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NEW YORK—OCTOBER 12, 1911.—ATLANTIC CITY

PROGRAM TO-DAY

CONVENTION MEETINGS

- 9.30 a.m. Closing Session of Accountants' Association, Chalfont Hotel.
- 9.30 a.m. Session of Engineering Association, Marine Hall, Convention Pier.
- 9.30 a.m. Closing Session of Transportation & Traffic Association, Greek Temple, Convention Pier.
- 2.00 p.m. Closing Session of American Association, Greek Temple, Convention Pier.

ENTERTAINMENT

- Golf, All Day, A. E. R. M. A. Tournament, Atlantic City Country Club, Northfield, N. J.
- 10.00 a.m. Obstacle Golf, Lawn of Marlborough-Blenheim Hotel.
- 11.30 a.m. Concert by Leps and His Symphony Orchestra, Lobby, Convention Pier.
- 3.00 p.m. Concert by Leps and His Symphony Orchestra, Lobby, Convention Pier.
- 4.00 p.m. Obstacle Golf, Lawn of Marlborough-Blenheim Hotel.
- 4.00 p.m. Aviation Exhibition with Curtis Hydro-aeroplane, Ocean End of Convention Pier.
- 9.00 p.m. Promenade Concert and Ball, Ballroom, Convention Pier.

The Claim Agent and the Exhibits

The splendid exhibitions of electric railway appliances at the annual conventions afford the claim department delegates an excellent opportunity to become familiar in a short time with the many mechanical and electrical features of railway operation. It is logical that the visiting claim agent should give most of his attention to an examination of devices which are directly concerned with accident prevention, but it would be wise to study other equipment as well. For instance, he should acquaint himself with the latest developments in car platform design and seating arrangements, because many damage suits have resulted from accidents on the platform or inside the cars. Even such apparently remote matters as track switch construction and improvements in car wheels will be found to have some bearing on the accident expense account. Broadly speaking, it may be said that the claim agent is justified in taking an interest in all railway equipment developments that promise greater durability, since durability and safety are often synonymous terms. It is not necessary, of course, that he should study the details of the apparatus so closely as an engineer. It is enough for him to know that certain improved devices exist so that he can suggest an investigation of their merits when opportunity offers. It would be desirable for the claim agent to examine the exhibits under the guidance of one of his company's engineers, in order to have the benefit of the engineer's knowledge of the technical phases of the devices displayed.

Standard Overhead Specifications

This year's report of the committee on power distribution of the Engineering Association consists almost entirely of recommended specifications for materials and construction work in connection with the installation of overhead and underground transmission lines. This is a particularly valuable line of work for the committee to pursue, especially because such specifications are most helpful to the smaller companies which do not maintain a large engineering force and consequently are not in a position to prepare suitable specifications of their own. A standard specification prepared by competent engineers after careful study and deliberation is a good guide to follow, especially where there are no local conditions which would require serious modification. A transmission line installation frequently involves the joint rights of other interests besides those of the company which is putting up the line. In such cases a standard specification agreed to by all the interests serves to protect against unreasonable demands by any party to the agreement and to guarantee a type of construction which will insure safety to all. The crossing of a high-tension transmission line over a railway track or an existing line of telephone or telegraph wires is a typical example. The last section of the committee's report contains complete specifications for such crossings which have been prepared jointly by committees of the National Electric Light Association, the American Electric Railway Engineering Association, the American Institute of Electrical Engineers, the Association of Railway Telegraph Superintendents and the American Railway En-

gineering Association and also by representatives of the telephone and telegraph companies. This co-operation of engineering societies in a matter of common interest to all is an encouraging step forward. More can be done along similar lines of procedure now that a precedent has been established.

The power distribution committee mentions in its report three specifications of which it has made outline drafts for consideration by joint committees in the future if such action can be brought about. These are specifications for the joint use of poles, crossings of trolley wires over steam railroad tracks and crossings of foreign and electric railway wires. It is to be hoped that joint action on these subjects will meet with the same success during the coming year as attended the specifications for overhead crossings of high-tension transmission lines this past year.

Efficiency Engineering

The subject of efficiency became of widespread public interest through criticism of steam railroad methods before the Interstate Commerce Commission in hearings on rate cases. Thus it was, in effect, a suggested new application of an old theory that stimulated public interest in the topic. In the report of the joint committee, presented yesterday before the Accountants' and Engineering Associations, a discussion of this subject was included, with the commendable idea that it would attract additional attention to the possibilities involved. The committee wisely refrained from attempting to suggest the application of the doctrine to all branches of railway operation. Unfortunately the time of traumen and station agents cannot, like that of armies, navies and other protectors of life and property, be rendered of highest efficiency by the elimination of lost motion or lost time. It must include periods of waiting. However, wherever efficiency systems can be introduced they should lead definitely to better results. Constant study of the work of employees in shops, offices and other departments not directly concerned in the operation of cars should promote savings that will be of benefit to the railway and increased capability that it is equally sure will be of benefit to the men it employs.

Action on Interurban Rules

The Transportation & Traffic Association is to be congratulated upon the action taken in the meeting Tuesday morning on the adoption of the code of interurban rules. Charles L. Henry sounded the keynote of the discussion when he said that it was absolutely necessary to have a basic code of rules and that the companies should sink all minor differences of opinion and adopt a standard code at the earliest possible moment. We have no hesitancy in expressing the opinion that the revised code presented by the committee this year is a safe and workable set of rules. There may be some errors of omission and admission in the text which time will disclose, and the practice outlined may not be universally applicable to the conditions in all localities. But the code is practicable and is the best which has yet been proposed. The work of revising the rules is not finished. That must go on from year to year as defects are found or as conditions change, as with the American Railway Association, whose code has been subject to constant revision. But this fact has not detracted in any way from the value of the steam railroad code; rather, the fact has widened its field of application and improved its practice in minor details. Now that the Transportation & Traffic Association has adopted the code as standard, it remains for the member companies to put the rules into effect and thereby support the action of the association. From the discussion on the floor of the convention it would appear that a large number of companies intend to put the rules into effect as soon as possible if indeed they have not already adopted them.

High-Voltage Turbo-Generators

Mr. Crecelius' report on the suitable voltage and frequency for three-phase turbo-generators, read at the Engineering convention yesterday, is very welcome to the designer of stations. It is, of course, a familiar fact that with an assumed distance and amount of power transmitted the most economical voltage is not necessarily or generally the highest one practicable. There comes a time as the voltage rises when extra costs of insulation, particularly in underground cables, overbalance the reduced losses in the conductors. The data bearing on this point have been skilfully assembled by Mr. Crecelius, leading to the result that in the case of underground distribution at present costs of material nothing substantial is gained by passing the 11,000 volts which has often been used in turbo-generators. The common voltage of 6,600, which after all must be regarded as a concession to the uncertainties of early cable manufacture, seems unquestionably to be too low for economy, and double this voltage, which is also a common figure, adds to the cost of transmission at distances up, say, to 4 miles and shows no material gain up to about 10 miles. With generators of about 11,000 volts it does not pay to use raising transformers.

One of the problems which have to be met, however, in dealing with these high-voltage generators is the danger of those formidable short-circuits in the station which are so destructive to equipment. In stations as now designed one may have half a dozen large turbo-generators, all leading practically into the same set of busbars and liable to be involved in a common short-circuit. Mr. Crecelius very properly points out the advantage of using reactances to protect the generators. The usefulness of such protection is unquestionable, but we have a strong feeling that it has not yet been worked out to its limit of efficiency. In the first place we are inclined to think that most switchboard designs give altogether too good an opportunity for dead short-circuits in the station. Bearing in mind the actual operating conditions, it is not infrequently possible so to arrange a plant that save in rare instances the generators will be in parallel only through the transmission lines and so gain the necessary protection without the constant use of impedances. Large transmission networks are often run on this principle with a high degree of success, the lines acting as electro-dynamic buffers to an extent that enables the system as a whole to drive through almost any kind of interruption. If it is necessary to use current-limiting reactances in the station, it should be possible to design them so as to make them tremendously effective on a heavy overload without their cutting much figure at normal current. The design of such apparatus is capable of considerable improvement.

The question of frequency has substantially settled itself so far as the design of power stations for use with synchronous converters is concerned. Twenty-five cycles seems by general agreement to be the figure which on the whole gives the best results. Of course, if alternating-current motors are seriously to be considered, present indications point to the advantage of a considerably lower frequency, certainly less than 20, perhaps as low as 15. In planning, therefore, the great stations which are becoming increasingly common nowadays it may not be undesirable to take the chance of future use of alternating-current motors into consideration to the extent at least of conceding something to that chance in selecting a frequency for the generators. The bigger the generating units and synchronous converters in use the easier it is to build them for very modest frequency, and if a station is to be planned, as one hopes stations may safely be planned now, for twenty years or more of service, a frequency suitable for alternating-current motors as well as for synchronous converters is well worth consideration.

Conventionalities

Is associate membership worth the money? Ask James F. Shaw.

Lost—An opal scarf pin on the Pier on Tuesday. If found, please return to J. W. Fleming, space 226, Building 2.

Pop Sisson arrived upon the Pier early, remaining five minutes before being kidnapped by a party of ladies to pose for a group photograph.

Lost—On Monday evening in the ballroom, a small platinum chain. Finder will please return to Ross F. Hayes, Room 475, Marlborough-Blenheim Hotel.

B. V. Swenson, the genial and always smiling ex-secretary of the American Association, ran down to Atlantic City for the day on Wednesday. He just couldn't stay away.

Former chairmen of the entertainment committee Whipple, Hayes and Berry have condescended to act as plain committeemen at this convention—a worthy precedent.

E. B. Peck, the genial, jovial gentleman who sits on the lid of the Indianapolis Street Railway treasury, claims that he has broken all long-distance records for convention roller-chair flights.

The social festivities on the Pier on Tuesday night were graced by the presence of Hugh J. McGowan, who is deeply interested in the welfare of the traction industry, particularly that part of it in Indianapolis and the heart of Indiana.

F. R. Newman, who recently resigned his position as general manager and purchasing agent of the Southern Cambria Railway, a 1200-volt line in western Pennsylvania, is attending the convention as a guest, merely to keep his hand in on railway matters.

C. N. Duffy, comptroller the Milwaukee Electric Railway & Light Company, is an enthusiastic advocate of the company section plan for increasing the associate membership of the American Association. He spoke on this subject on Tuesday before the Accountants' Association.

E. F. Murphy, for several years train dispatcher on the Cleveland, Southwestern & Columbus Railway, has been made superintendent of the Southern division of that road, which is a modern, high-speed, rock-ballasted line forming an important part of the existing through route between Cleveland and Columbus.

H. H. Littell, who issued the original call for the organization in 1882 of the American Street Railway Association and was its first president, is in attendance at this convention, accompanied by his son. Mr. Littell resides in Buffalo and for many years was general manager of the electric railway system in that city.

Four past-presidents of the American Association are attending the convention this year. They are H. H. Littell, the dean of the association, who was its first president in 1882 and 1883; Albion E. Lang, president in 1897-1898; Charles S. Sergenat, president in 1898-1899, and James F. Shaw, president from 1908 to 1910.

Have you had A. E. Carrier, of the National Carbon Company, come up to you in all his majesty as a member of the exhibit committee and suggest that you change or remove some of your fancy decorations? He does it so delightfully that the worst misanthrope would feel honored by the suggestion. It isn't hypnotism, but just inborn good fellowship that accounts for his winning way.

W. Worth Bean, Benton Harbor, Mich., is attending his twenty-ninth convention of the American Association. There have been only thirty conventions. The one which Mr. Bean

missed was that of last year, when he was in California. Mr. Bean was formerly largely interested in the electric railway between St. Joseph, Mich., and Benton Harbor, but has now retired from active management.

L. E. Fischer, of Danville, Ill., which, to be definite, is located 115 miles south of Chicago in the corn belt of Illinois, rang the convention time clock at 11 A. M. Wednesday. Mr. Fischer has been dubbed "Duke of Choctaw" since he gracefully accepted the vice-presidency and general management of the lighting and railway properties at McAlister, Okla. He is also vice-president and treasurer of a road in Clarksville, Tenn., which has almost 6 miles of track.

Duncan McDonald, general manager of the Montreal Street Railway Company, was due to arrive late Wednesday evening. Other officials of the Montreal property, which, by the way, is soon to be known as the Montreal Tramways Company, thus conforming truly to the British phraseology, were J. D. Evans, consulting engineer; R. M. Hannaford, chief engineer; D. E. Blair, superintendent rolling stock, and A. S. Byrd, superintendent power plant and aviation expert.

A. H. Carlisle is present at the convention for the first time. He is stopping at the Marlborough-Blenheim. Mr. Carlisle recently returned from a three months' trip to Europe. While abroad he organized the P-A-Y-E (London) Syndicate, Ltd., which is to be a holding company for the International P-A-Y-E Tramcar Company, Ltd. The latter company will own the foreign P-A-Y-E patents and license electric railways in England and on the Continent to use prepayment cars.

A strong contingent has been sent to the convention by the Milwaukee Electric Light Company. It consists of R. B. Sterns, general manager railway department; C. Nesbitt Duffy, comptroller; Fred G. Simmons, superintendent way; George Keummerlein, Jr., superintendent transportation; H. A. Mullett, superintendent rolling stock; F. J. Boehm, assistant secretary and treasurer; and M. S. Rausch, claim agent. They seem to be as glad to get back as their friends are to see them.

H. E. Chubbuck, vice-president, executive and generalissimo of the Illinois Traction Company and the Western Railways and Light Company, president Illinois Electric Railways' Association, and for twelve years secretary Illinois Electric Association, arrived Wednesday morning to take charge of his cohorts, which include C. F. Handshy, general superintendent; J. M. Bosenbury, superintendent motive power and equipment; H. J. Vance, purchasing agent, all of the Illinois Traction System, and W. A. Martin, superintendent Quincy Horse Railway and Carrying Company, and Walter Achepole, auditor Western Railways and Light Company. Fred Buffe, publicity manager, had reservations on the Chicago special train, but was taken ill Saturday. He is reported better. The McKinley system places a minimum weight of 200 pounds on all department officials.

Vice-President-in-charge-of-entertainment W. L. Conwell, of the A. E. R. M. A., since his debut as a high-diving automobilist has been in receipt of the usual flattering offers which theatrical promoters make to meteoric celebrities. "Bill" Wood, who manages the well-known New York and Queens County shows on Long Island, wired Mr. Conwell (in a prepaid message) as follows: "Did accident really happen or are newspaper reports emanations from jealous press agents? Please name salary your appearance for fifty weeks in vaudeville demonstrating waterproof automobile accessories, we to write suitable lines for you. Having run through fence you might secure engagement as racing driver in milk-wagon handicap." Mr. Conwell's private secretary gave out a statement yesterday saying that Mr. Wood's proposition was neither the only nor the most attractive advance made, and that Mr. Conwell was not going to be in a hurry in deciding his future course.

SOCIAL EVENTS TO-DAY

After the athletic orgie of last night the convention delegates will to-day have an opportunity to indulge in a little mild exercise on the golf links, or if they prefer, to watch a real sporting event in the afternoon, when C. C. Witmer will give an exhibition of flying over land and water in a Curtiss hydro-aeroplane. In the morning and afternoon Leps and his orchestra will give concerts in the lobby of the Pier and in the evening the promenade concert and ball will take place.

CONCERTS

The program for the morning concert at 11.30 o'clock will be as follows:

- (1) Overture, "Wilhelm Tell"..... Rossini
- (2) "From Foreign Lands"..... Moszkowsky
- (3) Fantaisie, "Bohemian Girl"..... Balfe
- (4) Menuett..... Bocherini
- (5) Pizzicato, "Sylvia"..... Delibes
- (6) March from "Queen of Sheba"..... Gounod

In the afternoon the following program has been arranged:

- (1) Overture, "Maritana"..... Wallace
- (2) Largo..... Handel
- (3) Waltz, "Roses from the South"..... Strauss
- (4) Selections from "Stradella"..... Flotow
- (5) American Fantaisie..... Herbert

GOLF TOURNAMENT

The golf tournament will continue all day at the Atlantic City Country Club, Northfield, N. J. All those wearing the convention badge are eligible to enter. An eighteen-hole blind handicap match will be played. Each player will select his own handicap, based on a net score to be drawn between 80 and 85. The tournament round must be declared by each player with the handicap selected before beginning play and all cards must be attested. First and second net score and low gross score prizes will be awarded. Cars of the Shore Fast Line leave Florida Avenue and the Boardwalk and Virginia Avenue and the Boardwalk every half hour, running direct to the club house.

AVIATION EXHIBITION

The aviation exhibition which will take place at 4 o'clock in the afternoon, weather permitting, promises to be the most spectacular event of convention week. The Curtiss hydro-aeroplane is fitted with pontoons which support it on the surface of the water. The machine will be launched from a boat, and Mr. Witmer will rise from the water, circle over the Pier and perform several graceful evolutions in the air before alighting again on the water. If the surf is too high the pontoons will be detached and the flights will be made from the beach alongside of the Pier.

PROMENADE CONCERT

The promenade concert and ball to-night will be held on the Pier. Leps and his symphony orchestra, beginning at 9 o'clock, will give a concert of selected compositions, which will last about an hour. Immediately after the concert the floor will be cleared of chairs and dancing will begin. A unique feature has been provided in connection with the ball programs whereby gentlemen may know where to locate their partners and meet them in their favorite city, New York, Chicago, Philadelphia, Boston, Washington, St. Lou's, Atlanta, San Francisco, Montreal, St. Paul, Omaha. Banners indicating these cities will be arranged about the hall and spaces have been provided in the dance orders for noting the appointed meeting places as well as the names of partners.

D. C. Noble, president Pittsburgh Spring & Steel Company, is one of that growing number who have Atlantic City conventions of two associations marked up on their record. Mr. Noble for many years has been a conspicuous figure at the annual conventions of the Master Car Builders' Association.

THE CURTISS HYDRO-AEROPLANE

C. C. Witmer is preparing to make flights to-day and tomorrow with his Curtiss hydro-aeroplane, the only flying machine that has been successfully developed for starting from and alighting on the water. Mr. Witmer hopes to make his flights from the Atlantic Ocean, and, if successful, his feat will mark an advance in aviation that may prove the first step in transoceanic aeroplane flight. The Curtiss Exhibition Company, which has provided most of the aeroplane exhibitions and contests held in the United States, has made a specialty of providing flights as traffic promoters for electric railways. It was because of the desire of Jerome Fanciulli, general manager of the Curtiss Company, to demonstrate the value of aeroplanes as permanent attractions for electric railway parks that the entertainment committee was able to provide this unusual feature. Mr. Witmer is one of the most skillful operators of the Curtiss machines.

The hydro-aeroplane, which is the result of the inventive genius of Glenn H. Curtiss, is equipped for use on land or water. It is with this machine that Hugh Robinson, another of the Curtiss aviators, will endeavor to fly from Minneapolis to New Orleans over the Mississippi River, making his start on Friday of this week. The Curtiss Exhibition Company has provided aeroplane exhibitions for more than a dozen large street railway companies this summer and has made such a success of this attraction that a number of traction companies are arranging to have regular aviation fields and operate their own aeroplanes next summer. The Curtiss Exhibition Company is a member of the Manufacturers' Association and Mr. Fanciulli is personally in attendance at the convention. The Curtiss hydro-aeroplane is on the beach opposite the Marlborough-Blenheim, and the delegates will be permitted to give it a close inspection.

AMONG THOSE PRESENT

F. A. Healy, secretary and treasurer of the Ohio Electric Railway, is accompanied by Mrs. Healy on this trip.

D. Beatty, of the Public Service Railway of Newark, spent his birthday Wednesday in attendance at the convention and received many congratulations from his co-workers.

L. A. Osborne, vice-president of the Westinghouse Electric & Manufacturing Company, gave a dinner last night to a party of fifteen friends. The dinner was served in the Green Room of the Marlborough-Blenheim.

Robert F. Carr, president of the Dearborn Drug & Chemical Works, is attending the convention for the first time in four years. His absence in previous years was due to illness. Mr. Carr is now sleeping outdoors and is feeling like a two-year-old.

President William H. Forse, Jr., of the Accountants' Association, is having the pleasure of showing Mrs. Forse the East for the first time. As Mr. Forse has a national reputation as a sightseer he has systematized the trip so as to visit the greatest points of interest on the route without loss of time.

Pink Spear has been conspicuously absent from his booth for the first few days of the convention, but Mrs. Spear will arrive this morning and it's a hundred to one that he will be found at the Dearborn Drug & Chemical Works' booth hereafter through the day and at his room at the hotel after 9 o'clock each night.

The United States Light & Heating Company, New York, N. Y., exhibits at spaces 257-9 a full line of National storage batteries, of various types and sizes for power plant installation, signal service, railroad car lighting, vehicle, telephone and in fact every class of service to which a storage battery may be applied.

MEETING OF THE AMERICAN ASSOCIATION

CARNIVAL DAY

The second session of the American Association was held yesterday afternoon and was executive in character. President Brady called the association to order at 2:30.

The first subject on the program was the appointment of the nominating committee. Mr. Brady said that he would appoint a committee of five. This committee was announced later and consists of Messrs. J. H. Pardee, R. P. Stevens, P. S. Arkwright, E. B. Peck and H. T. Edgar.

Daniel T. Pierce then presented a paper upon measures for the welfare of employees. This paper is published elsewhere in this issue.

J. G. Cannon, president Fourth National Bank, New York, then read a paper on electric railway securities. This paper will be published in a later issue.

General Harries then moved a vote of thanks to Mr. Cannon for his paper. The motion was carried.

J. V. Davies, chief engineer Hudson & Manhattan Railroad, then read a paper on that railroad system. There was no discussion.

Thomas N. McCarter said that it gave him pleasure to move a vote of thanks to Mr. Davies in this instance. Mr. McCarter was familiar with the wonders of the Hudson & Manhattan Railroad from the time that Mr. McAdoo started on what seemed then an impossible venture. The Hudson & Manhattan Railroad was only comparable in its wonderfulness with the new station of the Pennsylvania Railroad in New York, the two together forming the most gigantic engineering scheme from a transportation standpoint that this country has yet seen. Mr. McCarter thought that the world and more especially the metropolitan district of New York owed these gentlemen a debt of gratitude and he wished them every success in their enterprises. When such enterprises as these were started and carried through to completion it made one stop and think where the modern viewpoint was coming out; in other words, should men like Mr. McAdoo and Mr. Davies, and Mr. Jacobs, his partner, give ten years of their lives to the construction of an engineering wonder under the depths of the Hudson River and then be allowed to get savings bank interest for their returns? This was a concrete illustration of the ridiculous proposition now so popular throughout the country that public utilities shall be limited to a mere interest return. None but a fool would put his money in any such enterprise as this, if that were to be his sole reward. The firm of which Mr. Jacobs and Mr. Davies are members is one of the most enterprising engineering firms in the world. The gentlemen composing it were concerned in the building of the Pennsylvania tunnel as well as in the McAdoo tunnel; they had done a vast amount of work in England, and it seemed to Mr. McCarter a healthful sign when the American Electric Railway Association could get such a man as Mr. Davies to give the members the value of his experience and thought. It gave him great pleasure to move Mr. Davies a vote of thanks. The motion was carried unanimously.

President Brady announced that the next business on the program was the presentation of the paper by General Harries on "The Effect of Electric Railway Operation on Taxable City Property," which is reprinted elsewhere in this issue.

Paul Winsor, Boston, presented a paper discussing the subject.

Chairman McCarter then introduced Albion E. Lang, Toledo Railways & Light Company, who presented a paper, "The Toledo Street Railway Situation," which is reprinted elsewhere in this issue.

A vote of thanks was tendered to the authors of the papers. The meeting then adjourned.

The street railways of Santiago, Chile, carried 83,158,755 passengers during 1910, against 75,670,943 for 1909.

Athletes, near athletes and has-been athletes romped and cavorted through a series of stunts in Marine Hall last night to the great amusement and edification of the assembled multitudes. The circus poster artist would have described the occasion as a "Riot of hilarity, side splitting, stupendous, surprising and successful. An aggregation of funny, frisky and frolicsome foolishness." All aboard for the big show.

No, Harold, the gents in striped suits are not real desperate convicts. They never did anything worse than buck a utility commission or abolish a few transfer points. The tough bunch of bone-headed mutts who carry banners are innocent supplymen, who wouldn't even take an order if it was lying around loose. What are they doing? Hush! it's a shame to call it baseball with the World's Championship series so adjacent. What are their real names? Foolish question No. 936,781. Look at the score card.

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| <p>LIFERS.</p> <p>"Con Walsh" Brady, p., Capt.
 "K. O. Brown" Page, c.
 "Sandow" Allen, 1b.
 "Walker Weston" Wood, 2b.
 "Ralph Rose" Hedley, 3b.
 "Hackenschmidt" Harries, s.s.
 "Matty McGrath" Pardee, i.f.
 "Johnny Hayes" Shannahan, r.f.
 "Jungstrom" Choate, c.f.</p> <p>SUBS.</p> <p>"White Hope" Donecker.
 "Terrible Turk" Todd.
 "Longboat" Munger.</p> | <p>STONEBREAKERS.</p> <p>"Monk" Castle, p., Capt.
 "Buck" Conwell, c.
 "Slivers" Sisson, 1b.
 "Spike" Williams, 2b.
 "Biff" Ellicott, 3b.
 "Bloke" Heulings, s.s.
 "Chimmie" Ebert, i.f.
 "Thug" Evans, r.f.
 "Humpty" Hawley, c.f.</p> <p>SUBS.</p> <p>"Mickey" McGraw.
 "Pug" Porter.
 "Sisco" Keegan.</p> |
|---|--|
- Umpire, Mr. Hank Fassett.

The score? Who cares? but the Lifers won the Jumbo cup, and according to the official score keeper the score was 7 to 5.

"Car coming!" Is it 13 or 23, sauerkraut or corned beef and cabbage? Dare-devil Donecker, the Sauerkraut Speed King, against the Pride of Ireland. A sight to thrill the heart. The engines running like clock work, the exhaust spitting spit, the steady hands guiding the juggernauts at breakneck around the turns. Once, twice, three times around the track the daring drivers sped, the Pride of Ireland always in the lead. He made the Sauerkraut King eat his dust all the way and won by 50 ft.

