump in operation.

\* \* \*

J. B. Davidson, general manager of Cameron Electrical Manufacturing Company, of Ansonia, Conn., has been busy at the convention in the interest of the company.

\* \* \*

George E. Austin and F. A. Lachance are present at the convention representing the American General Engineering Company, Imperial Rubber Company and the George E. Austin Company.

\* \* \*

In the absence of John G. Buehler, president of Columbia Machine & Malleable Iron Company, Mrs. Buehler and Miss Buehler are meeting his customers and friends. They are stopping at the Chalfonte.

\* \* \*

National Vending Machine Company, New York, N. Y., located at space 419, is exhibiting a unique automatic money changing ticket and stamp vender which is attracting a great deal of interest. This machine is so constructed that it will accept none but good coins; all others will be returned.

\* \* \*

The Trolley Supply Company, exhibiting at space 207, is displaying the new No. 10 "Peerless" trolley base; also a new combination arc and incandescent headlight, with all the advantages of a larger lamp, but only weighing 22 lb. In addition to these are being shown the Nos. 5 and 2 Knutson retrievers, "Ideal" catcher, "Peerless" check valve and "Star" base.

\* \* \*

Gould Storage Battery Company, New York, is exhibiting a storage battery car equipped with Gould storage batteries on the Boardwalk in front of the Pier. This car has been in service on the Twenty-eighth & Twenty-ninth Street Crosstown line in New York, and is here temporarily for exhibition. W. S. Gould and W. E. Winship are present at the convention.

\* \* \*

A noteworthy feature of the General Electric Company's comprehensive display was that the entire exhibit was erected by one man with a G. E. portable electric hoist, whereas six to eight men were required when tripods were used. A historical equipment on view is one of the original Sprague motors for the Richmond line opened in 1888. This motor operated until Oct. 1, 1911.

\* \* \*

The Railway Track-Work Company, Philadelphia, Pa., has spaces 156 to 160, Machinery Hall, for exhibiting two different types of rail grinder, for removing corrugation from the heads of rails and for grinding hammered joints. A very important feature in these types is that it is not necessary to block traffic in the operation of these machines. Any radius of curve may be ground with either machine.

Stephen D. Barnett, Eastern representative of Strong Carlisle Hammond Company, Cleveland, is attending the convention in the interest of the Randall Graphite Sheet Lubricator Department. The Randall method of lubrication consists of wire gage studded with cones of graphite. This is laid in the bearing and the babbitt poured around it. The exposed graphite lubricates at all times, and it is said that the oil consumption is reduced 80 per cent.

\* \* \*

The Curtiss Exhibition Company, New York, has recently closed contracts for aeroplane exhibitions with the Spartanburg Railway, Gas & Electric Company, Spartanburg, S. C., for Thanksgiving Day, and with the Houston (Tex.) Electric Company, for a three-day meet in November. Jerome Fanciulli, general manager of the Curtiss Exhibition Company, is at the convention and will be pleased to confer with the delegates should they be interested in aviation meets at their lake or park resorts.

\* \* \*

The Cutter Company's exhibit of circuit breakers in space 174 embodies the latest development in remote control apparatus. Three methods of operating circuit breakers are shown. One is the electro-pneumatic type, especially adapted for subway and elevated roads. It is operated with compressed air taken from the system that operates the track switch. The breaker is equipped with the "Auto-ite" feature, rendering its closing on overload impossible. The second design, or motor type, is closed by a worm gear, the worm being brought into mesh with the gear by a solenoid. When the closing movement is completed the motor and the gear solenoid are automatically cut out. The motor is designed to operate through a wide range of voltage. The third, or magnetic, type is closed by a solenoid, the coil of which is in circuit only during the closing movement. The signal lights are mounted with the control switches and indicate the position of the breaker, whether opened or closed. Breakers of the reverse current and the direct acting time limit design are also on exhibit.

\* \* \*

Stamping on a steel rail the number of the heat or melt of steel from which it is made has been a practice followed by manufacturers for many years, but the advantages of such a record have been largely confined to the makers themselves. Railroads are now taking a much keener interest in the matter due to the activities of the rail committee of the American Railway Engineering Association. It is important that the heat number and rail letter (indicating the position in the ingot) be reported of all failed rails. This record can then be compared with the inspector's reports, which, as well known, give the chemical analyses of each heat of steel, with the result, it is hoped, that some questions relating to chemical composition may be solved. There has been considerable difficulty in the past in correctly locating and reading these heat numbers and letters. They have been easily confused with the manufacturers' brand, which is rolled on the rail web, and frequently also some of the figures have been omitted from the numbers, so that the identity of the steel was lost. With a view toward eliminating much of this trouble Robert W. Hunt & Company, the well-known inspectors of rails and fastenings, have just issued a card 11 x 14 in. in size entitled "Branding and Heat Number Stamping of Steel Rails." This card gives an account of how the branding and stamping is done at each mill where rails are made on the American continent. This inspection firm has a permanently located staff of over fifty rail inspectors. The card describes the methods of locating and reading the proper heat number. It will be sent free to any address upon request to any of the Hunt Company's offices. Members at the convention can obtain cards from C. W. Gennet, Jr., by addressing him personally or at the Traymore Hotel, Atlantic City, N. J.