Event No. 3 was a forlorn hope from the beginning. With a crowd of pushing apprentices pitted against a bunch of supplymen, only one result could be expected. The railway men won with two goals to none for the supplymen. The two teams lined up as follows:

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| <p>MECHANICS.</p> <p>"Hen" Harvie, Capt.
 "Dub" Doyle.
 "Abe" Adams.
 "Gabe" Gove.
 "Wap" Winsor.
 "Bing" Banghart.
 "Mack" McWhirter.
 "Chick" Clark.
 "Ben" Benedict.
 "Sam" Sawyer.
 "Ack" Ackerman.</p> <p>SUBS.</p> <p>"Lew" Litchfield.
 "Sol" Schreiber.
 "Vic" Voynow.</p> | <p>DUDES.</p> <p>"Birdie" Besuden, Capt.
 "Ferdie" Keyes.
 "Winnie" Wampler.
 "Mortie" Hegeman.
 "Bertie" Tomlinson.
 "Dollie" Bover.
 "Claudie" Nicholl.
 "Gussie" Bole.
 "Dudie" Turner.
 "Dottie" Green.
 "Dickie" Norton.</p> <p>SUBS.</p> <p>"Clarie" High.
 "Nattie" Berry.
 "Mertie" Swenson.</p> |
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The tug of war, which concluded the fun, was a strenuous affair. It was the last desperate struggle of supplymen against railway men and was fought to the last ditch. The supplymen won in two straight pulls.

Kerite Insulating Wire & Cable Company, New York, at spaces 316, 318, Building 3, calls special attention to Kerite signal wire. This type of Kerite insulated wire is in extensive use in both steam and electric railway service. As an interesting part of this exhibit, a piece of wire insulated with Kerite compound which has been in service thirty-five years is shown. The insulation is as flexible and in as good condition as the day it was installed. Samples of all types and sizes of insulated wire and cable are displayed. A piece of the cable furnished the government for the Panama Canal Zone is also exhibited. J. A. Renton is representing the company at the convention.

WEDNESDAY SESSION OF THE TRANSPORTATION & TRAFFIC ASSOCIATION

The Wednesday morning session of the Transportation & Traffic Association was called to order by President Page at 10 o'clock. The first matter on the program was the appointment of the following committee on nominations: Robert I. Todd, Terre Haute, Indianapolis & Eastern Railway; C. L. Allen, Syracuse Rapid Transit Railway, and Bruce Cameron, United Railways Company of St. Louis.

DISCUSSION ON CITY RULES

The report of the committee on city rules was then presented by H. W. Fuller. This report is printed on another page of this issue.

The discussion on city rules was opened by I. H. McEwen, who asked why it was deemed necessary to put the phrase "and be loyal to the interests of the company" in the first paragraph. It was desirable to have all rules standardized, and that phrase was used in the interurban or standard code. He also called attention, in the same notice, to the sixth phrase, "In all cases of doubt take the safe side," which was generally placed in the rules proper; also to the words "form of order," which were usually used in putting the rules into effect. He made the suggestion along the lines of standard revision.

After a brief discussion R. E. Danforth, Public Service Railway, moved that the general notice be made to conform in all respects to the general notice as adopted for interurban rules. This motion was carried.

Mr. Danforth called attention to Section A under Rule 2. As this was a general code, it would seem as though the rule as proposed was restricted too much, as it made no provision for near-side or open cars. He proposed as an amendment the wording "for the safety and convenience of passengers," omitting the rest of the sentence. This motion was carried.

C. L. Allen, Syracuse, asked whether the amendment proposed by Mr. Danforth struck out the wording "boarding or leaving car by way of rear platform."

Mr. Danforth said that it did, for this reason: The near-side car passengers do not board or leave from the rear platform and on open cars there are anywhere from eight to fourteen or fifteen entrances for which the conductor is held responsible. In a basic standard code further explanations could be put in to cover local conditions. Mr. Danforth also moved to strike out the phrase "whenever any danger would be likely to result from backing." He did not believe it wise to incorporate in a code which would be published widely an admission that it was dangerous to back a car.

Mr. Fuller thought it was a very good instruction to employees that in times of danger this backing rule should be followed.

Mr. Danforth believed that on double-end cars the motorman should change ends always, and not only when he or his conductor believed there was danger. This practice ought never to be left optional.

After discussion, Mr. Danforth's motion on the elimination of the "backing" phrase was lost.

Mr. McEwen stated that sometimes the rules read "conductor and motorman" and sometimes "motorman and conductor." Upon motion of Mr. Danforth, it was decided to change the entire rules throughout to read always "motormen and conductors."

Mr. Danforth further suggested under carhouse rules, referring to "leave of absence," that the first sentence, "Leave of absence will be granted only on account of illness, or for rest and recreation," be omitted from the code. It seemed unnecessary to state this in a printed code. It was hard to imagine many other things for which a man might possibly be excused from work. This motion was approved.

Mr. Danforth then proposed that the sections under the

headings "Suspension, Dismissals," "Pay When Off Duty" and "Re-employment" be omitted from the code. It was not to the interest of the company to publish sections of this character in the code.

Mr. Fuller said that perhaps it was Mr. Danforth's experience, in the neighborhood of New York, to get hold of old men who knew something of railroad regulations when they come to him. In Washington he got many country boys from Virginia and Maryland to whom it was necessary to make clear just what conditions they work under. To make this information clear, it was necessary to have this information in the rules.

E. C. Hathaway, Norfolk, said he had read the carhouse rules very carefully. The three rules to which Mr. Danforth objected had been unwritten rules, if not in the rule book. He believed that the rules should be retained in the code.

M. C. Brush, Boston, stated that in New England a number of motormen and conductors come direct from the farm. He saw no harm in publishing the rules, and such publication might do some good. He was reiterating what the railways would say to a motorman entering their employ, assuming that he knew absolutely nothing about railroad-ing.

Mr. McEwen suggested an amendment for the words "dismiss" and substituting the words "company property" in place of "badges," badges being too limited, and that they should turn into the company "company property." Under the title of "Re-employment," he moved that the word "or" be used instead of "and." The latter would be a more proper word to use so that the employee might obtain either the consent of the head of the department or the consent of the management.

The formal amendment to place under "Suspensions, Dismissals" the words "company property" as a substitute for the word "badge" was carried.

Mr. Brush, referring to the proposed substitution of "or" for "and," said that the man should distinctly understand that when he desires to be re-employed he must not only secure the approval of his immediate superior, who may have discharged him for cause or otherwise, but that he must also secure the consent of the management. If the word "and" was retained, the men were impressed with the fact that when they had been discharged they could not, perhaps, get on the right side of the superintendent to get back into the service again. In a large company it might often occur that the management would instruct the head of a department to discharge a man. Under such circumstances some other head of department might see fit to employ that man. In case both the consent of the management and the head of the department had to be secured, the wrong transferring of one man from one department to another would be prevented.

Mr. McEwen's motion to substitute "or" for "and" was lost.

Mr. Fuller asked if any one present had any suggestions to make on the recommended list of details for local carhouse rules. This seemed to be a good innovation.

Mr. Brush said that while the committee believed that it was absolutely impossible to lay down rules which would be applicable to all companies, it thought, nevertheless, that rules should be issued by various companies to cover certain subjects. It simply had given a list of those subjects with the understanding that the companies would take advantage of it to make rules to fit their particular company.

Mr. Danforth said, referring to Rule 108, that he would not put the additional section "Passenger Ringing Bell" in the rule book because he believed it was dangerous to have passengers fooling with the conductor's signal bell. It was a great deal better to have it distinctly understood that passengers were expected to leave signal bells alone. Most new cars and practically all of the prepayment types are provided with electric signal bells for the passengers, by

which the passenger signals the motorman to stop the car. This was eliminating the practice of having passengers ring the conductor's signal bell.

Mr. Fuller said passengers had a right to ring the bell to stop the car but not to start the car. The conductors should try in a polite way, however, to discourage the passengers from doing it.

Mr. Brush said this rule would not result in encouraging the ringing of bells unnecessarily and promiscuously by passengers, but it would have the tendency to compel the conductor to call the attention of passengers courteously to the fact that the practice was a bad one.

J. K. Choate, Otsego & Herkimer Railroad, did not believe the passenger had any right whatever to touch the bell.

Mr. Hathaway thought the rule was a good thing, as it would probably prevent friction between the conductors and passengers. It was put in so the conductor might recognize the fact that a passenger under some circumstances had a right to ring a bell.

C. Loomis Allen, Utica & Mohawk Valley Railway, said that if the committee was trying to make a rule that the conductor would act politely to the passenger who had taken liberties with part of the running apparatus of the car that was one thing, but if it was giving passengers a right to give a stop signal that was a very dangerous thing.

N. W. Bolen, Newark, said there were cases where his company had had passengers arrested and convicted for ringing the bell. If this rule had been in the book of rules the company would have lost these cases. He thought the rule should be omitted.

T. C. Cherry, Utica & Mohawk Valley Railway, suggested that this rule be framed to read: "In case a passenger should take the liberty to put his hand on the bell rope that they (conductors) should try to discourage the matter politely."

Mr. Choate agreed with Mr. Danforth that the rule should be absolutely eliminated.

Mr. Danforth said that he had conferred with the committee, which had an amendment to propose. Both he and Mr. Cherry, therefore, withdrew their motions.

Mr. Brush then put the following amendment in the name of the committee: "When a passenger rings a signal bell to stop the car conductor must try in a polite way to discourage the practice." This motion was carried.

Mr. Danforth expressed the hope that the delegates were individually prepared after this code was adopted by the association vigorously to indorse its use by their companies. The association was not passing a code of rules which the members were not willing to take home to themselves. He had done a great deal of talking because he did not want to appear at the convention as approving a code of rules and then go home to put in force a different code. On the whole the code was generally comprehensive and well got up. In conclusion he moved that the rule under head of "Change" read as follows: "Conductors will make change for passengers to the amount of \$—." He would not print the rest of the rule.

Mr. Hathaway thought the suggestion that the amount be left blank was a good one, for the simple reason that it was a legal condition which varied in the different states.

J. V. Sullivan, Chicago, moved that the rule be amended to read as follows: "Conductors are not obliged to change money of larger denomination than \$—." This gave them the discretion to change it if they wanted to. This motion was carried in place of the one suggested by Mr. Danforth.

Mr. McEwen called attention to use of the words "barn" and "depot" instead of "carhouse."

Mr. Fuller and President Page said that the word "carhouse" would be used throughout the book.

Mr. McEwen also called attention to the use of the terms "trip report" and "day card."

Mr. Brush said the criticism was well made. The same

term should be used throughout to designate the same thing.

Mr. Brush, in reference to a query by Mr. Allen, said that the suggested rules for prepayment cars were added to the end of the proposed code. No effort was made to insert them into the code so that they could be omitted by companies without prepayment cars. In further discussion of the prepayment rules, he called attention to the fact that the chairman of the committee had sent inquiries to 147 companies, of whom eighty-nine approved the addition of prepayment rules. There was no disapproval. There was approval from six and no answer from fifty-two.

Mr. Allen believed most of the members of this association were not in shape at this time to recommend a standard code of prepayment rules. There were several types of prepayment cars and new ones were presented almost every year. More time for consideration should be taken before making a standard code.

E. S. Fassett, Albany, thought the prepayment rules should remain.

Mr. Brush appreciated the fact that prepayment cars would differ as to the gates and as to the manner of collecting revenue.

On motion by Mr. Allen, the code was adopted up to the prepayment car rules. On motion by Mr. Brush, a similar resolution was passed with reference to rules for the prepayment type of cars.

EXPRESS AND FREIGHT TRAFFIC

The next business was the report of the committee on express and freight traffic. F. W. Watts, Utica, read the report, which is published elsewhere.

Charles E. Beattie, New Bedford, opened the discussion. The roads which he operates are doing a purely freight business, and the freight department is operated at a profit. He operates a single car, has no rights for train operation and does not operate carloads. That is practically one-way business. He found the cost of operation under different conditions was practically the same; for one road between two large cities it was 71 per cent and for another serving a summer resort district it was 69 per cent. This covered all charges including trackage, power, rent of equipment and everything which pertained to the business.

The question of soliciting was something that appeals to a great many, but it does not apply under his conditions because he could not guarantee the time of leaving and arriving. Working together with the claim department and the express department gets far better results.

In reply to a question by E. C. Spring, Mr. Beattie said that the percentage of operating expenses on the road, operating one way, was 69 per cent.

F. D. Norviel, Indiana Union Traction Company, said the freight proposition in the northern Central States was not a theory any longer. They were operating under the interstate commerce laws and had about 3000 miles represented in the Central Electric Traffic Association. His line had 365 miles of road and it operates from one to three freight trains a day in each direction. In connection with other lines they had freight service from Indianapolis to Ft. Wayne, about 122 miles, with one train in each direction there; also a new service, Indianapolis to South Bend, 175 miles. They made delivery on freight loaded in the evening on the following morning about 10 a.m. for that distance.

In reply to question by Mr. Spring, Mr. Norviel said that probably 60 per cent was one-way business and 40 per cent in the other direction. The maximum charge per 100 lb. was 31½ cents. The custom with the traction lines through his section was to use the steam railroad rates. They simply meet the competition of the steam railroads. Probably 11 per cent of the gross receipts were from freight business. The members of the Accountants' Association having arrived, the joint meeting followed.

THE JOINT MEETING OF THE ACCOUNTANTS' AND ENGINEERING ASSOCIATIONS

The joint meeting of the Engineering and the Accountants' Associations was called to order by W. J. Harvie, president of the Engineering Association, at 10 a. m. yesterday at Marine Hall. Mr. Harvie asked President W. H. Forse, Jr., of the Accountants' Association, to preside over the joint meeting. Mr. Forse then called on P. S. Young, co-chairman of the joint committee on engineering accounting, to read the report of the committee.

The report of the committee, which is published in abstract elsewhere in this issue, was then read by Mr. Young.

DISCUSSION OF THE REPORT OF THE JOINT COMMITTEE ON ENGINEERING ACCOUNTING

H. H. Adams, Metropolitan Street Railway, of New York, said that the subject of scientific management or efficiency was one which he personally had always considered. It had always been the endeavor of the railways to improve their efficiency in more ways than one. The subject, however, had been given particular attention in the last year or two, with a corresponding increase in results. There was no question in his mind that some incentive had to be given to the workmen in order to attain the best results. Premium work was generally to be preferred to piece work. Some time ago he had a large job to complete within a short time. By a gradual introduction of the premium system he was able to make a material reduction in cost and complete the work in the time required. He could not have done this on the day-work basis. Mr. Adams emphasized the need of a study of existing conditions before any work of this character was taken up. If the day-work basis was used the first thing to know was whether the basis was efficient. If so, that gave the basis for the introduction of a premium work system.

Harrington Emerson, the efficiency engineer, said that he did not consider himself an old man, but that in his lifetime he had witnessed the greatest revolution that had ever occurred during the existence of humanity. When he was born practically all energy was derived from human or animal muscle. Suddenly the world was able to use the stored-up coal, gas and oil for energy. It was exactly like the position of a young man who had been living on a scant allowance and suddenly inherited by the death of his father a great fortune. When, years ago, he started to plow up a section of land he was discouraged to find that it would require four years. Recently he saw a gang plow with engines that would turn over a section of land in thirty-six hours. The object of scientific management was to utilize without waste not only human muscle but also incarnate energy. The greatest mistake made by some labor leaders and workmen, and also, he was sorry to say, by many managers, was in supposing that strenuousness and efficiency were the same. They were not the same. The barnyard fowl who flew over the fence was strenuous without being efficient. The eagle who soared in the sky without moving its wings was efficient without being strenuous.

The aim of efficiency, Mr. Emerson said, was to accomplish the largest amount of work in a given time with the least effort. Wherever scientific management was applied the principal result was to give the workman an easier time. Scientific management rejected the piece-work theory and substituted efficiency, affording the most result with the least effort. Less effort and added responsibility yielded the better results sought by efficient management.

Walter H. Evans, Anderson, Ind., said that efficiency engineering or efforts to introduce scientific management could not accomplish much without the thorough cooperation of all that had to do with the management. The result of the efforts would depend on full co-operation and intelligent understanding by employees of the system. In his

mind railway managers had been efficiency engineers for a long time. Only lately, however, had they realized there was a wide, encouraging field for men properly qualified to devote themselves to this work.

J. H. Neal, Boston Elevated Railway, said that, speaking for manufacturing interests as well as street railways, he had found in New England that some misconception existed regarding scientific management. He had talked with some who thought that they were introducing efficiency methods but who were actually introducing only piece-work or a premium work system. The accountant could not help the efficiency engineer or the engineer very much in the introduction of efficiency methods except as he would be a help by keeping the records. Scientific management was very largely a question of whether a man was using his right hand when he should use the left or whether a man was used when power should be employed. It was necessary to keep in mind the value of the result obtained and the amount of energy expended in getting it.

Charles Hewitt, Philadelphia Rapid Transit Company, said that he wanted to congratulate the association on the work done by P. S. Young, co-chairman of the committee, who had given a great deal of time and thought to the discussion of the subject of scientific management and the compilation of the bibliography which was presented with the report.

In discussing the subject of what constitutes maintenance Mr. Hewitt said that during the deliberations of the committee it became very evident that a widespread divergence of opinion existed on this subject, not only among the members and accountants, but also among commissions. The sub-committee to which the consideration of this subject was referred received replies from twenty-nine commissions to a general letter sent to all of these bodies. Most of the commissions followed the system of the Interstate Commerce Commission, which had not given a precise ruling on this subject.

Mr. Hewitt gave one instance where two commissions having jurisdiction over a company differed regarding the charge for rent for a narrow strip of land on which a high-tension, long-distance transmission line was constructed. One commission thought that the rental should be charged to rentals, while another commission suggested that the expense be charged to maintenance of electric-line equipment. It seemed advisable that the association should start early in its consideration of this subject in order that its members and others might be guided properly as to the proper accounts to be charged for various classes of expense. Attention was called by Mr. Hewitt to the replies quoted by the committee, in which there was an intermingling of terms. The consensus of opinion, however, which corresponded with the judgment of the committee, was that maintenance was essentially the upkeep of the property and that any replacement beyond the original value of the thing renewed became a capital charge.

W. F. Ham, Washington Railway & Electric Company, stated that in connection with the work of the Accountants' Association he had been brought closely into touch with the Interstate Commerce Commission through the Bureau of Statistics and Accounts. Mr. Hewitt had really described the situation as Mr. Ham saw it. Whatever expense was required to keep the integrity of the property, Mr. Ham added, was maintenance. That which extended or improved the property over and above maintenance was new construction or betterment. He believed eventually that that was the way in which the problem would be worked out. At the same time it was easier to describe a general theory than to work it out practically in a system of accounting. If it should be assumed that the report of the committee would be adopted, it would appear that the classification was deficient. If it was assumed that a car was worn out in service or decayed, what was there in the classification that provided for the replacement of the car or writing off the

value thereof? It would be found that no account took care of replacement, and some such account was necessary. Just how this would be worked out was a matter for development. Assuming again that a power station was abandoned or a new power plant was constructed to take the place of an old one, the adoption of the theory that whatever maintained the integrity of the property should be charged to maintenance account would put therein the original value of property which had gone out of service. To place that, however, in the maintenance account would destroy the value of the operating statistics for comparative purposes. To what account should the cost of an engine or dynamo be charged if thrown out of service? While it was easy to adopt a general theory, it was not easy to adopt a practical scheme that would be satisfactory to the engineering, accounting and financial elements. He was impressed by the remarks of the committee that no system was complete unless it included all maintenance, and that maintenance included depreciation.

Mr. Emerson said that he had had a great deal to do on a large scale with questions relating to the maintenance of shop tools and locomotives. It had been difficult to find out the maintenance costs. One absurdity after another in the practice developed and made the scheme appear absolutely ridiculous. The proper treatment of this subject did not depend on the classification or the accounting. It depended on an inventory. Only through an inventory could the facts be learned. An annual inventory should be made so as to show specifically what changes had taken place.

Mr. Neal asked Mr. Emerson how he would determine the value of a car, for instance, that had been in service for three years. Most railways earned only 5 or 6 per cent on their capital, and an error in making a valuation would be serious.

Mr. Emerson said that there might be either an increase or decrease in values due to the improvements placed on the car or the treatment to which it was subjected in service, but he did not know how the question could be settled except through a specific inventory.

Martin Schreiber, Public Service Railway, of Newark, N. J., asked if the committee thought it would ever be possible to define maintenance costs without an understanding regarding the different degrees of maintenance. One man might maintain his property at 50 per cent of the reproduction value and another at 75 per cent. The one who kept the property at 50 per cent would show lower operating costs. The costs of the two properties, however, would not be fairly comparable.

T. E. Rust, Boston & Northern Street Railway, asked the position of the committee about the inclusion of costs of labor in various charges.

P. S. Young, Public Service Railway, of Newark, N. J., said that he thought Mr. Emerson had really pointed the answer to the question asked by Mr. Schreiber. Comparisons could not be made fairly except where the percentage of original cost represented by present value was known. Costs were really the costs of both labor and material together. Unless there should be a careful segregation of costs the construction account would be increased abnormally. From an accounting standpoint it was necessary to return to the question of value.

Mr. Schreiber said that the man who spent less on maintenance than he should spend received credit that he didn't deserve. He might have reduced the condition of the property. The question was as to the degree to which the property should be maintained. There was no question as to the large field presented by efficiency engineering at the present date, but there was not so wide an opportunity in the railway industry as in the manufacturing business. For instance, when a car was seen in the middle of the day carrying only one or two passengers it was apparent

to everyone that efficiency was not attained. Someone was losing money on the operation of the cars. But the cars had to be operated and what could be done about it? He was in favor of efficiency engineering, but it was not always possible to introduce the methods advocated. On a street railway one of the large elements of costs was that of operation of the cars, but up to this time no one had been able to propose a scheme to reduce this expense.

H. G. Stott, Interborough Rapid Transit Company, New York, said that maintenance comprised everything that was necessary to keep the plant in the condition in which it stood when received from the manufacturer; that is to say, everything that would keep the plant at 100 per cent efficiency. Under this plan there was no depreciation. A serious item, however, to be considered was that of obsolescence. It would require a prophet to know what provision should be made for this item. A great many plants would increase efficiency by taking out engines and installing turbines, effecting economy through decreased cost and reduced expense for labor. The cost of the old units, however, was in the accounts and the cost of the new was not a fair charge to capital account. He had always maintained that an amortization charge should be fixed at a certain percentage and revised at periods of three, five or ten years, so that finally the railway would have a fund to meet necessary expenses. When persons said they could operate a railway at a certain ratio they should include not only the maintenance charges but also a charge for obsolescence.

Mr. Hewitt said that the discussion had been sufficient to impress upon the associations the judgment of the committee as to the wide difference of opinion regarding the question of what constitutes maintenance. If the report did no more than to start the ball rolling so as to crystallize sentiment the committee would feel gratified that its work had accomplished something. The committee realized that it was difficult to take up the subject without discussion of depreciation. He thought that, as Mr. Ham said, there should be some account to provide for large replacements. This would avoid the variations that would otherwise creep into the charges to ordinary maintenance accounts. The conclusions of the committee pointed to the same necessity. The discussion by Mr. Emerson had suggested a new line of thought which only showed the wide divergence of opinion on the entire subject. The suggestion made by Mr. Schreiber might be brought before the committee for consideration during the coming year. One commission had used amortization as applying entirely to capital; for instance, it defined the expiration of franchises as amortization of capital. Mr. Hewitt expressed the wish that the association would continue the committee for further consideration of the subjects in the next year.

Mr. Schreiber said that some parts of a property could not very well be kept up to 100 per cent efficiency, if proper economy was to be exercised.

Mr. Ham moved that the report of the committee be received and that the work be continued for another year.

The joint session was then adjourned.

R. D. Nuttall Company, located at spaces 147 and 149, is displaying very extensively the products of its manufacture. The company has just completed its new works, and is showing a large photograph of them. In this connection it will be interesting to note that in 1888 the company occupied a building with about 10,000 sq. ft. of floor space, while to-day it is occupying a building containing over 180,000 sq. ft.

F. F. Stockwell and William W. Field, of the Barbour & Stockwell Company, of Cambridgeport, Mass., arrived in Atlantic City on Monday. As is their custom, they have no exhibit, but few customers and friends escape their cordial greetings.

WEDNESDAY'S SESSION ENGINEERING ASSOCIATION

President Harvie opened the session by the appointment of the following nominating committee: F. G. Simmons, Milwaukee, chairman; Charles Hewitt, Philadelphia; Charles H. Clark, Cleveland; William Roberts, Akron, and F. R. Phillips, Pittsburgh.

L. P. Crecelius then presented the report of the committee on power generation.

Mr. Crecelius said that in most plants the only instrument for the boiler was the steam gage. There was no way of determining the proper mixture of air or fuel or the rate of working. It was almost impossible to adjust the rate of working intelligently, and so the use of instruments of greater accuracy was suggested. The report also suggested the use of a more volatile fuel and hinted at the use of two furnaces for one boiler and the desirability of forced drafts. Mr. Crecelius described other features of the report, discussing it by subdivisions.

Charles Hewitt, Philadelphia Rapid Transit Company, said that the question of larger grates together with forced draft was now very pertinent in Philadelphia, New York and possibly in many other places. He understood that Mr. Stott had recommended, under light loads, the banking off of one fire and the running of the other boiler at a lower capacity with the other fire. Mr. Hewitt had had difficulty in doing that, possibly because of a difference in the design of the fronts and the grates. He found in doing so that smoke and back fire were forced through the hoppers. A representative of the New York Edison Company had told him that they forced boilers to 100 per cent and even higher rating on tests, but in regular work the boiler was forced about 80 per cent when exceptionally big loads came on. The question came up as to how far this economical forcing of the boiler can go under different conditions. It was a question where to stop in this forcing of the boilers. From what he had gathered it did not pay to go much over 30 or 40 per cent. Mr. Hewitt said that the question of using forced draft depended largely upon the coal. With a good soft coal it was possible with a well designed station to get natural draft which would give full rating out of the boiler. But with the finer grades of anthracite coal, on account of smoke, it became necessary to force the draft, and in using the forced draft there appears to be an abnormal loss of the physical particles, varying in accordance with the amount of the draft. To offset that, the tendency has been toward greater grate area, until at the present time grates that were twelve feet deep were being installed in Jersey City. It was expected to have the firemen throw the coal in part way, and then use a shover. The whole object of using these enormous grates with the forced draft was to reduce the rate of flow through the grates, and the loss of the finer particles of coal. In one station 600 tons of unconsumed carbon had been taken out of the soot chambers during one month. Thus it was a question as to how far to go with forcing the draft and enlarging the grates in order to save that coal. Mr. Hewitt had been very much interested in the diagram of Mr. Stott showing the variations from moment to moment in the output of the boiler.

William Roberts, Akron, spoke of the need for raising the personnel of the men in the boiler room and making them feel more that they were a part of a plant which was producing the right kind of power at the right time. He believed that forced draft was the best means for obtaining increased power.

E. J. Burdick, Detroit United Railways, said that in two large power houses he had a banking period, in one of more than 55 per cent, and in the other of over 40 per cent. Municipalities, sooner or later, would require forced draft to reduce smoke. Some years ago he established in connection with his power department a chemical laboratory and in connection with that a combustion department. Boiler

rooms were in the hands of this combustion department, and it was producing very remarkable results. Although the steam flow meters might not give fully accurate results, so far as steam economy was concerned, they did give us operating results of high value.

H. G. Stott said, in regard to the point raised by Mr. Hewitt as to banking, that so long as the draft was kept at about a quarter of an inch, there was no sign of smoke. He had run evaporation tests of double-end boilers, and found the efficiency was practically the same as that with a single stoker boiler, and apparently that was not very good economy. One could sacrifice a good deal in the efficiency of operation in order to save in fixed charges.

Mr. Stott had not the slightest doubt that the committee would be able to report during the next year that it was a practical thing to obtain 300 per cent rating on a boiler. He thought that with the moderate use of a forced draft and with high grades of coal the efficiency would be very good. It would not fall off more than five per cent. At present it was absolutely conservative to say that one could run boilers at double rating with efficiency and economy.

As to the pilot-tube readings, the variation in the moisture was so small that it could be neglected for practical purposes. There was less than one-quarter of one per cent variation in moisture in a twelve-hour run.

Replying to William Roberts, Northern Ohio Traction & Light Company, as to overloading and deterioration, Mr. Stott said that his eighteen boilers using double stokers had now been used for nearly five years. There was absolutely no sign of more deterioration in these double-stoker boilers than there was in the single-stoker boiler. These boilers were running above rating continuously. Of course, that does not apply to the furnace proper. The deterioration there was about 60 per cent more than a single stoker boiler. The boiler itself was actually cleaner than those having a lower rate of evaporation. Presumably this was due to the high velocity sweeping out the tubes and carrying out all the dirt with it.

T. E. Rust, Waterloo, Cedar Falls & Northern Railway, asked Mr. Stott what he considered the point of maximum efficiency in forcing a boiler merely from the evaporating standpoint.

Mr. Stott replied that the boiler itself had very little to do with the question. With one stoker he noticed that the best evaporation efficiency was about 80 per cent. That was raised to about 130 per cent. Another stoker apparently gave 150 per cent on the same boilers. It seems to be more a function of the furnace, the furnace arrangement and the stoker accompanying it than of the boiler itself.

DISCUSSION ON THREE-PHASE GENERATORS

The next discussion was on the best standard voltage and frequency to be adopted for three-phase turbo-alternators, with reference to size as related to voltage.

E. N. Blake understood that there were three rather distinct recommendations, namely, that the transmission potential should be 11,000 volts, that the generation potential should also be 11,000 volts, and that adding voltage changing transformers to introduce more reactance to the circuit was undesirable. As to the transmission voltages these figures should be used with a great deal of care in applying them to a large system transmitting through underground ducts. In investigating this question and making calculations as to the various voltages ranging from 6600 to 33,000, he was very much surprised to find that the limiting factor was not an electrical one, but, strange to say, the size of the duct. He had found that with voltages ranging from 6600 to 33,000 a 3¼-in. depth gave approximately the same carrying capacity for every purpose. His recollection was that the most efficient potential determined at that time was 22,000 volts, using the standard size duct. The generating voltage involved the matter of reactance. Three or four large companies were now introducing reactance either in

their old equipment or in new equipment. This question should be given further consideration. It seems to him that the generating voltage was not necessarily tied up with the transmission voltage. If the advantage of reactance was granted then the generating voltage was a matter of generator design and generator insulation and the transmission voltage was a matter of local conditions or a matter of economy to be attained in a given transmission system.

Mr. Stott said the report entirely confirmed his own opinion. It should be the general province of the designer to require reactance. It certainly introduced additional loss to make up very valuable space. If the same object can be accomplished by introducing reactance in a generator it would look as if that was the desirable way to do the thing. The question of transmission voltage over underground feeders was tied up absolutely till the question of getting satisfactory insulation of cables was settled. Of course the manufacturers quoted a higher potential than 13,000, but his experience with them so far had not been satisfactory. As shown in this report 11,000 volts came so near to being the theoretical voltage for transmission in cities that it seemed a pity to move away from what was absolutely a safe voltage on underground feeders.

Mr. Lake thought it was possible to introduce a generator with the lower generating voltage, thereby simplifying the problem of insulating the generating circuit, and the capacity of the commutator need only be one-half the capacity of the generator. In Chicago they had, in addition to introducing the one to one reactance, stepped up to 20,000 volts in a territory where there are lines from 10 to 18 miles in length. On the new station of the Boston Elevated Railway Company the generators were 6600 volts, and the transmission lines 13,200 volts. In St. Paul there were a couple of 25,000-volt cables that had operated successfully for a number of years. If the size of the duct in transmitting large amounts of power was taken into consideration a higher potential than 15,000 volts might be found more desirable than a lower voltage.

COAL SPECIFICATIONS

There was no discussion on the question of d.c. turbo-generators larger than 500 kw. Referring to the coal specifications, Charles Hewitt, Philadelphia, asked about the advantages and disadvantages of purchasing coal this way. They had before them two distinct specifications, one of which had for its present basis a medium priced coal and the other the highest priced coal. What advantages had the one over the other?

Mr. Bayne, Mechanical Engineer, Pennsylvania Coal & Coke Company, said that last year he had gone through several hundred specifications on coal purchased on the B.t.u. basis. They had been so widely diversified that it was almost impossible to give a direct analysis of any individual one; but the chief trouble seemed to be the impossibility of the mechanical engineer and the chemist getting together on a specification that would suit each particular plant. The specifications have not been acceptable to the coal man, which has been due to the fact that they have been drawn up by chemists, who know very little about furnace conditions or the actual burning of coal in the furnaces. The next trouble was lack of knowledge in sampling coal. Most plants have no methods whatever of sampling coal, leaving it to the fireman to take a shovel out of every wheelbarrow load or something of that kind. That was not fair to the company buying the coal nor to the coal man. His company did not object to bidding on a specification basis. In fact, it would be very glad to, provided it could find specifications that were acceptable to both sides. He had gone on the car and taken samples right along with other chemists and obtained an entirely different result in the same car. Coal was not a manufactured product. If a reasonable leeway were allowed in a specification prepared jointly by a mechanical engineer and chemist there was no

coal company in this country that would not be glad to sell on that basis.

Richard McCullough, St. Louis, said he had been buying coal on the B. t. u. basis for several year, buying about one-third of the coal on contract. A coal with 11,000 B. t. u. is considered good. He had a chemical laboratory to test the coal. In making a contract with the mines considerable latitude is permitted in B. t. u. and in the ash. If they run 200 B. t. u. higher than is called for by the contract a bonus is given and if they are 200 units below they are penalized. Similar rules are made for ash. The ash is fixed in the contract with each mine and a latitude of 2 per cent or 3 per cent is allowed in that on good coal. A deduction is made for moisture if it runs more than 6 per cent.

Mr. Rand, Boston, observed that the specifications mentioned only the quantity of ash. He had found that the quality of the ash was of importance, the fusing temperature, in particular, affecting the value of the coal for steam.

Mr. Stott said the beneficial result of their specifications was this: They always know what capacity they can expect from a boiler. Another improvement it gave them was that it made the cost of coal per kw-hour practically constant. The method of sampling was the root of the whole matter. They had a good deal of trouble getting samples fair to each party and so they took samples eventually from the center. It was done by a hopper taking out 10 lb, automatically from every two tons. These samples are thoroughly crushed and quarried, and crushed again to final samples of 20 lb. Too great care could not be taken to have equal parts lumped coal and fine coal. All analyses should be made on the dry basis.

At this point Martin Schreiber took the chair.

C. P. Crecelius, Cleveland, said that analysis of coal would not determine whether the fuel was right for the conditions or not. A boiler test was necessary. The success of the coal specification depended on whether the right kind of fuel was obtained for particular conditions, and that was based on price. As to coal having a peculiar ash it was manifestly a difficult matter to make a standard set of specifications cover all conditions.

Mr. Hewitt said that the fuel which had been purchased last year by him on this basis had not varied more than 15 B. t. u. and it was an even 1000 B. t. u. higher than the fuel purchased before, and at a lower cost.

Upon motion of H. H. Adams, New York, the report of the committee was accepted and the thanks of the association extended for its valuable report.

The meeting was then adjourned.

LADIES' CARD PARTY

On account of the inclement weather the ladies' party at the Golf Club scheduled for yesterday afternoon was called off and an informal card party substituted, which was held in the lobby at the Convention Pier. The ladies had their choice of playing bridge, euchre or five hundred.

Playing began at 3.30 and lasted until 5 o'clock, during which time refreshments were served. Twenty-four exquisite Irish lace prizes were distributed, seven being given in each division. The ladies winning in their different classes are as follows:

Bridge: Mrs. Wood, Mrs. Cummings, Mrs. Buckley, Mrs. Armstrong, Mrs. Maxwell, Mrs. Gonzenback, Mrs. Deming and Mrs. Nicholl.

Euchre: Mrs. Crabbs, Mrs. Hertzog, Mrs. Kerschner, Mrs. Dempsey, Mrs. Joel, Mrs. Oberlander, Mrs. Reynolds and Mrs. Hazelrigg.

Five Hundred: Mrs. Stieff, Mrs. Hubbell, Mrs. Cook, Mrs. High, Mrs. Adams, Mrs. Easty, Mrs. Collins and Mrs. Crowell.

An electric light and tramway company has been formed in Lujan, province of Buenos Aires.

ANNUAL MEETING OF MANUFACTURERS' ASSOCIATION

The annual meeting of the American Electric Railway Manufacturers' Association was held in Marine Hall at 4 o'clock yesterday afternoon. The attendance, while not large, was representative.

President Castle presided and presented the report of the executive committee. He stated that the membership of the association at the present time was 328, which was an increase of sixteen over the membership this time a year ago. President Castle urged the members of the Manufacturers' Association not to leave to the executive committee the work of soliciting new members, but each individual member should take up himself the responsibility of adding one or two names to the list. The report referred to the establishment of a permanent headquarters office in New York and the assistance which the establishment of this office had been to the executive committee. The amount of space occupied on the Convention Pier at the present convention, aside from the space occupied by track exhibits, was estimated at 76,370 sq. ft., which President Castle thought was a larger amount of space than had been used for exhibit purposes of any other railway convention. The president's statement indicated that the financial condition of the association was extremely satisfactory, although figures could not be given until the expenses of the present convention had been finally adjusted.

President Brady of the American Association spoke to the meeting for half an hour. After expressing his personal and official thanks for the assistance that the manufacturers had given in making this year's convention a great success, President Brady elaborated upon the opportunities offered by existing conditions for closer co-operation between the manufacturers and the representatives of the railways in meeting the present need for a widespread educational movement that would place the transportation industry in its right light before the public. He said that he was not prepared to suggest definitely the means whereby this highly desirable object might be accomplished, but as to the need for closer working relations he was emphatic and positive. Mr. Brady's remarks were received enthusiastically and the appreciation of them felt by the members of the Manufacturers' Association was formally expressed by a rising vote.

On motion made by J. R. Ellicott, James H. McGraw was invited to explain to the meeting what had already been done by a joint committee of the Manufacturers' and the American Associations in the matter of closer working relations between the two associations. Mr. McGraw referred to the fact that at the time the Manufacturers' Association was organized on its present basis at Philadelphia in 1905 it was the idea of many that the Manufacturers' Association should be an affiliated and not an allied association of the parent body, but at that time the authorities of the parent association felt otherwise. Now the situation had changed. The American Electric Railway Association felt that it would like to have in its various classes of membership a full representation of all the various interests that constitute the industry. Mr. McGraw pointed out that the Manufacturers' Association had never failed to live up to the full limit of its opportunities, and now that it had another vista of opportunity opened up to it, he felt that the manufacturers should rise to this opportunity and add possibly 3000 associate members to the main organization and through that means not only get into closer touch with the workings of the parent association and with the purposes which that association is endeavoring to accomplish, but with the manufacturers who by this means bear their full share in bringing about a better condition of public sentiment with regard to the public service corporations, upon whose prosperity the manufacturers so largely depend.

At the conclusion of Mr. McGraw's remarks, D. M. Brady expressed his hearty approval of what had been said by

Mr. McGraw and by President Brady of the American Association.

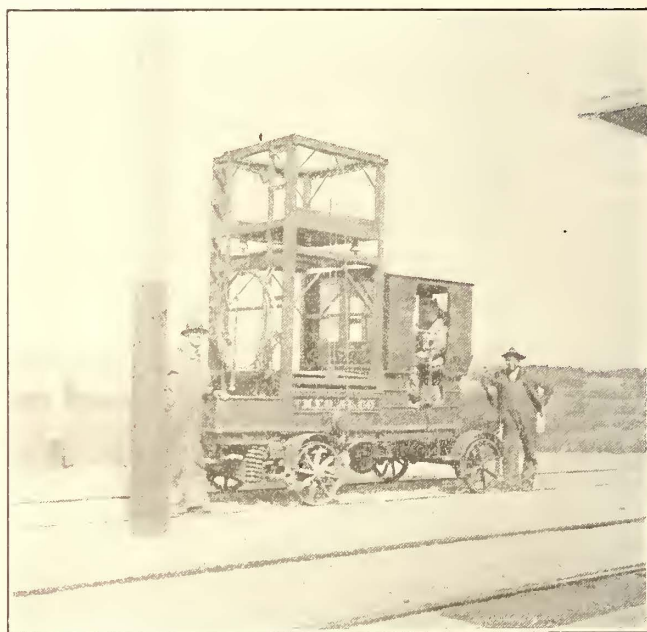
The annual election of five members of the executive committee to serve for three years resulted as follows: E. A. Hegeman, Jr., president U. S. Metal & Manufacturing Company, to succeed C. C. Castle; C. S. Hawley, president Consolidated Car Heating Company, to succeed himself; James H. McGraw, president McGraw Publishing Company, to succeed himself; H. C. Miller, Allis-Chalmers Company, to succeed J. R. Porter, and C. R. Ellicott, Westinghouse Traction Brake Company, to succeed J. R. Ellicott.

Messrs. H. C. Ebert, president Cincinnati Car Company, and W. L. Conwell, president Transportation Utilities Company, were recommended to fill the unexpired terms of the offices to which they had been elected by the executive committee since the last annual meeting of the association.

On motion it was ordered that the exhibit close at 2 p. m. on Friday.

GASOLINE LINE CAR FOR MILWAUKEE LINES

The accompanying engraving shows a very satisfactory automobile tower wagon built by the Milwaukee Electric Railway & Light Company and used by the line department. The car was made up from materials very largely on hand. It is propelled by a standard four-cylinder automobile engine of from 30 h.p. to 35 h.p. rating. The transmission is



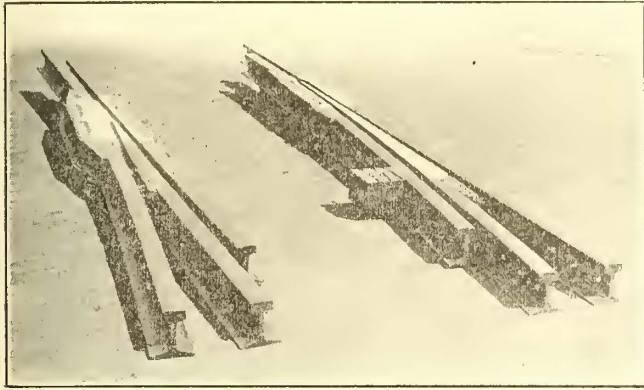
Gasoline Line Car of the Milwaukee Electric Railway & Light Company

of the friction type, by which the change of speed and the reverse are obtained by sliding a friction disk back and forth so as to take power from different parts of the driving disk. The friction disk operates an intermediate shaft which is connected to the front and rear axles of the car by chains. The control apparatus and the brake handle are arranged in the cab between facing seats so that the operator can always face in the direction in which the car is running. This car is used to maintain the overhead system between Waukesha Beach and Watertown and has been found very satisfactory, as well as much more economical than an electric car. This Watertown division is operated with a 1200-volt trolley.

The American Brake Company, St. Louis, Mo., is showing its automatic slack adjuster in the Westinghouse Air Brake Company's spaces 20-24.

LARGE NEW CARHOUSE AT LOS ANGELES

The Los Angeles Railway Corporation is now constructing a carhouse with a capacity for 300 cars of the Los Angeles Railway's standard type, which measure 44 ft. 8 in. long over all. The building was designed under the supervision of G. J. Kuhrts, chief engineer. The new structure will be 351 ft. wide by 624 ft. long and will contain twenty-four through tracks placed on alternate 12-ft. and 17-ft. centers. Each of the six carhouse bays will be 58 ft. wide between center walls and will be subdivided by a central row of columns spaced 20 ft. apart.

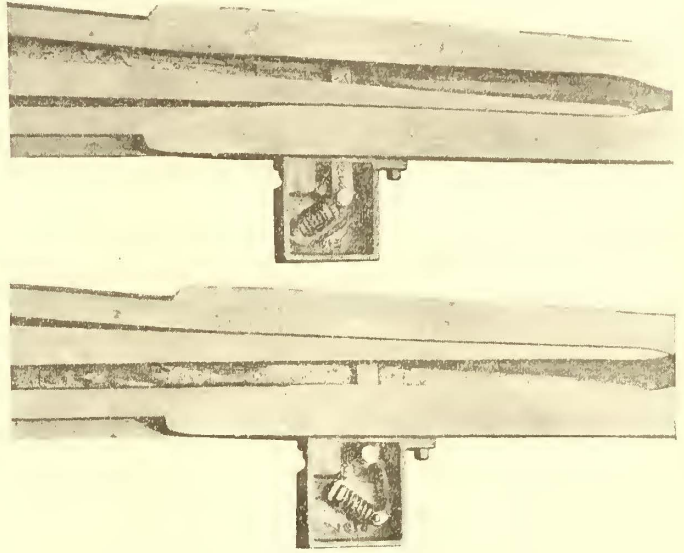


Switch and Mate of Dudley 100 lb. Rail

The structural features of this large new carhouse are of particular interest because they embody the use of reinforced concrete to make an ornamental building. The six bays of the building are alike in design and dimensions. Each is made up of six sections 104 ft. long by 58 ft. wide. Five connection joints are placed across the roof of each

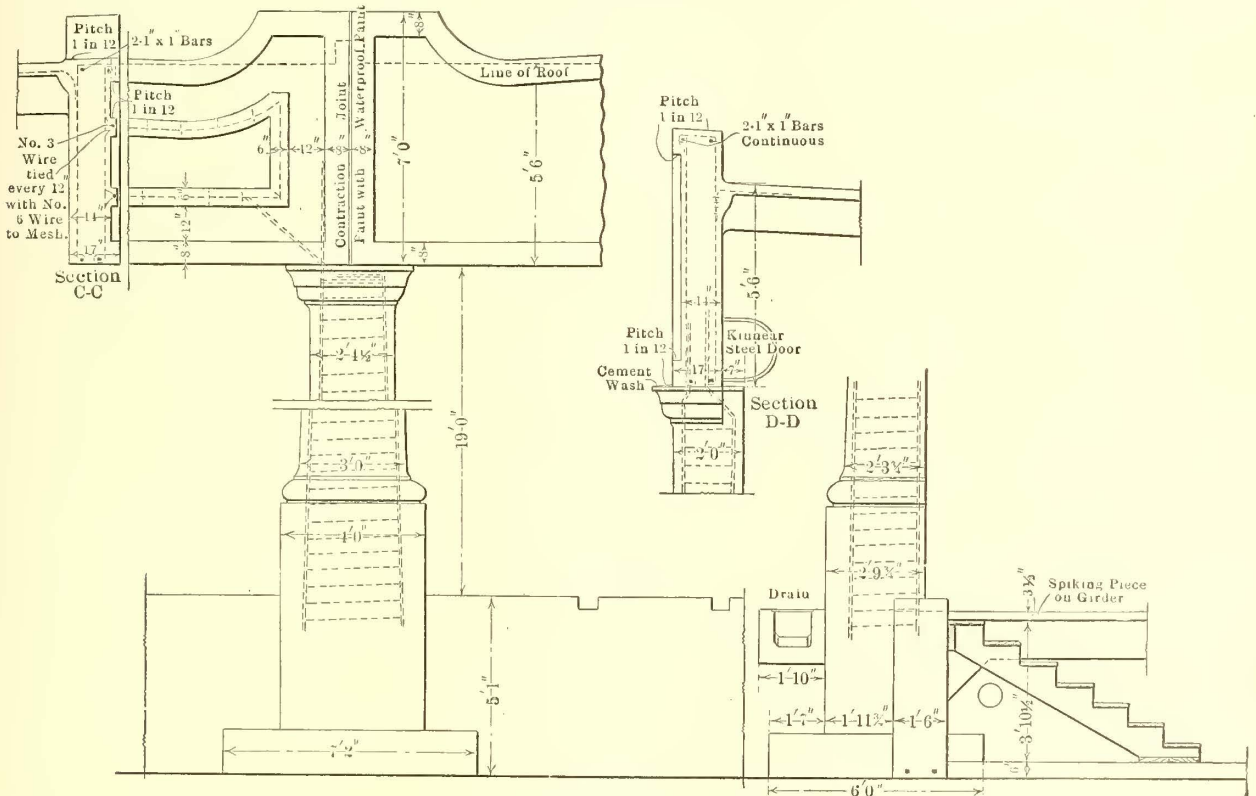
five fire doors, placed below the track level, will be equally spaced along the partition walls. The openings above the track level will be fitted with Kinnear rolling steel shutters, and the fire doors in the pits will be of the self-closing type. The roof will be composed of reinforced-concrete slabs, continuous from contraction joint to contraction joint.

Sections of the carhouse are shown in the diagram. The



Anti-Kicker for Tongue Switches

wall above the track openings will be of concrete reinforced with two layers of wire mesh and with 1-in. square bars. This concrete wall is carried by a series of reinforced-concrete columns tapering from 4 ft. in diameter at the base to 2 ft. 4 in. in diameter at the top. The openings between these columns will be closed with Kinnear rolling steel



Sections of Carhouse

subdivision of the building to provide for expansion and contraction of the long roof structure.

The six sections of the building are separated from each other by continuous fire walls, each pierced above the track level by three doors affording cross passage between the bays. The open type of pit construction will be used, and

doors. The bases of the columns at the ends of the building are connected by a reinforced wall 1 ft. 6 in. thick. Just outside of the row of columns is a cross gutter, 12 in. square in section, formed by 5-in. concrete walls. This gutter will lead the surface water away from the track entrances. Just inside the end walls are wooden steps

which have been constructed so as to lead to the pit floor.

The pit floors are made of concrete slabs 6 in. thick, extending from wall to wall. The stairways are placed at both ends of every pit.

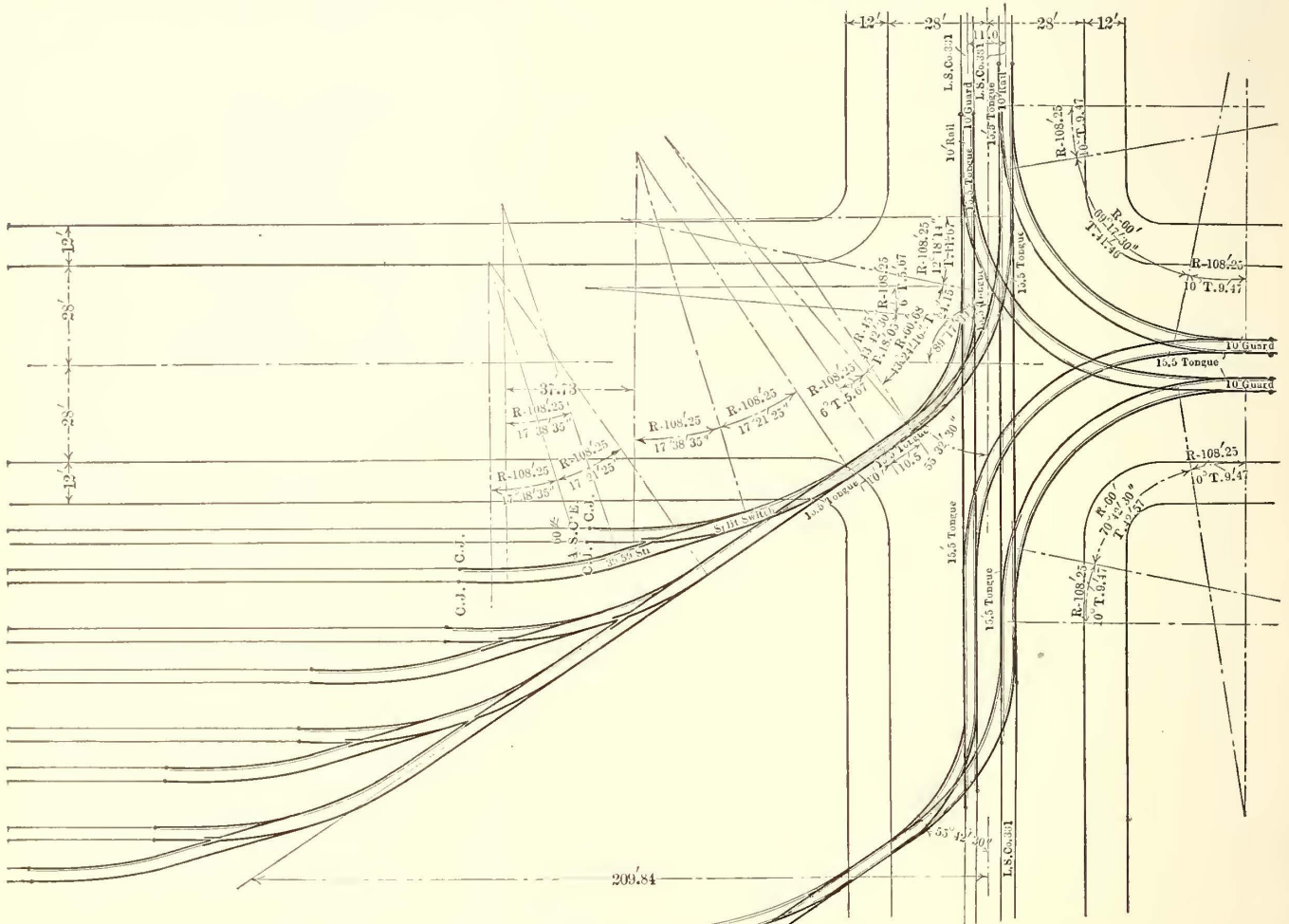
SPECIAL TRACK WORK

The special track work for the twenty-four leads from this large carhouse to the two tracks on the adjoining street, together with a double-track wye at the corner of the carhouse property, is now being manufactured by The Falk Company, of Milwaukee. The order for this work was placed through this company's Pacific Coast representative, Alphonso A. Wigmore.

The part of the special track work on private property will be made of 70-lb. standard T-rail, fitted where necessary with Cambria-F guard section, and will be the standard built-up type, with rigid frogs and split switches provided with standard ground throws. That part of the special track work laid on public property will be the hardened-

The type of anti-kicker spring box furnished by the special-work manufacturer for the switchpoints is illustrated in its two positions. The spring boxes are placed about 30 in. from the end of the tongue, where the throw is 1½ in. The tongues, which have a minimum length of 7 ft. and a minimum thickness of 2 in., bear on the switchboard floor for their full length. The throat ways are 1¼ in. wide x 1 in. minimum depth in the switches and mates and 1¼ in. wide x 1 in. minimum depth in the frogs. Clearance is provided for 3½-in. treads. All compromise joints between the 100-lb. rails and the 70-lb. rails and between the 70-lb. rails and the 60-lb. rails, which latter are used inside the carhouse, are to be made with Atlas compromise joints.