## THE ELECTRIC SERVICE SUPPLIES COMPANY

In the quarters of the Electric Service Supplies Company, space 311, "Protected" rail bonds and Keystone overhead material are arranged on two beautiful panel boards. On the bond board are to be found various types of flat ribbon concealed bonds, cable concealed bonds, long cable bonds, foot bonds, bond terminals and many other types. There are also shown numerous styles of screw and hydraulic bonding tools, all of which may be seen in operation. Of particular interest in this bond exhibit are sections of the 150-lb. third rail of the Pennsylvania Tunnel & Terminal Company bonded with "Protected" foto bonds to a capacity of 1,800,000 circ. mils and a section of the "bull-rail" used by the Philadelphia Rapid Transit Company on its subway and elevated division, bonded to a capacity of 1,000,000 circ. mils. On the display board devoted to Keystone overhead material, many new designs of hangers, strains and similar material are shown. All of this material is arranged to permit easy inspection.

A novel but very practical piece of lightning protective apparatus is a Garton-Daniels panel board electric arces er. This panel-board arrester is made up of three 800-amp kicking coils connected in series and shunted by three standard railway type Garton-Daniels arresters. In operation the panel arrangement of the arresters affords three paths to ground for any discharges occurring on the line and so largely increases the protective ability of the arresters. For demonstrating this panel-board lightning arrester there is employed an induction coil. Discharges from this coil are stored in condensers, which condensers discharge across the arresters. This closely approximates conditions surrounding the arresters when they are installed in actual service and are subjected to discharges of atmospheric lightning. Means are also provided for throwing 500 volts across the arresters at the time the discharge from the condensers occurs. This allows the operation of the arresters under both static and normal current to be observed.

The automotoneer exhibit includes styles for practically every type of modern street-car controllers. The standard type K-9 and K-6 automotoneers are shown mounted on the controllers, and also a type R-27-V Westinghouse type is shown. This last automotoneer is the first of its kind designed for both forward and reverse operation. In conjunction with the K-9 automotoneer, there is also shown on the same controller a Keystone double valve controlling the operation of a Keystone pneumatic gong ringer, a whistle and Keystone air sander. This is to demonstrate how the motor-man may work the brakes, give an alarm and apply sand, either singly or simultaneously, the signboard reading "Do not cross while bell rings." This refers to the Keystone highway crossing signal system. To demonstrate this signal the company has fitted up a wooden pole with a standard trolley harp and wheel, so enabling a person to walk under the contactors and see actual conditions on the line.

## COASTING RECORDS IN SOUTH AMERICA

On Oct. 5 Charles H. Hall, electrical engineer of the Railway Improvement Company, New York, sailed for Rio de Janeiro, Brazil, to supervise the installation of coasting recorders on the Rio de Janeiro Tramways system. T. Frame Thompson, managing director of the English syndicate which controls the United Tramways of Buenos Aires and Montevideo, while in this country placed an order for thirty coasting recorders to be installed in Montevideo. An engineer will be sent from New York to install these machines and also to conduct a test on the surface lines in Buenos Aires.

L. C. Pelott, of the Browning Engineering Company, Cleveland, Ohio, is attending the convention.

## HEAT-TREATED, OIL-TEMPERED AXLES

One of the most noteworthy and interesting exhibits is an axle made by the Cambria Steel Company, Johnstown, Pa., which after being finished was bent cold around an 8-in. mandrel forming a complete arc of a circle without sign of fracture. This is a street car axle of standard dimensions about 4¼-in. center diameter. The fact that a piece of steel of this large size could be so distorted is ample proof of its strength, toughness and ductility. The excellent properties of the Cambria "Special" axles are obtained by the use of particular chemical qualities, care in manufacture, and finally the system of heat treatment, including oil tempering and other slow and careful annealing. This axle steel has been adopted as standard by the Interborough Rapid Transit Company, New York, N. Y., and many other important transit lines. The essential points of the specifications are as follows:

"Chemical Composition—All axles shall be made of open-hearth steel with limits not to exceed the following: Phosphorus must not be above 0.04 per cent; sulphur must not be above 0.04 per cent and manganese must not be above 0.80 per cent. It is desired that the percentage of carbon be kept as low as possible.

"Heat Treatment—Physical properties must be obtained by quenching the axles in oil and tempering.

"Physical Qualities—Test pieces cut from one of each ten axles shall show the following qualities: Elastic limit, not less than 50,000 lb. per sq. in.; elongation in 2 in., not less than 22 per cent; contraction of area, not less than 45 per cent.

"Samples for Physical and Chemical Tests—Drillings for analysis and the physical test piece will be taken from the crop end parallel to the axis on any radius 50 per cent of the distance from the center to the circumference.

"For the most special and severe service the phosphorus may be made somewhat lower and the physical qualities slightly higher than above stated."

## EXHIBIT NOTES

The reception section of the booth of the General Electric Company has been a popular loafing place.

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C. I. Earll is present at the convention in the interest of Earll trolley catchers and retrievers, exhibited at the booth of the Lord Manufacturing Company.

\* \* \*

M. DeForest Yates, deputy controller of the city of Schenectady, N. Y. is present at the convention. He is here in the interest of the Recording Register & Fare Box Company, New Haven, Conn.

\* \* \*

G. E. Chamberlain of the Southern Exchange Company, New York, N. Y., is visiting his old time friends at the convention. He says he will be at the convention next year with an exhibit of octagonal poles and crossarms without fail.

\* \* \*

The Peter Smith Car Heater Company, Detroit, Mich., spaces 254, 256, is showing a device for electrical operation of cash registers in which much interest has been shown. This apparatus was invented by L. R. Gaw, master mechanic of the Saginaw Traction Company. It will operate any style of register.

\* \* \*

William Marshall, of the Anglo-American Varnish Company, Newark, is present at the convention in the interest of his business. He makes his headquarters at the booth of the U. S. Metal & Manufacturing Company. Mr. Marshall has been a regular attendant at the A. E. R. A. conventions for the past fifteen years.