One of the accompanying drawings shows one-third of the special track work which is being provided for one end of the carhouse, including the double-track "Y" at the street intersection and the leads for the first eight of the twenty-four through carhouse tracks. The leads for the other six-



Portion of Special Work at Carhouse

center type of construction and will be constructed of 100-lb. Dudley rail, the Lackawanna section 1001. Cambria-D guard section will be used with this rail.

An illustration of the type of switch and mate as designed by the Falk Company for use in the 100-lb. rail portion of the track is presented. It will be noted that the mate is on the right-hand rail and the switch on the left-hand rail, these positions being the reverse of customary practice but standard with the Los Angeles Railway. The frogs are the Falk Company's standard shrunk-in hard-center type. In constructing these the manganese steel plates are set in the molds with the rail ends and are cast in place. The switch tongues and the switch and mate inserts are of manganese steel. The switch tongues are provided with the manufacturers' tongue-pin keying device, which affords an easy means for adjusting the tongue pin either horizontally or vertically.

teen tracks are divided into two groups of eight each with curves and special work similar to the eight tracks here shown.

At a meeting of the special committee appointed to judge the feasibility of municipal control of the Winnipeg Electric Railway it was decided by vote to let the railway remain in the hands of the private corporation.

The Danbury & Bethel Street Railway, Danbury, Conn., has presented the motormen and conductors in its employ with service stars and stripes, graduated according to their respective years of employment with the company. The insignia consist of gold stars, silver stars and blue broadcloth stripes. One stripe is given each year up to five. After five years silver stars are given.

MEASURES FOR WELFARE OF EMPLOYEES*

BY DANIEL T. PIERCE, NEW YORK

Mutual benefit associations are common and of long standing among city and interurban railways. Thoroughly organized and scientifically planned relief, pension and insurance systems are rare. There are many instances where employers act in the capacity of insurance company besides making very substantial contributions toward the deficits of mutual benefit associations. Unorganized welfare measures in other directions are also found upon a considerable number of railways.

There are very few railways that have adopted as a policy welfare systems founded on or inspired by recognition of any obligation to provide, at the employer's expense, for the temporarily disabled or superannuated employee and to insure dependents against immediate want upon the death of the wage earner. This neglect is not peculiar to electric railways. Few industrial concerns, even those whose human scrapheaps are largest, have assumed any definite responsibility for the welfare of their workers. That this responsibility must be assumed is evident from European experience and the trend of legislation here. And if the American employer does not take the initiative in establishing sick relief, pensions and insurance for his employees, this burden is likely to be imposed upon him in some form very much less agreeable than measures of his own devising.

In this country the strongest indications we have of ultimate possibilities in this direction have come in the form of enlargement of employer's liability and in the, to us, new contention that even in those cases of disablement classed as "unavoidable" the burden should not fall entirely upon the person injured by accident or disabled by sickness. But the best way to escape compulsory insurance and pensions and the whole paternalistic policy now generally adopted in Europe is to make such a policy unnecessary. The German employer's enforced contributions to disability, accident and pension funds now amount to five and one-half per cent of his wage account.

MOTIVES AND RESULTS

It makes every difference in ultimate results whether welfare measures are undertaken from motives of pure expediency or because the employer really wants to improve conditions of employment. No welfare plan will prevent labor troubles or even lessen their occurrence if it impresses the beneficiaries as something by which the employer expects to avoid a wage increase. And if that or something like it is the employer's motive the employee will find it out in more ways than one.

Such return as is obtained by the employer from welfare measures comes in the less direct and more intangible forms—in attracting and holding a better class of men and in creating such a spirit of attachment to the employer's interest as manifests itself in loyal, conscientious service. These things have a dollars and cents value, but they must be incidental to another reward—the reward which comes with the discharge of the duty to do something more for the faithful, permanent employee than to pay him his wages while he is able to work. If this is enough to do for the shifting and shiftless employee, it is not enough, judged by the standard either of expediency or obligation, to do for the man who spends his life in railway or any other service.

Many will deny that there is any obligation to care for the disabled employee and to provide at his death for those dependent upon him. This denial, however, is, I believe, based less upon the merits of the case than upon the fancied impracticability of doing systematically for a large number of more or less remote and scattered workers what is done without rule or system for old employees of the class which

comes in close contact with the employer and is known to him.

If there is any difference at all in the treatment accorded the two classes of men, those whose wage is smallest and who are not paid except for actual working hours should, but do not, receive the most consideration. Old Uncle John who sits at the president's door, or any long-service employee, is always "taken care of;" but old Uncle Billy, who has motored a car for fifteen years, perhaps after completing about as many years of horse-car driving, who knows or cares anything about him? Certainly not the executive officers of the company; they could not know much about the individual employee even if they wanted to, and this is the reason why we should do by rule for all deserving employees what is done for men who happen to be within the range of official notice.

DATA AND DETAILS

Coming down to details, such statistics and data as we have apply almost wholly to associations to the funds of which members contribute nominal dues. These figures show that the average death benefit paid by such associations on electric railways is \$212, and the average sick benefit \$6.50 a week. Eliminating from consideration what I have ventured to call the obligation of the employer, in regard to which there is, of course, room for wide difference of opinion, the objections to the mutual benefit associations are that they involve joint control with employees; require a large amount of administrative work, the collection of dues, etc.; that only about 50 per cent of employees take advantage of what such associations have to offer, which makes them only half as effective as a system supported by the employer and comprehending all employees. They also result in carrying large numbers of ex-employees on insurance rolls or in depriving such men of the benefits of their payments. The latter course is unfair and has been made illegal in many States.

It is contended, on the other hand, that employees most highly value something that they pay for, and that while the assumption of the entire cost of pensions and insurance by the employer will at first be greatly appreciated, it will finally be taken as a matter of course and a matter of right. The same thing may be said with equal truth of any plan, but in the one case the employees know that the employer is bearing all the expense, while if the employees pay any dues, however inadequate, they will feel that the benefits they receive are paid for by themselves and that no gratitude is owing to anyone. Furthermore, if the employer is assuming the cost of all the benefits offered by trades unions, and a pension in addition, this fact will retard, though it cannot be said that it will prevent, undesirable organization of employees.

If the mutual benefit association on old lines has any value from the employer's viewpoint, as a social center and as affording a harmless outlet for the tendency, found among all classes of men, toward some form of association, social activities and tendencies can best be encouraged independently of insurance, which is an intricate business proposition and one that should not be complicated with other things, however desirable in themselves.

SAFEGUARDS AGAINST FRAUD

The principles that should govern the payment of death benefits are the same as those I have outlined as applying to payments for disability. Such safeguards may be thrown about both that there is little chance of fraud or imposition. Sick benefits are not paid, as a rule, until the second week of disablement, and so, even if it were possible, it would not be profitable for the employee to lose a week's wages in order to draw \$1 a day for the limited time after that. In the case of both sick and death benefits it is not customary to make employees eligible until they have completed at least a year's service.

Pensions in almost all cases are carried wholly at the expense of the employer, and are paid only under such re-

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

restrictions as will limit pensioners to men who have been in continuous employment for a period of, say, twenty-five years.

The fairest method of fixing the amount of pensions is on the basis of a percentage, determined by length of service, of the average wage for a period of years preceding retirement. There should, however, be a minimum of not less than \$20 a month to protect the employee whose wage has been so small that on a percentage basis the pension would be inadequate.

The great preponderance of low-paid men in any industry can be depended upon to keep the average pension very close to the minimum stated. Payments figured on a basis of 1 per cent for each year's service of his average wage for ten years preceding retirement gives a man with an average wage of \$1,000 and twenty-five years' service a pension of \$250 a year, which is enough to keep a man from want. In such casual investigation as I have made of the life of pensioners, it appears that with an income of \$20 a month or thereabouts they become welcome guests in families where as penniless dependents they would be an unwelcome burden.

That it is possible to institute within reasonable limits of cost a sick and death benefit and pension system—all wholly supported by the employer—has been demonstrated by at least one large public service corporation and by a number of industrial corporations. The former company's estimates call for an appropriation of \$50,000 a year for this purpose, and its plan makes at least 8500 employees eligible for insurance and pensions. If, as indicated by these figures, \$5.50 per employee per annum will defray the cost of insurance and pensions it is easy to estimate the cost of such a system on any railway.

It should be stated that this cost estimate is founded upon very brief experience, and that if, as is hoped, insurance and pensions hold men more permanently in the service, an increasing number would be eligible, and the expense would enlarge in the same proportion. If, however, electric railway service can be made more permanent—that is, if the present small proportion of long-service men can be increased—it will be worth more than the cost in insurance and pensions.

Employment on city railways is not considered very desirable by the class of men that the railways want. We have plenty of applicants, but they are not all that they might be as to quality. Except for a certain minority found on all railways, motormen and conductors seem to be willing to leave railway service for almost any other employment. Street railroading does not appear to be adopted in most cases as a permanent calling, but merely as a makeshift. Those features of the work—such as the hours, wages and friction with the public—that make platform work among the less desirable employments cannot be greatly changed, and as they do improve other employments offer increasing advantages, so that electric railway service retains its relatively undesirable position from the workingman's standpoint. In view of these facts, it appears to be all the more necessary to counterbalance the real or fancied disadvantages of the service by making provisions for insurance and pensions.

LOAN FUNDS

Aside from employees' club rooms, which are not a part of my subject, there is another way in which street railways can help their men and themselves. This is by the loaning of small sums of money—rarely more than \$25—to employees whose misfortune or unusual requirements have got them into financial difficulties. Such loans should be made only in cases of real necessity, such as a birth, illness or death in the employee's family. Repayment in small instalments each pay day should be insisted upon. A loan fund of \$1,200 has been found adequate on a system employing 7000 platform men. It is possible, owing to the

constant repayments, to make each year loans aggregating many times \$1,200, and to accommodate probably 250 applicants. With such a fund open to the deserving men, there is no reason whatever why any employee (except those whose difficulties need excite no sympathy) should patronize the loan shark. In large cities the loan shark is a nuisance and sometimes a serious evil. Experience has shown that a carefully administered loan fund very largely eliminates the loan man, is a great help to employees, and enables the employing company to put such financial aid as it is called upon to render employees on a business-like footing.

While the control of welfare work of all kinds must be in the hands of executive officials, it is very desirable on large systems that the detail work, the making of investigations and the immediate contact with employees should be in charge of a welfare secretary. One reason for this is that the manner and spirit in which welfare work is done has much to do with its success. Furthermore, a connecting link (other than subordinate officials whose tendencies are not over-sympathetic) between men and management is a valuable aid toward the establishment of a good understanding and a good feeling.

LAST SESSION OF THE CLAIM AGENTS

The closing session of the Claim Agents' Association was held Wednesday morning at the Hotel Traymore. The first order of business was a paper on "How Can the Public Be Educated in the Prevention of Accidents?" by B. F. Boynton, Portland Railway, Light & Power Company, Portland, Ore. In Mr. Boynton's absence this paper was read by R. E. King, general manager of the same company. The paper was discussed by F. W. Johnson Philadelphia Rapid Transit Company; R. H. Schoenen, Lehigh Valley Transit Company, and others.

Upon invitation of President Drown, Arthur W. Brady, president of the American Association, addressed the meeting, after which a vote of thanks was extended to him by those present. A rising vote of thanks was tendered to the retiring president, Mr. Drown, for the excellent results he had achieved during his administration in increasing the attendance and the general interest in the work of the association. A vote of thanks was also extended to B. B. Davis, secretary and treasurer, for his continued efforts in behalf of the association and to the Traymore Hotel management for its many courtesies.

The nominating committee reported the following choice of officers for the ensuing year: President, H. K. Bennett, Fitchburg & Leominster Street Railway; first vice-president, C. A. Avant, Birmingham Railway & Power Company; second vice-president, R. H. Schoenen, Lehigh Valley Transit Company; third vice-president, W. F. Weh, Cleveland Electric Railway; secretary-treasurer, B. B. Davis, Columbus Railway & Light Company. These gentlemen were elected.

During the proceedings E. C. Carpenter, formerly in the claim department of the Indiana Union Traction Company and an ex-president of the Claim Agents' Association, made an address to the members and thanked them for their courtesy in inviting him to the meeting. Mr. Carpenter is now general manager of the Pittsburgh & Butler Street Railway.

The new president appointed the following committees: Executive committee: James R. Pratt, Baltimore; R. E. MacDougall, Utica; George Carson, Seattle; William Tichenor, Indianapolis: committee on index bureau: H. V. Drown, Newark; C. G. Rice, Pittsburgh; F. J. Whitehead, Washington; M. P. Spillane, Boston; B. B. Davis, Columbus; committee on ways and means: T. B. Donnelly, Cornellsville; Charles B. Brunner, Easton; C. B. Proctor, Memphis. L. V. Dixon, El Paso; committee on employment: C. J. McLeer, Schenectady; T. A. Cole, Los Angeles; M. S. Ransch, Milwaukee.

THE TOLEDO STREET RAILWAY SITUATION*

BY ALBION E. LANG, PRESIDENT TOLEDO RAILWAYS AND LIGHT COMPANY.

Much has been said in the newspapers from time to time about negotiations pending in the city of Toledo for the renewal of certain franchises under which the Toledo Railways & Light Company is operating, and from present appearances there will be much more to say before they are renewed, although there is ever present in the minds of the citizens, as well as in that of the company, the hope that a speedy settlement of the subject can be effected.

In the year 1885 three horse car systems were in operation, one being of standard gage, one of 3-ft. and the third of 3-ft. 6-in. gage, several miles of which were located on the sides of streets in the sidewalk bed.

About this date and in the three or four years following the city entered upon very extensive improvement of the streets by way of paving, thus imposing heavy expenses on the roads in reconstructing tracks and paying for pavements as required under their several ordinances.

During this period renewal ordinances had been easily obtained by each company running the statutory time of twenty-five years, and all roads had passed into a single ownership under the name of the Toledo Consolidated Street Railway Company. Subsequently the right to change the narrow to standard gage and extend tracks into new territory had been obtained, and work was actively going forward when electricity as a motive power made its appearance, and the right to change from horse to electric motive power was asked and readily granted by Council.

Added to the work of reconstructing tracks as above mentioned, a power house was built, new cars were purchased, and in the four or five years following very large expenditures were made necessary to meet these conditions.

One of the earliest electric roads, fully designed and operated as such, and backed by the Thomson-Houston Company, was constructed in our city in the year 1888, and extended from the heart of the city into the suburbs, a distance of about 2½ miles. It was built to demonstrate the practicability of operating surface cars by the new power, and notwithstanding that there was little if any natural traffic tributary to it, people from all parts of the city and from neighboring towns eagerly sought a ride over it, and for several months it did a rushing business. This road later became a part of the Consolidated system. From day to day during this period electricity as a motive power grew in popularity, and the promise of its great economy over the expense of operating by horses was so clearly demonstrated by engineers and sales agents that the tales of the "Arabian Nights" in the light of subsequent experience sounded very commonplace.

In 1889 the Toledo Electric Street Railway Company was incorporated and procured from the City Council the right to construct and operate a street railway in certain sections where transportation facilities were really needed, but there was no way for it to reach the heart of the business district except over the tracks of the horse car company. The laws of the State then, as now, permitted the joint use of tracks, 1 mile of old for every 8 miles of new track built, and in order to procure the necessary mileage, the horse car lines were paralleled, in many cases for long distances, in territory where traffic was insufficient properly to support one road.

This great promise of economy led the promoters of the electric road to offer reduced rates of fare—cash fare 5 cents, twenty-four tickets for \$1, six for 25 cents, five for 15 cents, good between the hours of 6 and 7 in the morning and evening; 1 cent for children under eight years of age—1 per

cent on gross earnings, and other unusual concessions, to the city, thus facilitating the passage of the coveted grant. At the time this grant was made the existing company charged a 5-cent cash fare and voluntarily sold and has since continued to sell eleven tickets for 50 cents, charging children under ten years of age 3 cents, and issuing transfers to all lines embraced in the Consolidated system.

The effort on the part of the electric company to gain entrance to the business district over the horse car tracks was stubbornly contested in court, and continued for two or three years at great expense to both companies, but finally ended triumphantly for the electric company.

The unscientific and haphazard way in which the roads had been laid out resulted in one line competing with another to the detriment of service on both, constant friction between employees, and imposing extraordinary costs of operation and rapid depreciation. It was not difficult to foresee an early termination of such a situation, and it came in 1896, when all the lines passed under a single ownership. Immediately thereafter application was made to Council to make a new grant with uniform terms and conditions, eliminating some of the parallel lines and double-tracking others, and offering not only an improved service but a lower rate of fare than the majority of our patrons were then paying, with transfers good between all lines in the city, coupled with other concessions more favorable to the city than had existed theretofore. This application was promptly refused. The mileage at this time was greater in proportion to population than in any American city, but had this excess mileage been properly placed population would have followed it, and the burden of the company not only lightened, but the city at large greatly benefited. The company was therefore forced to continue operation under these disadvantages to await the growth of population, in the meantime making no extensions of track into territory that needed transportation facilities and building only such double tracks as necessity required. Rates of fare are still collected in accordance with ordinance requirements, and until about three years ago, when the company voluntarily inaugurated a system of transfers between all lines upon the payment of a 5-cent cash fare, passengers were required to pay two fares to reach certain sections of the city.

Many of the grants overlap each other in the length of time they run on the same street, and out of a total of 68 miles of streets occupied by tracks the city is now claiming that on about 9 miles our rights expired in November, 1910.

Under a former management, in 1904, a second effort was made to effect some changes and improve the transportation facilities of the city, but the subject later became engulfed in politics and the application was refused. This is briefly the story of franchise negotiations since the advent of electricity as a motive power down to the year 1908. Since 1904 in every political campaign, although no claim was made that any grants had expired or would expire until 1910, candidates for office have declared that no street railway grant should be made except on a basis of 3-cent fares; hence during this period no new tracks have been built into new territory and no new construction carried on not absolutely required to conserve the business. The feeling has been so bitter, fostered largely by some of the newspapers of the city, that Council was afraid to, or at least would not, grant a right even for a switch or curve, no matter how important such right might be to facilitate the operation of cars, accommodate shipping interests or otherwise benefit the company and our patrons. This spirit of antagonism has put a stop to the construction of a large terminal station estimated to cost in excess of \$250,000, and also curtailed the shipping interests of merchants and manufacturers using the several interurban roads to reach their customers in adjacent towns.

With the hope of removing the embargo, so to speak, the present management of the roads called on city officials in

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

the autumn of 1908, and said that 3-cent fares with transfers in Toledo are wholly impossible if there is to be any return on the capital invested, but we were met with the statement that nothing could be done until the Cleveland negotiations then pending had progressed to the point of proving that 3-cent fares were impracticable. Later an adjustment of street railway matters was made in Cleveland on the basis of a sliding scale of fares, with which all are familiar, following which, on March 28, 1910, we requested the Mayor and Council to take up the subject of renewing the franchises which by the terms of the original grants would soon expire, with a view of arriving at a settlement of all questions involved fair and equitable alike to the city and to the company, and in so doing offered to furnish the city with every facility for an examination of our street railway properties and books, showing the actual cost of carrying passengers, the capital required for future developments, and all such other facts and information as might be desired. In due time our invitation was accepted, and the city appointed a firm of Cleveland accountants to examine our books, every facility being furnished them to do so.

After the accountants had examined our books and reported their findings, the same accountants requested that we furnish them in great detail with an inventory of our property. This, of course, we declined to do. We said, however, that "if in the course of our negotiations with the city it should become necessary or desirable for the city of Toledo and this company to agree upon a method of reaching the valuation of our street railway property as part of a comprehensive solution of the franchise question, we shall be pleased to present to any board of engineers upon whose selection we can both agree all such data and information as may be required by such engineers in making such valuation." In reply to this offer the city declined to appoint an engineer, but instead asked for an inventory to be turned over to the accountants. We therefore employed a competent firm of engineers to make a complete inventory, and handed the same to the city on the first day of November, 1910. In December following the Mayor addressed to the company a communication outlining his views as to the modern theory of the relations between public service corporations and municipalities; reiterating a belief that he and his administration believed that a rate of fare fixed at 3 cents, with universal transfers, was possible under certain conditions; saying that if 3-cent fares were unjust then the people would not insist upon them; "that these several conditions therefore make it necessary finally to determine the true value of the property employed," etc., and suggesting "that the next step in these negotiations is logically the drafting of an ordinance recognizing these broad general principles and providing for their practical and specific application," etc. Replying to this letter, we asked the Mayor to cause to be drawn an ordinance based upon the principles he had enunciated in his letter, so as to put matters in a concrete form for public discussion (which he had requested), leaving blank spaces for the insertion of valuations of rates of fare. The preparation of the ordinance was committed to the city solicitor, and possibly through some misunderstanding was printed and distributed before being submitted to Council for its approval; but it was a wide departure from the lines and theories outlined in the Mayor's letter. The city solicitor's office had evidently procured copies of various ordinances under which roads were being operated in this country and Canada, and extracted from them all their most burdensome conditions and incorporated them into what was called a tentative ordinance as a proper basis for an easy solution of the franchise question. One reading of the ordinance was sufficient to convince any practical operating man that a fare of 10 cents to 15 cents would not produce enough revenue to meet daily operating expenses. Other communi-

cations on the subject were passed between the representatives of the city and the company, which finally resulted in an agreement to hold open negotiations in the Council chamber to discuss the whole subject and try to agree upon the usual conditions of an ordinance, leaving until the end the subject of valuations and fares. Several meetings were held and many provisions agreed upon, while others were rejected, until the subject of fixing a valuation was the next necessary step in our negotiations. We therefore suggested to the city the appointment of a competent board of appraisers, one by the city, one by the company, and the two so named to select the third competent disinterested man, and thus appraise the property. This was followed by the city appointing Professor Bemis as its appraiser, at the same time suggesting the United States judge in this judicial district as the third man. Believing that a proper person to appraise a property embracing so many elements is a man who by training and experience is qualified to deal with the subject, our negotiations with the city have, for the time being at least, come to a standstill.

Since negotiations have been interrupted all sorts of drastic measures have been proposed and discussed, among them being the imposition of a rental charge for the use of the streets where rights have expired as claimed (a procedure clearly not authorized by the laws of Ohio), ejection from the streets, etc., and Council has figured out what it considers to be a proper rental charge, computed from November 10 last, at the rate of \$250 per day, and the city solicitor has brought suit for its recovery.

In the meantime another political campaign has opened up, and the old bogie of standing pat for 3-cent fares is being used as a recommendation for election or re-election, as the case may be, and the subject that is as vital to the growth and development of the city as it is to the best interests of our company is still pressing for solution, as it has been for many years.

During all these negotiations there have been some good business men in the Council, men of decision and sound judgment, and had they asserted themselves with courage at the opportune time the hypocrisy or political cowardice of their associates could have been easily exposed, and the whole subject would have progressed along sensible business lines that would doubtless soon have brought order out of chaos. It must not be inferred from what I have said that some officials have not earnestly and seriously endeavored to bring about a settlement, but the public mind has been so poisoned by the abuse of capitalists and corporations in general for so long a time that many men, especially those holding public office, have become so intimidated that under no circumstances can they be betrayed into a defense of either. Toledo is no exception to the general rule in this respect, and the facts cannot be disguised.

I have many times said in public and private that the manufacturing interests of our city, as well as our real estate and banking interests, can in no way be as rapidly stimulated and improved as by a speedy and just settlement of the franchise question. We have a large body of very intelligent and energetic young business men, and they, as well as citizens generally, are beginning to discuss this phase of the matter, and when they become fully aroused there will be "something doing," as the boys say, and Toledo will be the gainer.

This represents the franchise situation in Toledo to-day, briefly stated; but, being naturally optimistic, I am hopeful that the subject will soon receive that careful and unbiased consideration its importance deserves, and that this will result in a settlement of our differences in a manner mutually advantageous to the city and to the company.

The Tool Steel Gear & Pinion Company reports that among several contracts awarded it last month the latest is from the United Railroads of San Francisco.

THE EFFECT OF ELECTRIC RAILWAY OPERATION ON TAXABLE CITY PROPERTY*

BY GENERAL GEORGE H. HARRIES, VICE-PRESIDENT WASHINGTON RAILWAY & ELECTRIC COMPANY

While there is an overflowing stream of popular sentiment as to the benefits accruing to electric railway companies by reason of an imaginary public generosity in the matter of street-occupying rights, there is nothing in legislative procedure, on the lecture platform, or in the press, with respect to the error of such belief, nor is there even local admission of the actual facts. In spite of the rapidly and tremendously increased number of stockholders whose experiences have been and are exceedingly painful, there still remains the aggressive, countrywide belief that electric railway enterprises must be enormously profitable and that their vast supposititious wealth is due wholly to the mistaken liberality of each charter-giving or charter-selling community.

During the horse-car era and through the days of cable operation the lines were comparatively short and were invariably on busy streets; a reasonable gross income being assured before the investors were called upon to worry over that discounting and sometimes disturbing power which we term "operating expenses." But the incoming of the overhead trolley wrought magically. Strides toward the suburbs became record-breaking leaps. The sociologist foresaw the solution of the slum problem and was encouraged. The municipal authorities had new cause for pride. The rapid-transit organizer was a superior sort of being. The stockholder was hailed as one deserving of confidence, praise and compensation. The public smiled amiably.

What have the years developed? The fulfilment of the farmers' golden dreams; the brokers' opulent visions transmuted into solid cash; the sociological theory a many-times accomplished fact; tremendous municipal growth of the most desirable sort with enormous increase in municipal income; and electric railway construction, equipment, service, indebtedness, deficits, receiverships and strife far beyond the initial thought of any of us who basked in the pleasing sunshine in that seemingly long-ago time when city transportation really began to be.

In this brief paper are set forth figures which should show conclusively where lie the benefits which have come to one city—the National Capital—as a result of individual courage and corporate effort.

Because of the difficulty of obtaining the assessors' figures as to values on specific streets prior to 1902 the comparisons generally are for the eight years following that date, although that method works materially to the disadvantage of the railway case. With respect to the preceding years it may be sufficient to say that all electric-railway operation other than in the heart of the city had been conducted at a net loss which so terrified local banks that when consolidation measures were planned the whole sum needed to make them effective had to be secured from outside interests.

BENEFITS FROM EXTENSIONS

Now as to the relative benefits: In 1902 a total of 406 acres stretched alongside an extension had an average assessed value of \$348 per acre; brought up in eight years of operation from \$40 per acre. In 1905 the average assessed value was \$968 per acre. In 1908 it was \$1,013, and in 1911 it was \$2,370; an increase per acre in assessed value of 601 per cent, while the city's tax revenue from that property was, of course, correspondingly increased. On this same line was a famous old-time estate of 352 acres. This was sold in 1888 for \$30,000; practically \$85 an acre. To-day the least desirable of it is bringing 25 cents a square foot,

while the better portions are 40 cents or more per square foot.

The railway and the railway only is responsible for the difference between \$85 per acre and \$13,000 per acre. It is a reasonable conclusion that within the past five years this line has added \$8,000,000 to land values in its immediate vicinity. The railway that did the work piled up a deficit in excess of \$200,000, and the deficit, decreasingly, continues.

An extension of less than a mile of conduit construction road brought into the real estate market 210 acres in the northwestern section of the city. In 1902 the average assessed value was \$553 per acre. In 1905 it was \$950. In 1908 it was \$2,735 and in 1911 \$5,701, an increase of 931 per cent. Since the completion of this extension the aggregate of property values jumped, in response to transportation facilities, to nearly \$10,000,000. For the right to extend its lines one mile the railway company was assessed \$25,000 by Congress. The construction cost was in excess of \$100,000. The company has not yet wiped out the deficit which accrued during the years when it was engaged in making many fortunes for other people and in adding largely to the city's income.

One of the most interesting lines in the exhibit has had a hard time from its beginning. Originally a horse-car line—then electrically equipped, later the victim of a pneumatic exploitation and investment, then completely reconstructed for electric service—it has been the most persistently hammered proposition at which the Washington public ever threw brickbats. It is directly responsible for fully \$8,000,000 of increased values and its books show with torturing exactness that it has piled up a deficit of \$417,960.17.

Since 1900 one of our lines toward the western edge of the District has been doing a great deal of development work, increasing values considerably in excess of \$3,000,000. The bank examiner would say that it is at this time \$148,000 short in its accounts.

Other development lines are struggling bravely for the public welfare. One has succeeded in pushing land values from \$100 an acre to \$1,000 an acre throughout a stretch of territory three and one-half miles in length and two miles wide. This particular public benefactor is \$27,484 in arrears, just now.

Other lines, whose owners mourned over deficits for years, but that are now beginning to see daylight, are conceded to have given to the collector of taxes his percentage on more than \$13,000,000, but have never given to their stockholders one penny of dividends. The securities that we sold at par are even now to be purchased at an average discount of about seventy-five per cent.

A little more than twelve years ago what is now the Washington Railway & Electric Company's system consisted of eleven separate and distinct railway companies. One of the first moves made by the then holding company was to open up free reciprocal transfers between these independent companies. Discussing railway matters with the president of a local trust company and a great building association, who had many things critical to say of us, and whose conservatism is one of Washington's proverbs, he said that our transfer system—to the effects of which he had given much thought—had added \$50,000,000 to property values in the District of Columbia.

How do the books balance? The authorities—never willing to concede overmuch to public utility corporations—are agreed that electric railway development in the District of Columbia during the period covered by this paper has added directly about \$46,000,000 to land values (without considering the vast transfer benefits) and is responsible for a steady increase which in a large part of the territory now exceeds one hundred per cent annually.

The railways that did the work have accumulated a deficit of more than a million dollars with further deficits in prospect for two or three years to come.

Who is the debtor?

*Abstract of address made before American Electric Railway Association at Atlantic City, N. J., Oct. 9-13, 1911.

REPORT OF THE JOINT COMMITTEE ON ENGINEERING ACCOUNTING*

P. S. YOUNG, CO-CHAIRMAN; A. D. McWHORTER, CO-CHAIRMAN; N. E. STUBBS, F. B. LASHER, C. E. THOMPSON, A. F. ELKINS, CHARLES HEWITT, H. H. ADAMS, E. O. ACKERMAN AND JOHN W. CORNING

Your committee during the past year has held two meetings and at the first meeting the following sub-committees were appointed:

Sub-committee on review of 1910 report: H. H. Adams, chairman; N. E. Stubbs, John W. Corning.

Sub-committee on what constitutes maintenance: Charles Hewitt, chairman; E. O. Ackerman, F. B. Lasher.

Sub-committee on inter-department charges: A. D. McWhorter, chairman; C. E. Thompson, A. F. Elkins.

SCIENTIFIC MANAGEMENT

So much has been heard in the last few months about "scientific management" and its relation to efficiency that your committee has thought that mention of this subject might bring about a discussion of the application of its principles to shop management and so prove of value.

F. W. Taylor, who may be termed the leader in this movement to develop the producing capacity of the industrial world, has formulated these four fundamental principles of "scientific management":

(a) The development of a science for each element of a man's work, replacing the old "rule of thumb" method.

(b) The scientific selection and training of each workman.

(c) The hearty co-operation of the management with the men in order that the work may be done strictly in accordance with the principles of the science which has been developed.

(d) An almost equal division of the work and the responsibility between the management and the workmen, where in the past the greater part of the responsibility was left by the management to be shouldered by the workmen.

It can be said at the outset that those advocating "scientific management" have been greatly hampered by the failure of both employee and employer thoroughly to understand these principles and the advantages to be obtained by both from their application. The laboring man on the one hand has been afraid that it was another scheme to get more work out of him without due compensation, and back of that has been the thought that there was just so much work to be done, and that if each man did more work a number of men would be thrown out of employment and wages would drop because of the anxiety of these men to get employment. The employer has wanted to be shown practical results. He has so often seen the downfall of attractive theories, presented by men of glib speech, when conditions were met not within the field of vision of the originator, that he has become somewhat skeptical. The laboring man's fears are unfounded. Restriction of output does him more harm than anyone else. The more wealth there is produced the greater becomes his share of it. Increased production means increased consumption. The world's appetite for commodities is insatiable; it is limited always by the commodities produced. The advocates of "scientific management" say that by the selection of the men most fit for each particular job and by the development of these men to the highest state of efficiency in their work the earning power of these men is increased, and such men as fail to meet the tests are not injured, for experience has shown that by finding other work for which they were better fitted their condition has been improved.

The practical man who is an employer must admit that the "scientific management" advocates have proved their case when they point to the industries where the science has been

applied for a long time, and to the instances of efficiency found therein.

"Scientific management" recognizes the importance of initiative in the workman and encourages it in every possible way, but it goes farther than any of the so-called initiative and incentive plans whose purpose is increased efficiency by supplementing the individual effort of the workmen by the application of the principles recited above. The system of pay involved is subordinate to many of the other elements. The workman is not allowed to be spurred on by hope of reward without proper guidance, but each task is scientifically studied and both speed and workmanship are carefully considered throughout each step of the operation. A change in the relation between the employer and the employee is gradually brought about. The management comes to be looked upon as the guide, counselor and friend of the employee and a complete change in the mental attitude of both toward their common work through this co-operation is made possible.

Before an attempt is made to apply these principles, careful study of all the conditions should be made. Without full knowledge of the probable effect of these principles when applied to any particular problem, success is impossible.

The committee believes that the accountant and the engineer can meet on common ground in studying this great question of efficiency, and it also believes that a realization of the possibilities of improvement in our industry through a study of what has been accomplished in other industries will be stimulating and instructive. It has, therefore, added to this report a bibliography of the subject.

REPORT OF SUB-COMMITTEE ON REVIEW OF 1910 REPORT

The sub-committee, in reviewing the report submitted to the joint session of the Accountants' and Engineering Associations at the 1910 convention, found from the discussion that there seemed to be a lack of knowledge as to the flexibility of the subdivisions of the accounts suggested, and also as to the possibilities of further subdivisions of the sub-accounts of the 1910 report.

In order to throw further light upon the subdivision of accounts as suggested, your sub-committee has considered it advisable to elaborate the subdivision, and there is submitted a statement which follows, giving an outline of a further subdivision of some of the items contained in the 1910 report; these further subdivisions are submitted only as illustrations of the flexibility of a subdivision of this character.

The sub-committee fully appreciates that under certain conditions, particularly on the smaller properties, the subdivisions, as submitted in last year's report, are too extensive to be put into practice; also that the suggestions of a further subdivision are such as may only be used upon some of the larger properties; but subdivisions may be so arranged as to meet the requirements of the small or the large properties.

In the statement the sub-committee has revised where necessary the numbering of the sub-accounts, as in certain cases in the 1910 report the numbering was in error.

The sub-committee, in considering the discussion of last year's report, not only covered the discussion at the Atlantic City convention, but has also considered the discussion which took place at the convention of the Street Railway Association of the State of New York, held on Dec. 7, 1910.

In the discussion at the Atlantic City convention a letter from James D. Andrew, superintendent of power stations, Boston Elevated Railway, was read, in which it was suggested that sub-account 3001 cover maintenance of prime movers, and that pumps be put in sub-account 3004. Your sub-committee has given this question careful consideration, and after consulting various authorities, finds that it is the usual practice to consider pumps as auxiliaries, and it therefore has to suggest that the item of pumps be placed with the items of auxiliaries in sub-account 3004.

Under the sub-accounts covering the maintenance of rolling stock, the committee has made further subdivisions and

*Abstract of report read before the American Electric Railway Accountants' and Engineering Associations, Atlantic City, N. J., Oct. 9-13, 1911.

added two items which were not subdivided last year; that is, the items of heaters and repairs due to accidents.

The sub-committee has also considered the question of scrap credits for the various months of the fiscal year.

In the 1910 report there was included a method of handling scrap and accounting for same on a monthly basis. This part of the report your sub-committee considers an excellent method where the scrap is sold and accounted for monthly.

In the discussion of this portion of the 1910 report the question of allowing scrap to accumulate for favorable prices and the disposal of the same at other than monthly intervals was brought out, and your sub-committee considered it advisable to deal with this question, together with the accounting features, particularly the question of allowing credits for scrap as accumulated monthly. The following method is suggested:

Any scrap that is accumulated should be turned into the storeroom, when the storeroom or scrap account (if an account of this character is kept) is charged, and the proper operating or construction account, work order or job order is credited with the estimated value of the scrap. Forms Nos. 1, 2 and 3, in triplicate, as recommended in the 1910 reports for scrap material returned, are recommended for use in connection with the turning in of the scrap, upon which the account to be credited should be noted.

A monthly summary is made of these accounts, which shows the total charge to storeroom or scrap account, and the accounts or order numbers to be credited.

As the scrap is sold, credit is taken to the storeroom or scrap account, in which there will of course be some difference, as the amount actually received will be different from the estimated values when turned into the scrap account.

If a scrap account is carried, it may be carried as an open account, and adjustments made by raising or lowering the prices of scrap when turned in. If it is desired to balance the scrap account, this may be done at the end of each fiscal year.

The forms submitted for the handling and accounting for scrap in the 1910 report are recommended for use in connection with the scrap handling and accounting.

ACCOUNTS IN THE RECOMMENDED SUBDIVISION OF OPERATING MAINTENANCE EXPENSE ACCOUNTS, IN WHICH AMENDMENTS ARE SUGGESTED

1910 REPORT.	1911 SUGGESTIONS.
ACCOUNT No. 30—MAINTENANCE OF POWER PLANT EQUIPMENT:	
3001 Maintenance of engines, turbines and pumps	3001-A Maintenance of engines.
3002 Maintenance of boilers, including furnaces, stokers and settings.	3001-B Maintenance of turbines.
	3002-A Maintenance of furnaces, including grates and grate supports.
	3002-B Maintenance of stokers.
	3002-C Maintenance of boiler settings.
	3002-D Miscellaneous boiler repairs.
3004 Maintenance of auxiliaries, including economizers, condensers, cooling towers, ash and coal elevators, other elevators, etc.	3004-A Maintenance of pumps.
	3004-B Maintenance of economizers.
	3004-C Maintenance of condensers.
	3004-D Maintenance of heaters.
	3004-E Maintenance of ash and coal machinery.
	3004-F Maintenance of coal towers.
	3004-G Miscellaneous auxiliary repairs.
3005 Maintenance of electric plant.	3005-A Maintenance of d. c. generators.
	3005-B Maintenance of a. c. generators and compensators.
	3005-C Maintenance of exciters.
	3005-D Maintenance of rotary converters.
	3005-E Maintenance of transformers and cooling systems.
	3005-F Maintenance of switchboards, including bus-bars, oil switches and instruments.
	3005-G Maintenance of storage batteries and charging outfits.
	3005-H Wiring.
	3005-I Miscellaneous electrical items.

1910 REPORT.	1911 SUGGESTIONS.
3006 Miscellaneous, including such items as steam gages, steam and water meters, feed water controllers, damper regulators and similar devices.	3006-A Cranes, hoists, etc.
	3006-B Miscellaneous steam instruments, etc.
ACCOUNT No. 31—MAINTENANCE OF SUBSTATION EQUIPMENT:	
3101 Maintenance of electric plant.	3101-A Maintenance of rotary converters.
	3101-B Maintenance of transformers and cooling systems.
	3101-C Maintenance of switchboard, including bus-bars, oil switches and instruments.
	3101-D Maintenance of storage batteries, including charging outfits.
	3101-E Wiring.
	3101-F Miscellaneous electrical items.
3102 Miscellaneous substation maintenance.	3102-A Cranes and hoists.
	3102-B Air compressors, vacuum cleaners and other non-electrical devices.
ACCOUNT No. 32—PASSENGER AND COMBINATION CARS:	
(Elevated, Subway and Inter-urban Cars—weighing over 28 tons without load):	
3204 Truck repairs, including brake rigging.	3204-A Truck repairs, including brake rigging, type X.
	3204-B Truck repairs, including brake rigging, type Y.
3207 Air brake equipment.	3207-A Air compressor, including motor.
	3207-B Air piping, reservoirs, etc.
	3207-C Governors.
	3207-D Engineers', triple, electro-pneumatic, emergency valves, etc.
(Prepayment and Semi-Convertible Cars):	3208 Heaters.
3217 Air brake equipment.	3209 Repairs due to accidents.
	3217-A Air compressors, including motors.
	3217-B Air piping, reservoirs, etc.
	3217-C Governors.
	3217-D Engineers', triple, electro-pneumatic and emergency valves, etc.
	3218 Heaters.
(Closed Cars—Double Truck—other than those classified above):	3219 Repairs due to accidents.
3227 Air brake equipment.	3227-A Air compressors, including motors.
	3227-B Air piping, reservoirs, etc.
	3227-C Governors.
	3227-D Engineers', triple, electro-pneumatic and emergency valves, etc.
	3228 Heaters.
	3229 Repairs due to accidents.
(Closed Cars—Single Truck):	3238 Heaters.
	3239 Repairs due to accidents.
(Open Cars—Double Truck):	3247-A Air compressors, including motors.
3247 Air brake equipment.	3247-B Air piping, reservoirs, etc.
	3247-C Governors.
	3247-D Engineers', triple, electro-pneumatic and emergency valves, etc.
	3248
	3249 Repairs due to accidents.
	3258
	3259 Repairs due to accidents.
MISCELLANEOUS:	
3261 Fenders: All types, passenger and combination cars.	3261-A Projecting fenders.
	3261-B Wheel guards.
3262 Signs: All types, passenger and combination cars.	3262-A Car signs, Type X.
	3262-B Car signs, Type Y.
3611 Motors.	3611-A Repairs to Motors, Type X.
	3611-B Repairs to Motors, Type Y.
	3611-C Repairs to Motors, Type Z.

REPORT OF SUB-COMMITTEE ON "WHAT CONSTITUTES MAINTENANCE"

In order to ascertain what action, if any, has been taken with regard to this subject by the various public service commissions, a circular letter was sent to all such bodies and replies were received from twenty-nine. Twenty-two of these have made no ruling on the subject and have not made any attempt to define in any way what constitutes maintenance, other than the fact that they have adopted the general schedule of accounts promulgated by the Interstate Commerce Commission. Seven, however, have attempted to frame a definition in one form or other, and it would appear from a study of these rulings that in most cases "maintenance"

is a comprehensive term including everything that is chargeable to repairs or upkeep, and also including renewals or replacements, whether in part or in toto. One of the commissions requires that renewals when made in toto shall be charged against a "depreciation reserve," created by charges for "depreciation" under the head of "maintenance" in "operating expenses." Some stipulate that renewals when in excess of the value of the thing renewed shall be charged to capital account so far as the excess value is concerned. The Board of Supervising Engineers, Chicago Traction, has attempted to draw a complete distinction between repairs and renewals by adopting a unit for every part of the equipment or plant, so that when a unit is replaced it is charged to a renewal reserve fund accumulated in accordance with the provisions of the traction ordinances under which the companies are operating. These ordinances define "renewals" as "the replacement of any principal part of said street railways or their equipment or appurtenances." When less than a unit is required it is treated as a repair and is included under maintenance.

In the definitions adopted by the Public Service Commission of New York, Second District, the term "renewals" is used in connection with extension of the period of interest in property, as follows: "Renewals include all extensions of terms of years in land and tangible fixed capital and all extensions of the life period of franchises and other intangible fixed capital." The term "replacements" is defined in the following words: "Replacements include all substitutions for capital exhausted or become inadequate in service, the substitutes having substantially no greater capacity than the things for which they were substituted. When a substitute has a substantially greater capacity than that for which it is substituted the cost of substitution of one of the same capacity as the thing replaced should be charged as a replacement and the remaining portion of the cost of the actual substitute should be charged as a betterment." This distinction has no doubt proved useful to companies working under the system of accounts promulgated by that body.

The Public Service Commission of New York, Second District, defines "repairs" as follows: "When through wear and tear or through casualty it becomes necessary to replace some part of any structure, facility or unit of equipment and the extent of such replacement does not amount to a substantial change of identity in such structure, facility or unit of equipment, the replacement of such part is to be considered a repair and the cost of such repair is to be treated as an operating expense and must not be charged as a replacement in any capital account."

The Railroad Commission of Wisconsin rules that "maintenance" should be understood to mean "upkeep" and should cover all expenditures for current or ordinary repairs, renewals or replacements of property resulting through wear and tear, or through those casualties which are incidental to the nature of the operation, such expenditures being necessary to keep up the capacity of the railway to its original or equivalent state of efficiency. When, however, a complete replacement of any building or structure, facility or unit of equipment is made necessary, regardless of such current expenditures, the uncurrent or extraordinary repairs, renewals or replacements made necessary will be charged to "depreciation reserve" accumulated for that purpose.

The Corporation Commission of Oklahoma has never given rulings in special cases. From an accounting standpoint it has ruled generally that "maintenance" constitutes money actually expended for repairs and entire renewals of plant units. It defines "repairs" as follows: "When through wear and tear or through casualty it becomes necessary to replace some part of any structure, facility or unit of equipment and the extent of such replacement does not amount to a substantial change of identity in such structure, facility or unit of equipment, the replacement of such part is to be considered a repair." The commission defines "renewals" as fol-

lows: "Renewals include substitutions for any entire structure, facility or unit of equipment provided the substitution does not include the enlargement or improvement of existing structures, facilities or unit of equipment."

The system of accounts of the Public Service Commission of New York, First District, provides that when through wear and tear, or through casualty, it becomes necessary to replace some part of any structure, facility or unit of equipment, and the extent of such replacement does not amount to a substantial change of identity in such structure, facility or unit of equipment, the replacement of such part is to be considered as a repair and the cost of such repair is to be treated as an operating expense and must not be charged as a replacement in any capital account. This is modified to some extent in the definition of "depreciation," which contains this clause: "Where capital is substantially continuous such as tracks and cannot be satisfactorily individualized, the capital shall be kept in efficient operating condition through repair and the renewals and replacements of parts thereof shall be considered repairs." Maintenance includes not only repairs but also charges for depreciation which must be sufficient to provide a reserve by the time capital is retired equal to the original cost thereof less salvage.

In conclusion, your sub-committee is of the opinion that a definition of maintenance that does not include replacements in a system of accounts is incomplete unless the system provides for charging replacements to a "depreciation reserve" account created by charges to depreciation under operating expenses, in which case the term should include such depreciation; and that when the cost of a replacement by reason of increased capacity exceeds the original cost of the thing for which it is substituted that part of the cost in excess of such original cost should not be included in maintenance.

REPORT OF SUB-COMMITTEE ON INTER-DEPARTMENT CHARGES

The sub-committee on inter-department charges reports progress but feels that the subject is so large that it is desirable to defer the report for a year so that fuller information can be obtained.

The reports of the sub-committees have been considered by your committee as a whole and are presented with its approval.

VALIDITY OF ORDINANCE GRANTING FRANCHISE SUSTAINED

On September 26, 1911, the Supreme Court of the State of Oklahoma, handed down a decision, upholding in every particular the franchise of the Oklahoma Railway, which gives this company an indeterminate blanket franchise over all streets and alleys in Oklahoma City.

This company was granted a franchise in 1905 on certain streets of Oklahoma City. In 1909 the City Council adopted an ordinance extending this franchise over the entire city, which was ratified by a vote of the qualified electors of the city at an election called under the new initiative and referendum law of Oklahoma. The company began construction in one of the principal streets of the city. The validity of the franchise was questioned by the other railway companies in the name of abutting property owners. Claims were made to the court, among many others, that there was no authority of law warranting the enlargement of a franchise, and that, as the constitution of Oklahoma provided that no franchise should be granted, extended or renewed for a longer term than twenty-five years, and that as the franchise in question was practically a perpetual franchise, an ordinance amending this franchise extending it over all of the streets of the city was void. The decision of the Supreme Court completely sustains the validity of the ordinance of 1909 giving the Oklahoma Railway an indeterminate, blanket franchise over all of the streets of Oklahoma City.

REPORT OF THE COMMITTEE ON POWER GENERATION*

L. P. CRECELIUS, CHAIRMAN; H. G. STOTT, VICE-CHAIRMAN; R. A. DYER, W. E. ROLSTON, WILLIAM VON PHUL, B. F. WOOD, A. R. MYERS, C. L. GATES, A. WOLFF

During a meeting of this committee held March 21 at New York City, the subjects assigned were thoroughly discussed and the membership was divided into sub-committees of one. The following papers constitute the report of your

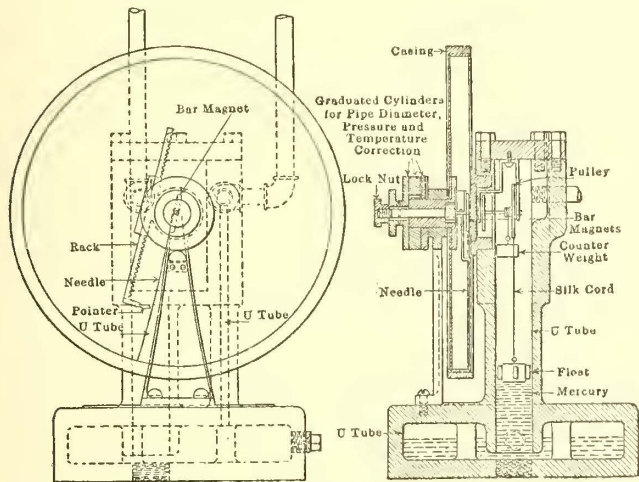
The second method is the use of a steam flow meter of the Pitot tube type, as shown in the illustrations.

This Pitot tube is inserted in the steam pipe connecting the boiler with the steam main or header and is connected to the indicating dial instrument by two 1/4-inch steel pipes. The indicating dial may be placed at any convenient point where its readings can be seen by the fireman or water tender. The accuracy of this instrument is probably about the same as that of the Venturi meter and applies closely enough for the purpose of general indication of the relative amount of work being done by different boilers.

A record of one-minute indications of this instrument, together with a record of the actual hourly weights of water evaporated, is shown by the accompanying chart. The instrument is so sensitive that after opening the side door of the furnace it will indicate a drop of about 50 hp within ten seconds. The results which may be obtained by means of such an instrument are evidently of the utmost importance, but extensive experience with it is lacking, as the instrument has just been placed on the market.

A third measuring instrument of almost equal importance, but for measuring the amount of coal fed to each boiler, has also been developed, and is illustrated. It consists essentially of a propeller of large pitch capable of being slipped inside a downtake coal pipe so that the coal in flowing down from the overhead bunkers or conveyor turns the propeller blades and by suitable integrating mechanism indicates on a dial the coal used in any particular period. Indications are that the results obtained are sufficiently accurate for comparative purposes.

In the furnace the principal development seems to be in the intelligent use of forced draft in order to obtain high rates of combustion when required. In most railway plants the ratio of one hour peak to average 24-hour load is approximately two to one, and the ratio of minimum hourly load to average 24-hour load about four or five to one, or a ratio of eight or ten to one from maximum hour to mini-



Power Generation—Section and Elevation Indicating Steam Flow Meter

committee, and it is suggested that the subjects which it was not possible to include in this report be referred to the 1912 committee.

DEVELOPMENTS IN THE GENERATION OF STEAM—1910-1911

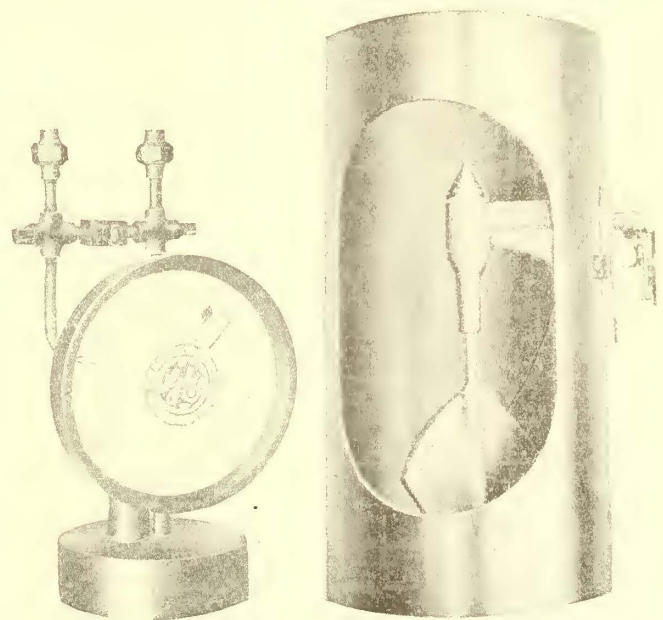
BY H. G. STOTT

During the past year several important steps have been taken in the development of new measuring instruments for use in the boiler room, and more complete recognition has been given the fact that the boiler and furnace of the future must be able to conform more closely to the load curve than in the past.

Heretofore in following the load curve the only thing to be carefully considered was the exact time when the reserve or banked boilers should be cut in or taken off: a boiler was looked upon as a practically inflexible unit which could be added or subtracted as the load curve might demand. Numerous causes existed (and still exist) to account for this condition of the art, but one of the principal causes was the lack of measuring instruments by means of which we could easily and quickly ascertain what a boiler was doing, without waiting for the result of a ten-hour test. While the standard method of boiler testing gives an accurate average result, it does not give any idea of what the boiler is doing for short intervals of time.

Two distinct types of indicating apparatus are now available, first, the Venturi meter, which is preferably used to measure the water fed to the individual boiler. This meter can be graduated to indicate either in pounds of water or in horse power on a vertical mercury column, or on a dial. Results may be obtained from this type of meter probably correct to within 3 or 4 per cent.

The most serious objection to this method of measurement is that the readings are subject to the control of the water tender or fireman, as each time he changes the rate of flow in order to keep the water in the gage at the proper level the indication on the Venturi meter changes simultaneously without any corresponding immediate change in the flow of steam from the boiler.



Power Generation—Steam Meter and Coal Meter

num hour. To meet this enormous variation of load in an economical manner, taking into consideration not only operating and maintenance charges, but also fixed charges, the best solution seems to be to design the boiler room equipment for maximum operating economy at the average load of the plant, and be prepared to sacrifice some slight loss in efficiency at the higher and lower loads. Several methods of doing this are available, the most obvious one being to install two stokers, or grates, under each boiler, so that one may be banked during the lighter loads. This

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

will give a range of steaming of almost two to one as required by the load curve. A second method, which has some very attractive features, but is as yet incompletely developed, is the use of oil in burners protected by the bridge wall from the grate or stoker on which coal is being burned. There seems to be every reason to hope that this will prove a very effective and efficient method of increasing the output of boilers during peak loads, provided that the oil can be obtained at \$1 or less per barrel, and that proper facilities for its storage can be obtained.

A third method is in the use of some form of grate or stoker which can be economically operated with natural draft up to, say, 150 per cent of rating, with best economy at 100 per cent rating. With peak loads the natural draft can be shut off and forced draft put on, thus forcing the boiler to at least 225 per cent rating with very good economy.

THE BEST STANDARD VOLTAGE AND FREQUENCY TO BE ADOPTED FOR THREE-PHASE TURBO-ALTERNATORS, WITH REFERENCE TO SIZE AS RELATED TO VOLTAGE.—BY L. P. CRECELIUS

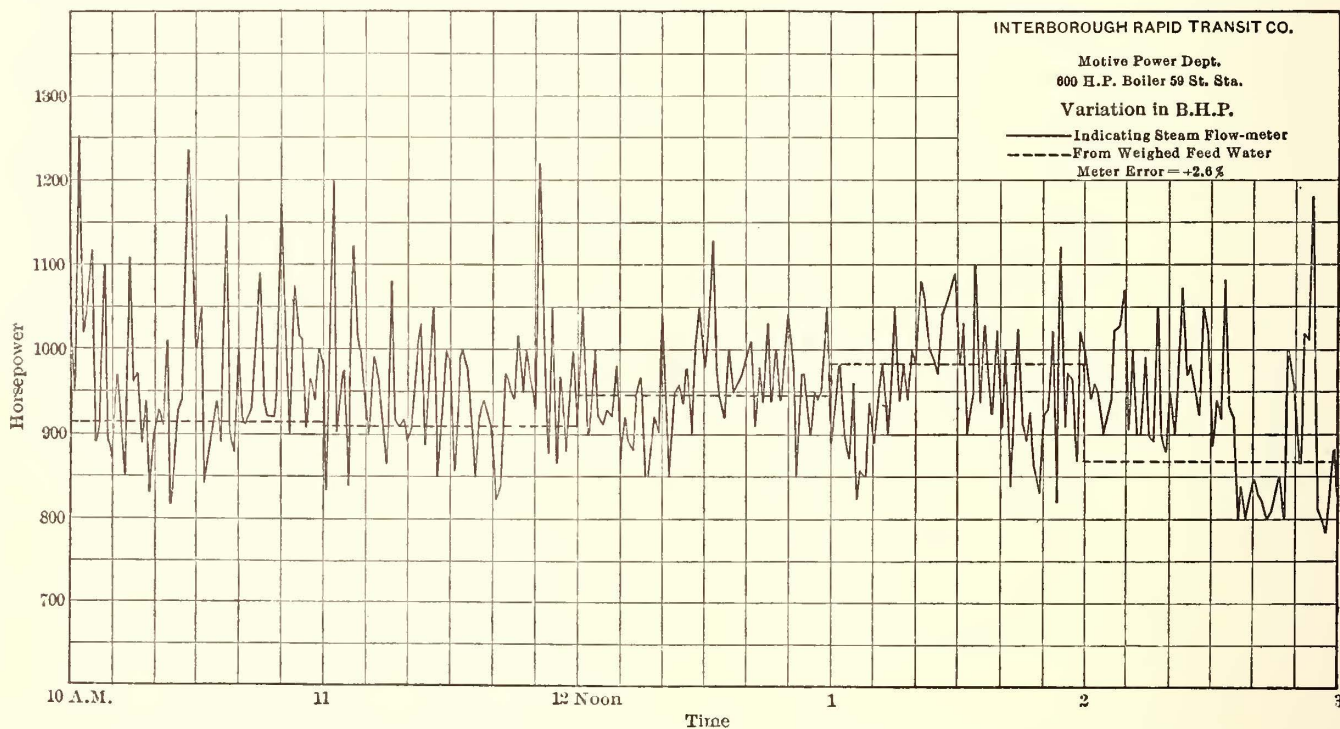
The present tendency toward increasing the speeds of turbines for the dual purpose of better steam economy and lower cost requires of a relatively small amount of iron and copper a large kilowatt capacity, because the high speed demands a reduction in diameter of the elementary revolving parts. Therefore, in large generators designers find it difficult to provide the necessary space for high voltage insulation, and this situation becomes more and more acute with the increased capacities now demanded by some operators, and has brought up the suggestion from builders to limit the voltage of large generators at 6600 volts and lower, and to use voltage-raising transformers.

The first step in analyzing this question is to determine the most economical and satisfactory transmission

50,000 ft. in length, although in a few cases a small amount of power is transmitted over greater distances. Accordingly, the following tables have been prepared to determine the most satisfactory standard transmission voltage. In arriving at the relative costs included below the cost of three conductor, paper insulated cables has been used, based on five per cent I²R loss, unity power factor, and 30 deg. C. rise in temperature, corrected to comprise the nearest commercial size, and due allowance has been made for spare cables and conduits. For comparison the usual and standard generator voltages have been used.

Distance power plant to substation, in ft.	Transmission voltage	Relative cost of trans. system incl. cables and conduits
20,000	6,600	126%
20,000	9,000	105%
20,000	11,000	100%
20,000	13,200	103%
30,000	6,600	142%
30,000	9,000	110%
30,000	11,000	102%
30,000	13,200	100%
40,000	6,600	161%
40,000	9,000	117%
40,000	11,000	103%
40,000	13,200	100%
50,000	6,600	186%
50,000	9,000	135%
50,000	11,000	104%
50,000	13,200	100%

These figures indicate that 11,000 volts is the most satisfactory standard transmission voltage for most systems requiring large steam turbo-alternators. The small gain in



Power Generation—Curves of Minute Readings Showing Variation in Boiler Horse-Power Obtained with Steam Flow Meter

voltage for general utility on power consuming systems which are so situated as to require the power plant to be located within 50,000 ft. of the substations. Included in this class are those systems supplying centers of population of 200,000 or over in which it is not only desirable but advantageous to generate directly at a potential in the generators corresponding to the transmission voltage. In the systems included the average length of transmission cables is less than 30,000 ft., and none averages more than

cost noted in favor of 13,200 volts does not seem to be enough to justify its use solely from the standpoint of economy or cost of the transmission system.

Having thus established the proper transmission voltage, it now becomes necessary to determine the voltage of the generators, and considerations of simplicity and economy demand that the voltage of the generators be the same if possible. To eliminate the destruction from short circuits, the resulting current of which reaches enormous values in

large generators, and to improve the stability of the system as a whole, operators are now seriously considering the introduction of some form of impedance or reactance to be placed between the generators and the distributing cables. It has been proposed that this protection should be secured by voltage compensators designed to include the necessary reactance, and it is true that within reasonable limits this is possible; also that the generator windings consequently would not be subjected to potential stresses caused by line disturbances. However, it is obvious that no protection is offered in case of internal trouble in the transformer. On the whole it does not seem proper or desirable to add voltage-changing transformers for the purpose of introducing more reactance to the circuit.

The proper protection can be best secured by connecting the necessary current-limiting reactances, mounted on non-magnetic cores, between the generator and bus, and this reactance should have a value of approximately 6 per cent.

As all turbines are essentially high-speed machines, it is to be expected that the cost goes up and the efficiency down with a reduction of rotative speed. The commercial consideration of cost has a decided influence on limiting the voltage of large turbo-alternators directly coupled to the turbine, while the engineering features involved in considerations of design as affecting the efficiency of the steam end at speeds required for 25-cycle work determine the limits between which the development of large directly coupled turbo-generators at 11,000 volts must stop.

In reference to frequency, for purely railway work the 25-cycle rotary converter is decidedly preferable and outweighs every other consideration. In fact, large lighting and power companies have found a frequency of 25-cycles most advantageous, and, therefore, consideration of the specific advantage resulting from the use of a higher or lower frequency is entirely immaterial.

The use of a three-phase, star-connected, 11,000-volt, 25-cycle generating system with grounded neutral seems particularly advantageous for conditions existing in the average American city of over 200,000 inhabitants where the power supply is generated by means of steam turbines, and it is a debatable question whether this does not constitute one of the principal limitations to large turbo-generators.

D. C. TURBO-GENERATORS LARGER THAN 500 KW CAPACITY BY R. A. DYER

Information on this subject was requested of the various electric companies, and the reply of the Westinghouse Electric & Manufacturing Company covers the situation in respect to d. c. turbo-generators larger than 500 kw very thoroughly. In part it is as follows:

"In reference to direct-connected units, this company has constructed a number of 500-kw, 1500-r. p. m. units. We have not built any 600-volt railway sets of greater capacity, nor have we ever entertained any serious requests for bids on them. From information, however, taken from the technical press, we would state that units up to 750 or 800 kw at a voltage of 250 and up to 1500 kw at 600 volts have been built by several different European electrical concerns. The average speeds of such size units are in the neighborhood of 1500 and 1200 r. p. m. respectively. The fact that such machines are built, and are running, disposes once for all of the question of the possibility of these sizes of units. On the other hand, the small number of such size machines in operation, and the experience of the manufacturers in this country, seem to indicate that the demand for such machines is not great. This, again, would indicate that there is no particular improvement over slow-speed apparatus in one or more of the essential features, that is, price, floor space, economy and maintenance. In order to show some of the difficulty in the way of building large-size d. c. units we submit the following:

"(1) It is essential to-day that carbon brushes be used on all classes of d. c. machines. No operating engineer would

consider the use of metallic brushes on a d. c. turbo-generator, because metallic brushes would require a great deal of attention and adjustment, and would cause excessive wear not only to the brushes but also to the commutator.

"(2) Experience has shown that the limiting speed for carbon brushes is in the neighborhood of 6000 to 7000 ft. per minute. This at once fixes the outside diameter of the commutator for a generator for any given running speed.

"(3) The radiating surface of any commutator fixes the current-carrying capacity. With the best grade of carbon brushes and a peripheral speed of 6000 to 7000 ft. a minute it is known that about $1\frac{1}{4}$ amp per sq. in. of surface of the commutator is about the safe upper limit of design. To show briefly how this works out, let us consider the case of a 750-kw, 250-volt machine at about 1500 r. p. m. with 6000 ft. per minute peripheral speed. The periphery of the commutator would be 4 ft. At $1\frac{1}{4}$ amp per sq. in. of surface, we could handle 60 amp total per inch of length of commutator, and for 3000 amp the capacity of the machine would require two commutators each 25 in. in length on its working face, or from 30 in. to 35 in. in over-all dimensions; that is, the distance taken up along the shaft for the commutators alone would be 6 ft. approximately. By the time we have added the armature core and its connections a distance of 10 ft. 6 in. or 11 ft. would be necessary from center line to center line of the bearings. The commutator diameter, at the above circumference, would be approximately 15 in., and it is evident that the shaft could not be made more than $10\frac{1}{2}$ to 11 in. in diameter. With the center distance fixed, this size of shaft would be probably too weak for safe operation and it would undoubtedly be necessary to increase the commutator speed to 7000 ft. per minute.

"The above shows that we are very near our limiting features in every particular in order to obtain a speed of 1500 r. p. m. for a 750-kw d. c. turbo at 250 volts. If we consider the steam end, however, we find that a speed of 1500 r. p. m. is not high enough to give the most desirable working point, when considered from the standpoint of steam economy. Such a unit is, therefore, a compromise on both ends of the set. The speed is higher than is desired for the generator, giving increased friction and windage losses and reducing the efficiency somewhat, and also increasing the cost. On the other hand, a cheaper and more efficient steam end could be built if operated at a higher speed. There is no doubt that d. c. turbos of larger capacity than 500 kw can be built. How much larger capacity depends upon the voltage at which they are to be built. Three thousand amperes is in general about as high current as it has been attempted to handle.

"A consideration of matters like the above, however, has led us to develop a geared set, and we have under contract a considerable number of d. c. turbo units involving the use of reduction gears of the Melville-Macalpine type, and while the only geared d. c. unit which we have in operation at present is a 500-kw, 250-volt set, which has been in operation in the works of the Commonwealth Steel Company, at St. Louis, Mo., since March 31, and which to date has been working very satisfactorily, we have a number of orders for such sets of 250 and 600 volt and 500 and 1000 kw capacity which will be in use within the next two months. The use of this gear renders possible a lower speed for the generator and higher speed for the turbine, both features tending to reduce the cost and improve the efficiency of the units composing the set."

Inquiry of the manufacturers of the reduction gear referred to above has developed the interesting information that the efficiency of the gear on test "shows better than 98.5 per cent" and that the cost of a unit, comprising turbine, reduction gear and generator, will be approximately the same as for a good Corliss engine and direct-connected d. c. generator.

THE PURCHASE OF BITUMINOUS COAL UNDER B. T. U. SPECIFICATIONS.—BY L. P. CRECELIUS

All of the technical reports prepared and distributed by the United States Geological Survey and the Bureau of Mines relate in some way to the subject matter of this report.

[The contracts of the Interborough Rapid Transit Company and the Cleveland Railway Company are included in the original report.—Editors.] Both of these specifications are highly satisfactory for the fuel supply covered for the particular conditions in each case.

Throughout its reports the government has been exceedingly careful to advise against the use of specifications purely on a B. t. u. basis; also recommending that a careful examination of plant conditions be made and a selection of fuel supply be chosen accordingly.

Briefly, the advantages of purchasing coal under a definite specification as found by the government are:

(1) Bidders are placed on a strictly competitive basis as regards quality and price.

(2) The field for both purchaser and dealer is broadened, as trade names can be ignored and comparatively unknown coals offered by responsible bidders may be accepted without detriment to the purchaser.

(3) The purchaser is insured against the delivery of poor and dirty coal, and is saved from disputes arising from condemnation based on the usual visual inspection.

(4) Experience shows that it is not always expedient to reject poor coal, because of the difficulty, delay and cost of removal. Under definite specifications, rejectable coal may be accepted at a greatly reduced price.

(5) A definite basis for the cancellation of the contract is provided.

(6) The constant inspection and analysis of the coal delivered furnishes a check on the practical results obtained in burning the coal.

The government further cautions that the aim in purchasing coal for any power plant should be to obtain a fuel which will produce a horse-power for the least cost, "all" things being considered. The most careful attention should first be given to the nature of the existing furnace equipment, draft and load; the character of coal best suited to the plant conditions, the number of heat units obtainable for a unit price; the cost of handling the coal and ash, and the possibility of burning the coal without smoke or other objectionable features.

In general it may be said that in any market the coal obtainable at the lowest price is the most economical provided the furnace equipment is suitable. If the furnace is not so designed as to permit the use of the cheaper coal, it should be changed.

The results of tests tend to show that, other things being equal, coals of similar composition are of value in proportion to the B. t. u. in the coal—a basis on which, indeed, all coals may be valued approximately.

It should be remembered, however, that the value of a coal for any particular plant is influenced by the fact that all furnaces are not equally suited for burning the many grades of coal. Aside from this factor, coals may be compared in terms of the B. t. u. obtained for a unit price.

The usual and customary element upon which premiums and penalties are based is the heat content expressed in B. t. u. The justification for this is based upon the fact that coal which gives up the most heat per pound of coal is the most valuable. However, because of the presence of the other disturbing elements mentioned above, and because in any market a number of grades of coal can be had at different prices, which variation in price is usually all out of proportion to the respective steam-making quality of the various coals offered, it follows that other restrictions must be added to the specifications.

The most disturbing elements in coal are ash, sulphur and moisture.

The presence of an excessive amount of ash in any coal manifests itself in the nature of a reduction of capacity because of its occupying a relatively large amount of effective grate area with inert matter. It is also the source of additional expense in the matter of cost of removal and extra wear and tear on ash-handling apparatus. It should, therefore, be restricted to a certain limited amount, no premium being allowed for a minimum. Penalties for amounts in excess of the allowable limit should be provided, and these preferably should become excessive after a certain value. The reason for this is principally that the amount of ash is in a measure the key to the nature of the coal, and the principal advantage of any coal specification should be to provide for a steady and uniform supply of fuel, previously determined upon as best suited to existing plant conditions, and to limit all other grades of coal.

Sulphur either free or in combination with other elements in excess of 3.5 per cent is decidedly disadvantageous to the fuel, especially so when burned on certain types of furnaces. It is the principal source of formation of fusible clinkers, which clog the fire, adhere to the grate bars, and increase enormously the cost of maintaining the furnaces. The presence of sulphur even more than ash governs the nature and the source of the fuel supply and excessive amounts should be severely penalized. No premiums for a minimum should be provided.

If coal bills are settled according to weights at the receiving station the moisture value should be determined and the B. t. u. determination made upon samples "as received." If bills are paid according to railroad weights at the loading station the B. t. u. determination should preferably be made on a dry sample.

Moisture is a matter entirely beyond the control of the dealer, depending upon weather conditions, distance of transportation, etc., and if the heat determination is made upon sample either "dry" or "as received," it has been compensated for.

Volatile matter more than any other element provides the means for determining the source of the fuel supply. The amount of volatile matter in coal increases with the distance from the Atlantic Coast to the Mississippi River and furnishes the means of knowing in what section the coal was mined. The presence of volatile matter is not necessarily detrimental to the coal, as experiments have clearly brought out the fact that coal containing more volatile matter can be burned quite as efficiently as coal containing less, in properly constructed furnaces. However, because of existing furnace equipment and severe smoke regulations, it may be necessary to restrict a fuel containing excessive amounts of volatile matter. The specifications of the Interborough Rapid Transit Company provide for this matter.

In some cases the premiums and penalties provided in coal specifications cannot be proportional with respect to the B. t. u. values, but must be of an accelerating nature, either above or below standard. This is the case in the specifications of the Cleveland Railway Company, and a short outline of the underlying conditions responsible for this is as follows:

There are available in the Cleveland market three grades of slack coal, at different prices, and of different steam-making qualities. These for the purpose of this report will be called Grade 1, Grade 2 and Grade 3. The market prices are according to quality and depend also upon the freight rates, but in no case is the market price anywhere nearly proportional to the relative value of the different grades when based upon evaporation, to justify the difference.

After a thorough study of the relative value of these coals, results obtained after careful and prolonged tests indicated (all things being considered, such as load, existing equipment, draft, capacity and price) Grade 2 coal to be the best suited. On account of a loss in effective plant capacity when burning Grade 3 coal, due to its poorer qualities, this fuel had to be cut out of consideration. Grade 1 coal is very satisfactory

and is received, but payment is made according to its value as compared to Grade 2 coal, which has been made the standard in the contract.

The Cleveland Railway Company specifications therefore have been drawn up with a view of stimulating the delivery of Grade 2 coal, adjusting the price of Grade 1 coal according to its real value and restricting the supply of Grade 3 coal as much as possible.

The value of the relative fuels, the prevailing market price and settling price are shown in the following tables:

Kind of coal	Grade 1	Grade 2	Grade 3
B. t. u.	13,350	12,700	12,150
Ash	11.60%	13.80%	18.11%
Sulphur	2.03%	3.50%	5.15%
Moisture	1.52%	2.70%	3.55%
Volatile combustible matter....	31.33%	35.62%	35.03%
Fixed carbon	53.52%	44.38%	38.16%
Market price per ton delivered..	\$1.75	\$1.60	\$1.40
Settling price according to contract	\$1.67	\$1.60	\$1.32

From the above it can be seen that the specifications thus establish a definite, concise and satisfactory manner of purchasing the fuel supply, avoiding all controversy as to kind of coal, and placing the burden of supplying the right sort upon the dealer.

It is hoped that the necessity in some cases of arranging premiums and penalties on B. t. u. values of an accelerating nature either side of standard has been explained, as also the reason for limiting other disturbing elements such as ash, sulphur, etc., to certain values. From this it can be seen that it will become necessary to change the tables whenever a change in market price disturbs the relative difference in the grades of coal shown above. Each case must necessarily be worked out upon its own particular merits. No one contract can be made to apply to every condition because of the great diversity of power plant equipment and load conditions, and also because of the variation in character and price of the fuel supply.

Statements and conclusions relative to the unfairness of arbitrary penalties and premiums which are not based upon real or proportional variations abound, and lately considerable stress has been laid upon the supposedly excellent results to be obtained from a combination method of purchase based upon an evaporation basis and an analysis basis. It does not seem proper to make an outside party responsible for the economical performance of equipment not in his control, simply because he happens to supply a necessary commodity. This is the circumstance when the coal dealer is called upon to supply fuel on a basis of evaporation and this disadvantageous practice will continue, to the mutual dissatisfaction of both parties, so long as doubt and uncertainty shroud the matter of a proper basis of fuel purchase.

In general, it is decidedly advantageous to purchase fuel under definite specifications wherever conditions are such as to require a fuel supply better than the poorest, lowest priced fuel obtainable.

Whenever conditions warrant the burning of the very lowest grade fuel which corresponds to lowest cost, definite specifications covering heat, ash, etc., are unnecessary.

The drawing up of coal specifications is not the work of a chemist, it is rather the work of a mechanical engineer, who, however, must be in close touch with a chemical adviser.

The McCord Manufacturing Company, Detroit and Chicago, is showing at its booth how the Universal weather stripping and sash fixtures may be adjusted to fit the window opening so as to obviate the necessity of the accurate car construction found necessary when ordinary metal sash is used. This company's window sash provides perfect fitting sash that may be operated easily at all times, regardless of the atmospheric conditions. The sash is made of copper and is proof against rust and corrosion.

REPORT OF THE JOINT COMMITTEE ON EXPRESS AND FREIGHT ACCOUNTING*

WALTER SIROYER, CO-CHAIRMAN; P. P. CRAFTS, CO-CHAIRMAN;
G. H. HARRIS, W. S. WHITNEY, E. L. KASEMEIER AND
J. C. COLLINS

Two meetings have been held and tentative reports were compiled after each meeting. These were submitted to the members of the committee, with the request that they be studied carefully and such changes as seemed to be advisable reported to the co-chairmen. As the committee members were able to apply the proposed plan to the operations of their respective lines, this procedure produced good results.

Your committee is of the opinion that it would not be practical, even if it were possible, to make an absolutely accurate or scientific separation of passenger and freight expenses, and it, therefore, appears necessary to adopt some plan which all companies may use as a basis for making comparisons. Very few roads operate under the same conditions, and with this in mind it was decided to make the basis of the segregation of expenses as elastic as possible.

Each company has a plan of its own for dividing expenses between the two branches of traffic. Thirteen out of twenty-six companies made no charge against freight traffic for maintenance of way and structures. Some companies did not take into account any charges for power consumed by freight cars, etc.

Your committee took up separately each of the eighty-eight accounts prescribed by the Interstate Commerce Commission in its classification of operating expenses of electric railways, and a plan for the division of each account as between the two branches of traffic was considered, and the recommendations made are in accordance with the opinions of the majority of the committee. It is the unanimous opinion of the committee that all items of expense that can be charged directly should be so charged.

Careful consideration has been given the matter of the adoption of the "car-mile" as against the "ton-mile" unit, and it was decided that the "car-mile" should be the unit basis adopted in view of the fact that interurban railways, with very few exceptions, are handling freight in a comparatively small way, and the freight car mileage is only a small percentage of the total car mileage. It would, therefore, seem advisable to continue the "car mileage" unit until such time at least as the earnings from freight traffic reach proportions that will justify the additional expense necessary to maintain the records which would be required by the use of the "ton-mile" unit.

Your committee, therefore, recommends for your consideration the following plan for segregating operating expenses between passenger and freight traffic:

Nos.	ACCOUNTS
WAY AND STRUCTURES	
1 to 28	Maintenance of way and structures.
	Prorate on the basis of the total passenger and total freight car mileage.
EQUIPMENT.	
29	Superintendence of equipment (shops and rolling stock).
	Prorate on the basis of the total passenger and total freight car mileage.
32, 33, 34, 36, 37	Maintenance of cars and locomotives (exclusive of service cars).
	Charge directly from shop records.
35	Service cars.
	Prorate on the basis of the total passenger and total freight car mileage.

*Abstract of a paper read before the American Electric Railway Accountants' and Transportation & Traffic Associations, Atlantic City, N. J., Oct. 9-13, 1911.

38 *Shop machinery and tools.*

Prorate on the basis of the total passenger and total freight car mileage.

39 *Shop expenses.*

Prorate on the basis of the total passenger and total freight car mileage.

40 *Horses and vehicles.*

Prorate on the basis of the total passenger and total freight car mileage.

41 *Other miscellaneous equipment expenses.*

Prorate on the basis of the total passenger and total freight car mileage.

42 *Depreciation of equipment.*

Where this account is used, charge directly for passenger and freight equipment plus proportion of service car depreciation.

43, 44 *Other operations, debit and credit.*

Charge or credit directly where possible. Items common to both passenger and freight traffic, prorate on the basis of the total passenger and total freight car mileage.

TRAFFIC.

45 *Superintendence and solicitation.*

Charge directly where possible. Items common to both passenger and freight traffic, prorate on the basis of the gross earnings from passenger and freight traffic.

46 *Advertising.*

Charge directly where possible. Items common to both passenger and freight traffic, prorate on the basis of the gross earnings from passenger and freight traffic.

47 *Miscellaneous traffic expenses.*

Charge directly where possible. Items common to both passenger and freight traffic, prorate on the basis of the gross earnings from passenger and freight traffic.

CONDUCTING

TRANSPORTATION.

48 *Superintendence of transportation.*

Prorate on the basis of the total passenger and total freight car mileage.

29, 30, 31 *Power (including superintendence of power plant and substations equipment, under accounts 29 and 48).*

Prorate on the basis of the total passenger and total freight car mileage.

60 *Passenger conductors, motormen and trainmen.*

Charge directly to the passenger department.

61 *Freight conductors, motormen and trainmen.*

Charge directly to the freight department.

62 *Miscellaneous car service employees.*

Prorate on the basis of the total passenger and total freight car mileage.

63 *Miscellaneous car service expenses.*

Charge directly where possible. Items common to both passenger and freight traffic, prorate on the basis of the total passenger and total freight car mileage (after deducting items strictly chargeable to expenses of conducting passenger department, viz., tickets, transfers, baggage checks, secret inspection, register rentals, and conductor's books).

64 to 65 *Station employees and station expenses.*

Charge directly where possible. Items common to both passenger and freight traffic, prorate on the basis of the gross earnings from passenger and freight traffic.

66 to 67 *Carhouse employees and carhouse expenses.*

Prorate on the basis of the total passenger and total freight car mileage.

68 *Operation of signal and interlocking systems.*

Prorate on the basis of the train mileage.

69 *Operation of telegraph and telephone systems.*

Prorate on the basis of the train mileage.

70 *Express and freight collection and delivery.*

Charge directly to the freight department.

71 *Loss and damage.*

Charge directly to the freight department.

72 *Other transportation expenses.*

Charge directly where possible. Items common to both passenger and freight traffic, prorate on the basis of the total passenger and total freight car mileage.

GENERAL AND
MISCELLANEOUS73 *Salaries and expenses of general officers.*

Charge directly where possible. Items common to both passenger and freight traffic, prorate on the basis of the gross earnings from passenger and freight traffic.

74 *Salaries and expenses of general office clerks.*75 *General office supplies and expenses.*76 *Law expenses.*77 *Relief department expenses.*78 *Pensions.*79 *Miscellaneous general expenses.*80 to 81 *Other operations, debit and credit.*

Same as No. 73.

82 *Injuries and damages.*

Charge directly where possible. Items common to both passenger and freight traffic, prorate on the basis of the train mileage.

83 *Insurance.*

Charge directly where possible. Items common to both passenger and freight traffic, prorate on the basis of the gross earnings from passenger and freight traffic.

84 *Stationery and printing.*

Charge directly where possible. Items common to both passenger and freight traffic, prorate on the basis of the gross earnings from passenger and freight traffic.

85 *Store expenses.*

Prorate on the basis of the total passenger and total freight car mileage.

86 *Stable expenses.*

Charge directly where possible. Items common to both passenger and freight traffic, prorate on basis of total passenger and total freight car mileage.

87 *Rent of tracks and terminals.*

Charge directly.

88 *Rent of equipment.*

Charge directly.

In recommending certain divisions of operating expenses your committee has shown them based upon the percentage of gross earnings from passenger and freight traffic, freight earnings to include the following accounts under the head of "revenue from transportation": Express revenue, freight revenue, milk revenue and switching revenue.

The Brill car on the Boardwalk has the advertising spaces filled with large sepia photographs of representative types of city and interurban cars built by the different Brill companies and also photographs of the principal Brill trucks. A label on each photograph designates the company for which the car was built and gives the chief dimensions of the car body. Among those shown are the "near-side" type of Philadelphia and Buffalo; the plain-arch roof Brill semi-convertible of the Capitol Traction Company, of Harrisburg; the "one-man" prepayment car of the Selma type and a large variety of interurban coaches, snow sweepers, etc.

REPORT OF THE COMMITTEE ON EXPRESS AND FREIGHT TRAFFIC*

BY H. E. REYNOLDS, CHAIRMAN; G. W. QUACKENBUSH, C. F. BERRY, F. W. WATTS, F. D. NORVIEL, A. R. PIPER

The committee sent a data sheet to member companies on March 1, and 110 replies were received from companies operating in thirty-seven States and in Canada and Mexico, which have been grouped in the following divisions:

North Atlantic.—Maine, Vermont, Massachusetts, Rhode Island, New York, New Jersey, Pennsylvania, Canada.

South Atlantic.—North Carolina, West Virginia, Maryland, Virginia, Georgia, Florida, South Carolina, District of Columbia, Mexico.

South Central.—Tennessee, Kentucky, Alabama, Louisiana, Arkansas, Texas.

North Central.—Ohio, Indiana, Illinois, Michigan, Wisconsin, Minnesota, Iowa, Missouri, Kansas.

Western.—Utah, Washington, Oregon, California, Colorado.

Of the 110 companies reporting, ninety-two are conducting an express or freight business. Thirty-seven companies report that no restrictions have been placed upon freight and express business by their franchises. The ninety-two companies conducting an express or freight business operate in 917 cities and towns and serve a total population of over 12,000,000.

In regard to the employment of solicitors for obtaining express business, twenty-seven companies do and thirty-seven do not employ solicitors. Several of those not employing solicitors indicate that employees or agents are sometimes engaged to do work of this character. Eighteen of the companies depend upon their agents to increase the business, while sixteen advertise for this purpose and ten state that no other method, except good service, is used to create new business.

Claims against the companies are handled in thirty cases by the express and freight department, while in twenty-one others they are settled by the claim department.

Eighty-one companies report that they handle newspapers. With one exception all the companies carry newspapers on passenger cars, while eighteen use express cars in addition. Fifty-one of the companies charge for this service and twenty-six do not.

The rates for this service vary from 3/4c per cwt. to 75c per cwt., a rough average being between 1/4c and 1/2c per lb. The method of handling collections for this service varies widely, most of the companies rendering a monthly bill. In the Central States, however, the stamped tag or ticket form of collection is principally used. Practically all of the companies report that the matter of charging for newspaper handling has no effect on the relations of the companies with the press.

With regard to transportation of baggage, most of the Eastern roads handle baggage, if at all, in express cars, and most of the Western roads take care of it either on passenger cars or on both passenger and express cars. Only five of the thirty companies reporting from the Atlantic States check baggage free on passenger tickets, while twenty-three of the forty-one companies reporting from the Central and Western States follow this practice.

The capacity of standard express cars averages about 20 tons, being slightly less in the Atlantic States than in the North Central, where one company reports 50 tons capacity and several report 30 tons capacity. The length of the standard express car averages about 45 ft., a few companies reporting cars only 30 ft. over all and two companies in New York reporting cars 60 ft. over all. These cars vary from 9 to 50 tons in weight, averaging about 25 tons.

Most of the companies reporting have established their express and freight business since 1900. All but four companies report that the business has shown a steady increase since the beginning, and one of these four states that the business increased until 1910.

The equipments used by the companies in handling the express and freight business may be classified as follows:

SECTION	No. of companies reporting	Combination and express	Motor box cars	Trailer cars	Baggage cars	Coal cars	Cinder cars	Electric locomotives	Miscellaneous cars	Total rolling stock
North Atlantic...	23	24	150	49	13	29	20	21	143	471
South Atlantic...	10	81	59	70	2	4	18	15	13	365
South Central...	3	5	5	25	12	13	2	2	9	76
North Central...	31	211	97	82	42	274	23	16	62	838
Western	5	9	14	64	12	72	0	1	144	321
Totals	71	330	325	290	81	392	63	58	461	2,071

Answering the question, "Do you consider it profitable to handle freight at steam road rates in single motor car operation?" twenty-four companies replied "yes" and twenty companies "no."

Forty-four companies handle carload freight. Fifty-seven companies report that they compete with steam railroads, nineteen with water transportation companies and eighteen with both steam and water transportation companies. With regard to contracts with old line express companies, nineteen companies state that they do have such agreements.

CONCLUSIONS

The period of experiment is passed and the trolley express and freight has become a recognized established business. This part of the business is becoming more and more a factor in the earnings of electric railway companies; hence it should be recognized and made to show far greater development.

There has been a great diversity of methods in operation, accounting, billing, equipment, etc., each company working along lines which seemed to it best at the time. The time has now come when it is imperative in the interests of all to make greater effort in the future to unify and standardize methods. With the gradual expansion of what is now more or less a local trolley and express traffic it is not a far look into the future to see the meeting of local services and the resultant exchange and extension of through traffic, in which event standardization of forms and methods would be a great aid. The existing differences are especially noticeable in the units employed in accounting for both earnings and expenses, and it would be of great benefit to all to fix upon a standard, whether car-hours, car-miles or ton-miles, so that an intelligent comparison may be made possible. Unless some particular local condition makes it advisable to do otherwise, the accounting of all trolley express and freight traffic should be entirely segregated from that of the passenger traffic. In no other way can the complete detailed study of the business that is so necessary to its development be obtained.

There is still much to be done in the way of systematic promotion of the business, by advertising, personal solicitation and in other ways. Possible shippers or consignees need to be told exactly what the service can do for them, just what it is and why it is particularly adapted to their individual needs. The way can be paved by the right kind of instructive literature, followed up by solicitors engaged for that purpose alone, or by employees of the express department in cases where the business has not become great enough to justify the added expense of special solicitors. Such solicitors or employees should not only be thoroughly conversant with the business but should make a study of the industries whose traffic they are seeking, that they may be able to talk intelligently of the adjustment of the service to the needs of their patrons.

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

A high-class service is not the only form of advertising necessary. Good service is essential in holding business already obtained, in overcoming the prejudice that inevitably greets any new idea, and such competition as may exist, but as a mainstay in promoting this or any other kind of business it must from the nature of things be slow in its results.

Aside from advertising, solicitation and high character of service there are other means of increasing the earnings of the future, such as encouragement of the location of reputable new industries, from which future traffic may develop. Electric railways should take an active interest in all town or city movements that honestly tend toward the progress, commercially or otherwise, of the cities and towns through which they operate, for increase in population and the introduction of new industries both spell enlarged opportunities for express and freight traffic.

Greater interest and assistance should be given the good roads movement which is sweeping the country. Better roads mean a lowering in cost and a quicker haulage of farm produce to shipment terminals, and this must bring about lower prices, an increase in the demand in the markets and a stimulation of production from which the express transportation companies must benefit. The handling of farm produce is destined to become an important feature of the electric express traffic because the service is especially adapted to handling of perishable goods of this character in a quick, safe and economical way.

Thirteen companies report their belief that finding a market for farm produce is profitable, and, while this question may to some extent depend upon local conditions, the committee believes that the carrying of farm produce is a legitimate and profitable field for development and would recommend that close attention be given it and that every reasonable facility and incentive be offered the farmer to make shipment in this way.

The question as to whether or not companies should charge for the transportation of newspapers and the method and basis of charging is important. In recent years the number of papers so carried has increased so rapidly and to such an extent that it is unquestionably becoming a serious problem that should be met. The majority of the companies charge a rate varying from $\frac{3}{4}$ cent per cwt. to 75 cents per cwt. It is only fair and just that compensation be received for this service, and the placing of this matter upon a strictly business basis will work out a condition that will be satisfactory to both the companies and the press. The committee recommends the establishment of a standard basis or method of determining such charge. In fixing such a standard it will undoubtedly be necessary to consider the size and selling price of the papers. Such concerted action would eliminate to a great extent, if not altogether, objections which might otherwise be raised by the press here and there were the movement purely individual.

The character and scope of the service seem to govern the equipment used for freight and express traffic. The committee recommends that equipment be carefully considered as to its adaptability to conditions under which it is to be used, as to the relation between the cost of operation and carrying capacity and as to the facility of loading and unloading. The rolling stock should also be kept in a high state of repair so that both efficiency and good appearance may be obtained. In this way the company may be protected against the serious antagonism and unfavorable impressions which oftentimes result from interference with passenger traffic and unattractive physical equipment.

The Railway Roller Bearing Company, Syracuse, N. Y., has received through The J. G. Brill Company the third order from the Third Avenue Railway, New York, for Rollway journal boxes, making a total of 56 car equipments for this company.

REPORT OF THE COMMITTEE ON CITY RULES*

BY H. W. FULLER, CHAIRMAN; D. A. HEGARTY, F. I. FULLER, M. C. BRUSH, C. B. BUCHANAN, M. M. PHINNEY

The committee on city rules submits as its report certain amendments to the present code of rules, several new code rules, a list of titles for local rules, a code of carhouse rules, a list of titles for local carhouse rules, pre-payment car rules and a list of titles for local pre-payment car rules.

[The text of these proposed amendments and additional rules was printed in the ELECTRIC RAILWAY JOURNAL for April 22, 1911, p. 713, and is not reprinted here. Editors.]

The committee, from its study of the 1909 code and the amendments thereto, is convinced that the code does not contain all the rules necessary to make a complete set of standard rules, and therefore recommends the adoption of certain new rules, and suggests their place in the code.

No mention is made in the code of the fact that certain rules necessary for the operation of any company must be drawn to meet local conditions, and it is recommended that the titles for such rules be listed in the code under a proper heading.

Further study convinced the committee that the 1909 code and amendments thereto had been drawn with the understanding that each company which adopted the code would have a set of carhouse rules. It has, therefore, drafted a set of standard carhouse rules and supplemented them with a list, by title only, of local carhouse rules.

The standard rules for the operation of pre-payment cars were drafted at the direction of the executive committee, and the list of titles for local pre-payment car rules was added by the committee in order to complete the scheme.

No attempt has been made by the committee to assign numbers to the additional rules recommended, for the reason that it seemed best to await the action of the convention with reference to the report.

The committee sent out a data sheet to 294 member companies requesting criticisms of the proposed amendments and additions. Replies were received from 147 companies, and most of the proposed changes were approved by at least 85 per cent of the companies replying.

KNCKKS FROM THE KNOCKERS

(REPORT OF SUB-COMMITTEE K, OF THE BROADWAY BARBARIANS.)

Who was Sam Trawick's lady friend? She was an artistic landscape, and the only "prop" lacking was a safety razor.

No, Helen, a Brighton punch is not a temperance drink. John L. Sullivan's right was a love tap beside it.

It is understood that Mugsy McGraw and Connie Mack were watching Hank Fasset last night with a view to engaging him as umpire for the world's series. He won't do, though. He is too modest and retiring.

Tom Mullaney is in our midst with his real boss and his pet dinky car. It may not be much, but it beats horse cars, doesn't it, Tom?

Young Bill Silver is attending his first convention. Welcome to our ranks, Billy. You will like us after you get acquainted.

Matt Brush, the boy wonder, is thirty-five years old today. Hence the congratulations which he is receiving. Matty was planning to leave town before he was discovered, but he is being closely watched and will be taken dead or alive to the Brighton Hotel to-night for a little surprise party.

Has anybody here seen Rupert?

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

HUDSON RIVER TUNNELS*

BY J. VIPOND DAVIES, CHIEF ENGINEER HUDSON & MANHATTAN RAILROAD

The Hudson & Manhattan Railroad, which comprises only 19 miles of single track, probably represents some of the most difficult conditions and also the most expensive construction of any similar railroad, and the total cost per mile of road was probably as high, or even higher, than any other rapid transit railroad in existence.

The difficulties in the construction of any such rapid transit railroad as this, practically the whole of which exists below the level of the sea, involved obviously an extremely large cost. But while the total cost of the undertaking is great and involves for the complete railroad and necessary real estate, power stations and equipment, a sum equivalent to approximately two and one-half millions of dollars per mile of railroad, the railroad is peculiar in the concentration of its business, and the short haul over which it operates its traffic permits a low operating cost per passenger to offset the high original capital cost of construction.

The system as a whole, including its connection with the Pennsylvania Railroad, has been in operation only since the first of October of this year. Nevertheless, the growth of traffic month by month for the current year has shown an increase of practically 20 per cent over the traffic of the same months last year, and as the suburban district of New Jersey develops and the education of the traveling public increases, it appears certain that a growth such as this may reasonably be expected to continue.

DETERMINING FACTORS

The determining factors in arriving at the capacity of a railroad such as this were: (1) The carrying capacity of the train, determined by the dimensions of the cars and the cars per train. Physical conditions of construction at terminals limited the possible train length to approximately 400 ft., suitably divided into eight-car trains. The cars are about 50 ft. long by 9 ft. wide. (2) The headway which it would be feasible to obtain with the best possible equipment of brakes on the cars and by a satisfactory signal system, operating an automatic block system equipped with automatic stops, permitted operation of trains on an actual headway of 90 seconds.

TRACK CONSTRUCTION

For the most part the track in these tunnels is designed with ballast foundation, but at certain points, such as on curves and at junctions, the track is on a concrete foundation, but as a general proposition we have found the ballasted track more satisfactory through the ability of the maintenance department to more easily maintain the surface and to renew ties and rails. For the most part the running rail is open hearth steel with carbon between .75 and .90. This steel is entirely satisfactory in these tunnels where the changes in temperature are extremely slight. The principal trouble which has arisen in the maintenance of track is the rapid corrugation of rail at points where power is usually applied or where brakes are applied. In such locations it has been found desirable to renew the rail without any regard whatever to the fact that the wear of the rail may not be sufficient to justify renewal, but the renewal is made solely to obviate the unpleasant "chatter" due to the corrugations in the rail.

SIGNAL SYSTEM

A portion of the system is equipped with a signal system of all-electric design, while the other portion is equipped with the electro-pneumatic system, all being arranged with single overlap and with automatic stops throughout the lines, which are under cover. The well-nigh perfect results obtained from the signal system may be interesting, as from

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

the signal failure reports for the year ending Aug. 31, 1911, the failure of signals was in the ratio of 1 to 1,050,784; automatic stops at the ratio of 1 to 2,793,591.

VENTILATION

In the construction of these tunnels, a point which may be of general interest is that of ventilation and temperature in the tunnels. The maintenance of continuity in the single tube system is carried out as far as possible, and only at stations with island platforms or at junctions is there any break in this continuity. The result is that the trains themselves force the column of air through the tunnels to points where exhaust fans are installed, which remove this air column as it is pushed forward to the fans. At the same time at other points intake fans for supplying fresh air from the outside are installed, which force fresh air into the tunnels in the rear of trains to supply the displacement. By actual test and experiment as to the movement of the column of air ahead of trains, it has been found that 60 per cent of the entire tunnel displacement is pushed forward by the moving trains. I stated just above that fresh air is taken in by intake fans. It will be obvious that in the hot summer months when the external temperature is higher than the temperature in the tunnels forcing air into the tunnels or the changing of the tunnel air with the outside atmosphere would not tend to lower the temperature in the tunnels, but, on the contrary, might tend to increase it. Furthermore, there must of necessity be a large heating effect from the operation of motors, journal bearings and from brakes, as well as the great volume of heat generated by the passengers themselves, and it, therefore, becomes of the utmost necessity to actually lower the temperature in the tunnels.

COOLING EFFECT OF CONSTRUCTION

The construction of the Hudson & Manhattan tunnels, as well as the tunnels of the Pennsylvania Railroad, is for the most part with an exterior metal lining of concrete, but in every case the lining itself is in contact with the moist exterior soil, thereby providing the means of properly absorbing and radiating the heat within the subway into the exterior soil. The effect of this construction has been most satisfactory to the management as well as to the traveling public, with the result that the temperature in the tunnels throughout the year, both winter and summer, does not vary more than 10 degrees.

REPAIR FACILITIES

In the early operation of the railroad, when only the Hoboken line was completed, and it was desirable to commence operation at once, even with an incomplete railroad, we had no car yard in the open and cars had to be inspected and maintained standing on tracks underground. At a later date, when we were able to extend our lines into New Jersey and get our car shops and yards in operation, it was readily seen how absolutely essential it is in the operation of any such tunnel railroad as this to have the inspection and maintenance of cars executed in the open where there is plenty of natural light. The cheapest thing possible in the maintenance and care of car equipment is daylight, and any underground tunnel must be considered only with proper provision for car-shop sand yards in the open daylight.

The ladies voted down the "thank you" to the weather man yesterday. He spoiled their afternoon at the Country Club. Charley Elliott came to the rescue as usual and arranged a card party on the Pier at the eleventh hour.

Hon. George A. Post, president Railway Business Association, and chief executive of the Standard Coupler Company, spent a few of the late hours on Tuesday and a few of the early hours on Wednesday at the convention. His rotund and eloquent presence was welcome to his many friends.

JOINT MEETING OF THE ACCOUNTANTS' AND TRANSPORTATION & TRAFFIC ASSOCIATIONS

The joint meeting of the Accountants' Association and the Transportation & Traffic Association was held in the Greek Temple yesterday. W. H. Forse, Jr., president of the Accountants' Association, called the meeting to order at 12.15 p.m.

Mr. Forse stated that the co-chairmen of the committee on express and freight accounting were unable to be present. In their absence E. L. Kasemeier, Ohio Electric Railway, a member of the committee, was asked to read the report. Mr. Kasemeier then read the report, an abstract of which is published elsewhere in this issue.

DISCUSSION ON JOINT REPORT ON EXPRESS AND FREIGHT ACCOUNTING

J. K. Choate, Otsego & Herkimer Railroad, asked the committee how freight car mileage was figured.

Mr. Kasemeier said that freight car mileage would be loaded car mileage.

Mr. Choate asked how a comparison would be made on his road, where passenger cars were handled by single cars, and freight cars by train mileage.

Mr. Kasemeier said the record should be made from the dispatcher's report.

Mr. Choate asked how, with the locomotive or a motor car on the front of the train, followed by eight or ten loaded cars, the motor car and the loaded car behind would be handled.

Mr. Kasemeier said it would have to be considered as so much per car. There had to be some basis for division, and car mileage seemed to be the most plausible one.

Mr. Choate said that the company he represented made arbitrarily a charge against freight for expenses. It would not be fair to charge the same ratio proportionately for a steam freight car which had been accepted for delivery as for a single motor car, with its motors carrying an equal load. There would be greater wear and tear on the track for one than for the other. The proportion of power used in propelling ten cars in a train was a very different matter. It would be necessary for many of the roads handling freight to adopt arbitrarily a different method from that outlined in this report.

Mr. Kasemeier said that the report would not meet all conditions. Some roads would have to alter the basis outlined a great deal.

Mr. Choate said that he considered train miles and also earnings in arriving at the charges, and a very different basis from either train mileage or car mileage was used. The wear and tear on the tracks was entirely different with a train of ten or more cars from what it was on a single car. The great difficulty in the determination of a cost figure was the vast difference in the loading of cars. A 50-ton coal car, loaded with coal, might be next to a car of hay with less than 12 tons. He did not know how to make a division.

J. H. Neal, Boston Elevated Railway, did not think the report was intended to cover operations so extensive that they approached in any degree the operations of the steam railroad. The steam railroads had the ton mile unit, and in a case such as had been described he thought that should be used. It was stated that ton-mileage in most cases would work out all right, but each company had to bear in mind factors peculiar to itself. For instance, it was very evident that if a freight terminal was constructed in the heart of the city, the interest on it would eat up the return on the freight received, so that it was not sufficient to figure the operating expenses and then deduct them from the gross earnings and assume that a profit was made. Mr. Neal did not believe that rules of universal application could be made at this stage. Sometimes freight made almost express time. Sometimes trailers could be picked up under certain conditions of grade, etc., and helped along, thereby reducing the actual train mileage.

E. C. Spring, Philadelphia & Western Railway, said there was a great difference between the Eastern and Western roads in the treatment of freight and express service. He was a thorough believer in the ton mile unit rather than the car mile. The ton mile unit afforded a just basis of comparison and could be used by all.

President Forse read a letter on the subject which had been written by Irwin Fullerton, auditor of the Detroit United Railway, who had been asked to speak on this subject, but was detained at the last moment.

F. D. Norviel, Indiana Union Traction Company, said that inasmuch as this meeting would be ended the next day and there had to be some action on the committee reports, it would be better to adopt the report as made by the committee. There would not be any future year in which conditions would not arise that would make revision necessary.

Mr. Russell said that the rules might be recommended to those who were beginning or those who had not adopted any methods of ascertaining the differences, but when a distribution of expenses was made between two different departments of service it had been found by experience that in the passenger department alone the car mileage unit was not a proper basis for comparison between roads. On one road a meter was installed to show the exact amount of power used in one section, and the cost of power per car mile was a little less than one-half what it was on the rest of the system, owing to the difference in cars. The car mileage basis for the passenger department alone was not the proper basis for distribution of the expense accounts. It certainly cost more in the way of maintenance of track, overhead and especially of equipment, for a double-truck passenger car than for a single-truck car. In further consideration of the questions it might be that there would be some other method of division that would appeal to the committee. In formulating a set of rules it should be possible to look far enough ahead to provide for contingencies and make the foundation for the divisions so clear that they could be built upon with any sort of superstructure that might arise afterwards.

The report of the committee was accepted and filed.

The exhibit of the Standard Motor Truck Company includes six types of double trucks, a number of forged steel wheels, including "one wear wheels" and a forged steel gear. The new truck side frames are pressed complete from one piece of sheet steel and are much stronger and lighter than forged frames. The journal bearings are made to hold the axles from end movement and are adjustable to take up wear. The bolster hangers are protected from wearing down. The brake shoes, on trucks with no brake beams, are held by a new form of single brake hanger so they cannot wear unevenly or to one side of the wheels. The shoes are prevented from chattering and squealing on steel wheels by the use of a single hanger which is attached directly to the brake head. A new form of brake rigging is shown on the No. 0-36 maximum traction truck, which is lighter than former designs and has a form of adjustment which reduces the time required to put on brake shoes. An automatic form of brake adjuster is exhibited which is being extensively used on all of this company's trucks. For all of the large trucks a compound form of easy riding elliptic spring is used. The company's "slogan" is in evidence by two printed signs, which read, "Ask Any of the Roads Using Them." The company is represented by A. W. Field, general sales agent; A. Christianson, chief engineer; W. C. Price and R. Hammerstron, engineers of Pittsburgh; W. G. Cory, sales agent of New York, and George Boyd, sales agent of Chicago.

In the booth of the Sangamo Meter Company, Springfield, Ill., several of its latest type watthour meters are shown. Among these is the Sangamo mercury motor watthour meter of the street car trip reading type.

THE CARNEGIE DISPLAY

One of the leading features of the Carnegie Steel Company's exhibit at spaces 354-364 is the display of Schoen and Slick rolled steel wheels. This company manufactures both steam railroad and electric railway wheels by two processes, the older of which is the Schoen process, examples of which have been on exhibition at former conventions. This year it is showing two subway or elevated types of wheels, three interurban wheels of standard design and one narrow rimmed street car wheel for city service. Along with these wheels is shown one of the cylindrical blocks of steel from which the wheels are forged and rolled. These blocks are sheared from a 15-in. round rolled from a 22-in. square ingot, thus giving a reduction of 61 per cent in cross section. The use of these rounds instead of flat, rectangular slabs represents this company's latest improvement in steel wheel manufacture.

The Slick process, being also adapted to the manufacture of comparatively small light wheels, has been utilized to produce rolled steel blanks for street railway motor gears, and two of these blanks, as well as a finished gear, are shown by the company.

Axles have not been given special prominence in former exhibits, but this year special attention has been given to them, due to discussion in the Engineering Association regarding standard specifications. Two racks, containing four standard axles each of medium and hard grade respectively, occupy the center of the Carnegie space. In each grade one axle is shown for each of four qualities, viz., standard, forged, annealed, toughened and high test. A comprehensive pamphlet descriptive of the process by which these axles are produced and giving results of a series of tests is being distributed.

Steel sheet piling, while attracting less attention than in former years, is still one of the interesting products being exhibited by this company. In addition to a section of track laid on steel cross ties and with Duquesne rail joints, in concrete construction, the company also has on exhibition a tie taken from track which had been laid seven years. This tie is still in practically perfect condition, having lost but 3 per cent in weight. The general impression is that steel cross ties in concrete construction cost very much in excess over a standard type of wood tie construction, but data published in the company's pamphlet on "Modern Track Construction" show that this impression is far from being warranted by the fact.

Vanadium alloy steel is now being manufactured in considerable quantities by the company, and a number of car parts, such as a rolled-steel wheel, an axle, different types of springs and bars, made of vanadium steel, are on view. A mechanical device for vibrating a car spring to demonstrate the advantages of vanadium steel is in operation at space 183.

The Street Railway Association of the State of New York is perfecting plans to educate children to the danger of accidents that they risk each hour. With the co-operation of teachers and parents, personal talks, pamphlets of warning and danger signs are to be presented in schoolroom, home and playground. Beginning with the mothers and fathers technical data showing the margin of safety about all kinds of cars and tracks are to be distributed. On blotters and other attractive souvenirs prepared for the youngsters there have been printed such maxims as "Don't hitch to a car," "Don't touch loose wires," "Don't play on tracks," "Don't jump off until the car stops," "Don't cross tracks till you look or send your little brother or sister across alone." Recent reports of the Public Service Commission of the First and Second Districts show that accident damages have cost the street railways of New York State almost \$5,000,000 in one year.

EXHIBIT NOTES

I. R. Nelson, of I. R. Nelson & Company, Newark, N. J., is attending the convention in the interest of his own company.

Wylie Brown, general sales agent of the Bridgeport Brass Company, is present at the convention in the interest of phono-electric wire. He is stopping at the Shelburne.

W. A. Darrow, Philadelphia representative of the Elliott Company, power accessories, and Liberty Manufacturing Company, tube cleaners' tools, both of Pittsburgh, spent Wednesday on the Pier with his many friends.

The National Brake Company, Buffalo, N. Y., is calling particular attention to a new type of Peacock brake for use on storage-battery cars. This model is very light and weighs only about half as much as the standard types.

E. W. Furbush, L. O. Duclos and E. A. Duclos are attending the convention in the interest of the Massachusetts Chemical Company. They are not exhibiting any of their insulating products, but have an attractively decorated booth in space 234, Building 2, for the reception of their customers and friends.

The Pressed Prism Plate Glass Company, Morgantown, W. Va., with offices in New York City and Chicago, has an exhibit of its ornamental plate glass in space 191, Aquarium Court. It is making a specialty of high windows, deck and Gothic glass for electrical railway equipment. The representatives are A. O. Brown and L. R. Waterman.

The Railway and Industrial Engineering Company, Pittsburgh, Pa., is demonstrating the advantages of a new line of horn-type apparatus for use on high-voltage circuits. Its principal recommendations are reliability, simplicity and low cost. It affords a simple and effective means for controlling and protecting industrial loads on high-voltage railway transmission lines.

At the Brill exhibit in the Main Building is shown a line of fare boxes which cover every requirement. Several types are arranged to be attached to the platform floor and several to railing. Of the latter is a particularly interesting box designed for the Public Service Corporation, and which is largely made of aluminum. It is known as the No. 4 Special. One of the larger boxes, the No. 3A, has an all-steel case and is popularly known as the "narrow four-compartment-till box," as its width is but $3\frac{3}{4}$ in.; the height is $4\frac{1}{2}$ in., and the weight 70 lbs. All of the Brill fare boxes operate on the same principles and have the same tilting plate and cash drawer mechanisms. The boxes are made with and without trip registers and totalizers. The handle at the top operates both the tilting plate and the totalizer.

Rooke Automatic Register Company, of Providence, R. I., is showing a new type of the Rooke automatic register at space 246, Building 3. The register is of the same size as the old type, but registers on as many dials through different forms of fares, nickels, dimes, and one form of metal tickets to cover a six-for-25-cents, or any other form of fare. The Rooke register is now in successful service on over forty roads throughout the United States. It is stated that not in a single instance for the past four years has a company that once installed the Rooke system discontinued its use. During the past two months the Rooke system has been placed on the lines of the Wallkill Transit Company, Middletown (N. Y.); Port Jervis (N. Y.) Traction Company; Catskill (N. Y.) Traction Company; Black River Traction Company; Watertown (N. Y.) Company, and the Fishkill (N. Y.) Electric Railway Company. George F. Rooke and W. A. Williamson are present to explain the advantages of this system of fare registration.

Among the Exhibits

T. G. Abel, of Brooklyn, N. Y., specialist and contractor in car painting, is at the convention in the interest of his own business.

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Home Rubber Company, Trenton, N. J., is exhibiting all its rubber products at space 274, among them being the black sheet packing N. B. O.

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Charles N. Wood, of the Wilson Trolley Catcher Company, of Boston, Mass., is located at space 305. Wilson trolley catchers and retrievers compose the exhibit.

* * *

James B. Strong, Arthur Gemunder and Wellington B. Lee, of the Ramapo Iron Works, of Hillburn, N. Y., are displaying two types of switch stands and lanterns for interurban and steam railway service at space 400, Building 3. The works manufacture all types of special track work, steam, electric and industrial, but consider this material too cumbersome for exhibiting at the convention.

* * *

The gears and pinions exhibited by The Whitmore Manufacturing Company, Cleveland, at spaces 162, 164, 164A, have all been lubricated by Whitmore's Gear Protective Composition. This company makes the composition, not the gears. The gears and pinions exhibited have had large mileages in regular service on various roads, and their excellent condition is a demonstration of how Whitmore's Gear Protective Composition increases metal life, without increasing the cost of lubrication.

* * *

A new metal trap door for flush platforms and an improved adjustable all-metal shade roller are features of the exhibit of The O. M. Edwards Company, Syracuse, N. Y., in spaces 325, 327, 329, 331. The display includes all its well-known types of trap doors, window fixtures and sash locks, etc., but a large part of the space is devoted to Omeco metal furniture for office use. A specimen of all-metal chiffoniers of special design for use on battleships of the United States Navy is attracting considerable attention.

* * *

Two good things from the other side are to be seen in space 218, occupied by Wonham, Sanger & Bates, New York, N. Y. One of these is the H-B life guard, and the other is the C. H. ampere meter. The life guard is well known, over 21,000 being in use throughout the United States. The meter is of more recent introduction, but the company is confident that its success will be just as great as that of the life guard. Both of these devices were placed before American electric railways only after they had demonstrated their merit on many installations in Great Britain and other countries.

* * *

The largest and most elaborate boiler rooms exhibit ever shown at an electric railway convention is offered by the Murphy Iron Works, Detroit, Mich., at space 99, Machinery Hall. The exhibit consists of a 550-h.p. Murphy automatic smokeless furnace weighing approximately 60,000 lbs. This furnace is of the heavy duty type, operating under natural draft at loads approximately 1,100 h.p. Running at this rating it will burn from 35 lb. to 40 lb. of bituminous coal per sq. ft. of grate surface. The stoker exhibited was built for the American Sugar Refinery's Brooklyn plant, and is one of the units of a 13,200-h.p. installation. The furnace as exhibited is complete in every detail.

The Griffin Wheel Company, Chicago, Ill., is showing a new chilled-iron wheel known as the "F. C. S." type. The specific merit claimed for this wheel is that it possesses the greatest possible efficiency. The surface of the flange and tread is composed of 3½ per cent carbon white iron, which forms an excellent material to reduce abrasion to a minimum. The plates of the wheels are of a soft, yet strong metal capable of withstanding the shocks and strains of severe service. The hubs are also soft enough to permit easy machining, and yet have sufficient elasticity to give the necessary pressure against the axle to prevent the wheels from working loose. Other types of wheels are also shown.

* * *

In addition to the regular exhibit at its booth, the Cleveland Frog & Crossing Company has a Kerwin portable crossover out on the pier beside the Greek Temple. This is the invention of John Kerwin, of the Detroit United Railway. It is constructed of 80-lb. rails and is built together just like a permanent crossover. It rests on flanged shoes which hold it securely in position on the rails of the track without the necessity of any watching or attention whatever. It can be moved from place to place simply by attaching a chain to rings provided for the purpose and pulling it along behind a car, locomotive, etc. It slides readily on its flanged shoes. The whole crossover weighs 20,000 lbs. and can be adapted for any width of devil strip.

* * *

The Indianapolis Brass Company is exhibiting in space 210 a motorman's mirror designed to be attached to the front vestibule of the car. The glass may be adjusted to the proper angle to give the motorman in the vestibule a clear view of the rear steps. The company is also showing the protective and reclaiming pole sleeve for iron poles. This device has self-locking joints which are so designed that the two halves may be fitted together around the pole to make a perfect sleeve. After it is placed around the pole it can be filled in with cement or other substance, giving a bearing surface over its entire length. These sleeves are 30 inches long. The company is also showing its general line of trolley cars, splicers, frogs, crossings, section insulators, Morganite and Battersea carbon brushes, car equipment specialties and linemen's tools. James H. Drew, secretary, is in charge of the exhibit. He is assisted by F. E. Dickieson.

* * *

The General Electric Company is showing its ozonator, a device designed to improve ventilating conditions in confined places by generating ozone, which is a powerful oxidizing and deodorizing agent. It consists of a transformer for changing the supply voltage to a value high enough to operate the ozone-generating elements. The latter consist of several glass tubes coated with copper, each containing an aluminum tube separated from the glass tube by a small annular gap. One high-voltage lead from the transformer is connected to the copper coatings of the glass tubes and the other lead is connected to the aluminum tubes. When the current is turned on a violent electrical discharge takes place between the inner surface of each glass tube and its inclosed aluminum tube, thereby changing the oxygen of the air in the annular air gaps into ozone. A centrifugal blower mounted on the top of the case blows air into the ozonizing chamber and through the generating elements, thence through the screened opening in the front of the box into the room. One small switch on the top of the case is used to put the entire apparatus in or out of service. The other, a three-point switch, serves to connect the transformer to the ozonizer for generating ozone in amounts to suit varying conditions of congestion, humidity and other requirements.

S. D. Barnett, New York, N. Y., is attending the convention in the interests of Randall graphite sheet lubricator, manufactured by the Strong-Carlisle Hammond Company, Cleveland, Ohio. Mr. Barnett also represents the Nickel Chrome Car Wheel Company.

* * *

The Nachod Signal Company, Philadelphia, Pa., is exhibiting at space 142 a track model with cars operating on it to show the LD signal which is used for single track. The company is also showing, for the first time, a new signal box hanging, which greatly reduces the cost of erection.

* * *

Charles E. Smith, manager of the electrical department of the Standard Paint Company, New York, has an attractively decorated booth but no exhibit at space 277. This company's widely used P. & B. insulating products have now been on the market for over twenty years. Harold E. Lavelle is also present at the convention.

* * *

Standard Underground Cable Company is exhibiting at space 282 an extensive line of its products, including cable accessories, as well as bare and insulated wires and cables. The two special features of this exhibit are a terminal pole showing its multiple D. O. A. terminals connecting a 25,000-volt underground, three-conductor, lead-covered cable to an aerial line and a 5,000-volt subway junction box.

* * *

Portable electric track tools in operation are shown by the Chicago Pneumatic Tool Company at spaces 100, 102, 104. Among other tools are track drills for bonding, screw spike drivers, grinders and a complete line of hand drills from 3-16 in. to 2-in. drilling capacity. The company also has in operation a 450-ft. belted compound air compressor, furnishing compressed air for the various exhibitors. Its pneumatic hammers and drills are also on exhibition.

* * *

The exhibit of the Universal Trolley Wheel Company, space 343, contains two interesting trolley novelties. One is an independent center trolley wheel which reduces scrap from pounds to ounces and which is so constructed that interlocked pockets in the axle regulate the flow of grease from the lubricating chamber in the hub. The other novelty is a quick-detachable, non-rivet contact spring which can be placed in the harp in a few seconds without removing the pole from the car. The exhibit is cared for by L. J. Tetlow, L. H. Kendall, H. L. Bancroft.

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A full line of Expansion boring tools, including a new "2 in 1" boring tool for steel wheels is being displayed by the Matthews-Davis Tool Company, St. Louis, Mo., in space 119. The "2 in 1" tool makes both the roughing cut and the finishing cut. It is asserted that this tool increases the efficiency of a boring mill over 50 per cent. It has quick, accurate micrometer adjustment for each pair of cutters. The company is also showing a new micrometer caliper which permits taking the size of the axle to be fitted, making the calculations for hydraulic fitting without having to transfer the size with an inside caliper.

* * *

The Recording Register & Fare Box Company, New Haven, Conn., whose exhibit is located in space 130, Machinery Hall, is exhibiting six types of fare boxes, two types of fare registers and its line of well-known self-lubricating trolley wheels. The fare boxes include samples of the types recently furnished to the United Railways Company of St. Louis and the Public Service Railway, New Jersey. There is also a registering fare box for tickets and cash. It registers all the cash and then returns it to the conductor; the tickets are retained in a drawer and are

accessible only to a duly authorized person. Other novelties are a box designed especially for the Boston Elevated Railway and the No. 8 fare box, which is similar to No. 5, but simpler in construction.

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An original application of electricity to the heating of cars is being displayed by the Gold Car Heating & Lighting Company, New York, N. Y., at space 217. The principal part of this device is an iron pipe which runs under the longitudinal seat of the car and which contains a small quantity of water. The outer side of the pipe is surrounded with a radiating coil of wire, while a resistance coil is inserted in a jacket at one end of the pipe. The entrance of current heats the water, which thereupon circulates freely throughout the pipe for the full length of the car. It is stated that this system gives more efficient radiation for a given amount of current than other heaters. In fact, not more than 9 amp were necessary in a given case as compared with 12 amp to 14 amp for the ordinary type of electric heaters. The company is also exhibiting its new ventilated-core electric heaters. The merits of these devices are being explained by Edward E. Gold, E. B. Wilson, J. M. Stayman, F. H. Smith, F. Cahill.

* * *

The Western Electric Company is perhaps unique at the convention, in that not only is its apparatus shown in its regular exhibiting space but Western Electric telephones appear at every other exhibiting space throughout the convention halls. In its spaces 233 to 240 a complete railroad train dispatching system is set up. This consists of one dispatcher's outfit and three way stations equipped with the No. 50 type selectors and the various types of telephone sets which are used in this class of service. These telephone sets include the Western Electric and Van Akin telephone arms, the No. 1020 type arm and a new folding bracket type, the well-known desk stand and a variety of other telephone details. This equipment is the same as that in service to-day on over 50,000 miles of steam railroad in the United States. It clearly shows the recent advance of the telephone, which is rapidly replacing the telegraph for railroad work.

* * *

In view of the agitation regarding the standardization of drawbars the exhibition of the W. T. Van Dorn Company in Aquarium Court is one of timely interest. During the past year this company has developed at least six new coupler heads, each designed to conform to recommendations made by the standardization committees and to be interchangeable with couplers of the M. C. B. type. The very latest Van Dorn drawbar head contains many new automatic features. It not only couples and uncouples automatically, but it is so constructed that the train air line, signal system and heating pipes are automatically connected or disconnected by the same operation. This coupler is not built along M. C. B. standards, but by the aid of a small auxiliary casting it may be coupled with the M. C. B. type of head. Another new coupler shown is the Van Dorn No. 40. This is an M. C. B. radial drawbar which through the use of a pivoting head is adapted for abrupt changes in grade. The head is supported and kept in alignment by strong springs located at the top and bottom of the casting and just back of the head. Practical demonstrations are made showing the ease with which this head can be coupled with the Major M. C. B. head and exploiting its practicability on lines where abrupt breaks in grades occur. The company is also showing for the first time its No. 41 drawbar, which has a 14-in. knuckle, thus affording unusual vertical play. This drawbar has a centering arm and butting wall and other exclusive advantages. It was designed especially for interurban service. Many other types of couplers are also exhibited.

Poole Brothers, Chicago, Ill., are showing in space 315 an attractive line of booklets, time-tables, folders, tickets, etc.

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Niles Car and Manufacturing Company, Niles and Cleveland, Ohio, did not bring a car to Atlantic City this year, but has its headquarters at space 273, where J. A. Hanna and F. C. Robbins may be found.

* * *

The McQuay Norris Manufacturing Company, space 308 Building No. 3, is quoting some very interesting data on the results of using "Leak-Proof" piston head packing rings for air compressor, pump, and engine service.

* * *

The Detroit Steel Products Company is showing in space 168 an interesting model demonstrating Detroit Fenestra solid steel window sash which has been used in the new power station of the Boston Elevated Railway and other modern power houses and carhouses.

* * *

Holland roller-bearing bases, anti-friction pin bases, trolley harps and wheels, and sleet cutters are the principal features of the exhibit of the Holland Trolley Supply Company, Cleveland, at space 414. Mine trolley harps and a mine roof drill are also shown.

* * *

Samples of Galco, the new material for use in headlinings and other interior finish of cars, are at space 186. This material is manufactured by the Gardner Artificial Lumber Company, Barberton, Ohio. The general sales agent is the Marflo Railway Appliance Company, Cleveland, which is represented at the convention by J. P. Henderson.

* * *

Wonham, Sanger & Bates, New York, N. Y., report an order for 900 H-B wheel guards from the Chicago Railways Company. This is in addition to an order of some time ago for 2500 equipments now in service. The Chicago City Railway Company has also ordered 576 H-B wheel guards in addition to 1800 already in service. This guard is now standard on all surface cars in Chicago.

* * *

The Adjustarod is a new "deadman" anchor rod which is being exhibited by Crouse-Hinds Company, Syracuse, at space 216. It is a combination of clamp, pulley, swivel, rod, washer and lock-nut, which affords facilities for tightening. The exhibit also includes arc and incandescent headlights, condulets and guy anchors. Literature pertaining to these products is provided for distribution.

* * *

The combination light and trolley poles which are being shown by the Electric Railway Equipment Company, Cincinnati, Ohio, at space 419, are attracting a good deal of attention. There are samples of a number of styles and two poles outside the booth are connected up and lighted. The exhibit includes a very complete display of line material for both regular and catenary construction.

* * *

The new coin register for use on prepayment cars which is shown for the first time by the International Register Company is one of the big attractions in Building 2. This register automatically registers pennies, nickels and dimes and automatically records these in 5-cent fares. When quarters are put into the hopper they are not recorded but are retained at the top so they may be readily withdrawn by the passenger.

* * *

The Baldwin Locomotive Works have on exhibition at spaces 105 to 111 three types of trucks. One feature of the exhibit is the actual weighing of a truck which is suspended from a dynamometer and shows that every pound of truck, (exclusive of wheels, axles and boxes) will sustain

six pounds of load. The specifications for these trucks are being distributed in the form of a special pamphlet. The company is represented by S. A. Bullock, Wallace R. Lee, W. B. Keys, C. F. Dodson and C. H. Peterson.

* * *

An innovation in weatherproof windows and fixtures for street and interurban railway car windows is being displayed at spaces 374, 375, by the Transportation Utilities Company, New York. The operation of the window-sash is made easy and positive according to an entirely new design. Different types of weatherproofing make the designs applicable to any particular arrangement of car windows on both old and new equipment with either single or double sash. The weatherproof window arrangements displayed are said absolutely to prevent the admission of wind, dirt, cinder, etc.

* * *

The exhibit of Forsyth Brothers Company, Chicago, Ill., at spaces 342, 344, demonstrates what can be done with pressed-steel units in car construction. This company is showing its unit pressed side sections, which are being used in the construction of some of the latest types of all-steel cars. These sections are made in several styles. When assembled with sills and plates these unit-sections form a truss of the entire side of the car. They reduce the number of parts, joints and rivets to a minimum and may be used in building any type of car. The company is also showing brass sashes suitable for any type of car, and several other types of self-adjusting metal sashes which are being used on cars built both for steam and electric railway service.

* * *

Steel wheels are being exhibited this year by the Lobdell Car Wheel Company. The special features of these wheels are strength, lightness and compactness for a spoke design of special open-hearth steel and heat-treated. The company's special process insures an extremely hard flange and tread section and one that is of uniform hardness all the way through. One-wear steel wheels are furnished for roads not having shops equipped for turning steel wheels to a smaller diameter and for roads desiring a light durable steel wheel with a very hard tread and flange. These are essentially the same as the standard types excepting that the rim is much lighter. Lobdell one-wear wheels are adaptable for any service from electric locomotives to storage battery cars. The company also has a capacity of over 600 chilled-iron wheels a day.

* * *

Feralun, one of the Amco products manufactured by the American Abrasive Metals Company, New York, N. Y., is exhibited in several forms at space 437 on the north aisle near Convention Hall. H. W. Mowery, of the New York office, and J. P. Warfle, of the Philadelphia office, are in attendance. Types of safety treads for cars and plates of Feralun on steel steps are shown. Feralun safety treads are applicable also on station stairs and wear indefinitely. In power houses this material is available for steps or floor plates as it does not get slippery even when covered with oil. To illustrate another quality of Feralun, an interesting contrast is shown by means of a cast iron plate which is subjected to a special torch flame for six minutes. This burns a hole through it, while a Feralun plate of the same size subjected to the same test shows no signs of deterioration. This quality of Feralun makes it invaluable for fire-door liners, grate bars, etc. It is being so used by the Brooklyn Edison Company, New York Edison Company, Interborough Rapid Transit Company and others, but owing to its recent application to these purposes its exact value in this line is not determined, although it has already shown decided superiority over the ordinary materials used. Ash removal system parts subjected to excessive abrasion, as well as crusher parts, pumps, and other pieces of similar apparatus, are also made of this material.

The motor gear and pinion department of the E. W. Bliss Company, of Brooklyn, N. Y., is represented at the convention by B. W. Stone.

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Sterling Varnish Company has spaces 429 and 430, near the farther end of the Pier, where it is welcoming its many friends. The company is represented by H. C. Todd, A. S. King and W. F. Hebard.

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The exhibit of the Duff Manufacturing Company, located at space 431, contains a complete line of its products, which include Genuine Barrett jacks, ball-bearing jacks, Duff-Bethlehem jacks and motor and armature lifts.

* * *

O. H. Reynolds, associate member representing William Jessup & Sons' Steel Company, New York, is present at the convention in the interest of the railroad steel business of the company. Mr. Reynolds was formerly mechanical engineer of the Northern Pacific Railroad, and later New York editor of the *Railway Review*.

* * *

L. Zink, foreman blacksmith of the Detroit United Railway, is showing in the booth of the Baldwin Locomotive Works, spaces 105, 107, 109, 111, a new brakeshoe adjuster which has attracted the attention of mechanical men. This device takes the place of the ordinary turnbuckle for taking up the wear of brakeshoes and of steel wheels.

* * *

N. W. Halsey & Company, dealers in investment bonds, are located in space 10, Building No. 1, and H. D. Robbins, representative of the company, is in attendance discussing financial matters with railway officials. Mr. Robbins reports that at present the bond market is particularly good. He believes that this condition is natural at a time when the price movements in stocks are uncertain.

* * *

An exhibit of much interest is that of the Cambria Steel Company, located at spaces 321, 323. One of the special features is a pair of "Cambria Special" steel axles, made of steel which is hard, but at the same time so tough that the axles have been twisted cold around each other in the form of a rope. The axles made of this "special" steel have given good service on the cars of the Interborough Rapid Transit Company's lines in New York City.

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The National Carbon Company, Cleveland, Ohio, is giving out a line of educational literature, including the following: "Commutator Slotting," a treatise on reasons and methods with illustrations; "Brush Testing," treating on the best known methods and showing how this company does its extensive brush testing; "Arc Lamp Practice," an extensive and well illustrated treatise on the subject; "Analogies Between Battery Current and Water Flow," a non-technical book.

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The Universal Audit Company, New York, N. Y., engineer in economics, administration and efficiency, is displaying charts showing analysis of commercial organizations in every department, including financing, selling, producing and accounting. The exhibit shows the principal features of a correctly designed organization. These charts are reproduced also in booklet form and distributed at the exhibit at space 415. The exhibit is in charge of H. F. Stimson and Frank G. Shinn.

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The Charles N. Wood Company, Boston, Mass., is exhibiting at space 305 the electric railway signal of the Electric Railway Signal Company. This signal is designed for use on city and suburban roads operating cars at moderate speeds and gives its indications by semaphore arms as

in steam railroad practice. No lamps are used in the signal circuit, although the semaphore arms are illuminated by reflected light at night. The operation of the signals is explained by the inventor, W. M. Chapman.

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The exhibit of the J. W. Paxon Company, located at space 249, is unique in that it is the only one of its kind at the convention. The company makes a special feature of the steel-wire frog and switch broom equipped with chisel point for cleaning grooves, frogs, switches and special work. In connection with this is also being shown an extensive line of wire and bristle brushes as well as brooms adaptable to all purposes and uses on tracks, cars or power houses. Another feature is a set of circular brushes used in the Nichols system of car cleaning, as mentioned in one of the convention discussions.

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Le Roy Scott, general sales manager Federal Storage Battery Car Company, Silver Lake, N. J. (Beach cars with Edison storage batteries), is apologizing to the many that expected to see one of the latest type Beach cars in operation at Atlantic City during the big show. Mr. Scott is in fine humor and says he is happy because his company has just advanced another step by closing an order for its first storage-battery three-car train to be operated by the multiple-unit system of control, in through service on a steam road. Mr. Scott reports the company's new factory "chock-a-block" with battery cars and that it could not beg, borrow or steal a car from the lot under way or finished to show at the convention this year. Ralph Beach, president, will be at the Marlborough-Blenheim Thursday to see his friends and look over car accessories.

* * *

This year's exhibit of the Pennsylvania Steel Company, located at space 187, possesses many interesting features which have not hitherto been covered by exhibits of this character. The celebrated Mayari steel is represented by rods bent into peculiar shapes and turned to show the possibilities of this steel for the finer parts of automobiles and light machinery requiring superior quality of metal. There are also planer chips demonstrating the difference in the quality of open-hearth steel and bessemer steel. The exhibit of street railway frogs, mates and switches of various kinds shows an exceptional quality of excellence in this product. An entirely new feature in the action of an automatic switch stand is also shown. This consists of a special crank and lug which operates a pin that shears off when the switch is trailed through, thus saving the parts of the switch stand from being broken and making a very inexpensive feature in repairs to the stand.

* * *

The Midvale Steel Company's exhibits are at spaces 433 to 436 at the end of Pier near the entrance to the Greek Temple. One of the most interesting of these is a sample of a properly heat-treated locomotive driving axle and a motor-truck axle for electric service. The descriptions from the company's testing laboratory giving the physical properties and the method of producing this quality of steel throw considerable light on this much-discussed subject. Another interesting exhibit for electric railway service is a pair of axle-mounted rolled-steel wheels which have been mated for hardness or carbon content as well as for diameter. Heretofore the latter feature only has been considered important in the mating of wheels, but this exhibit will give food for thought to those who are interested in the uniform wear of wheels where hardness is shown to be such an important factor in pairing. Another exhibit shows a pair of rolled-steel wheels which have already demonstrated their phenomenal wearing qualities by running 80,000 miles without a single turning of the treads. Various types of steel-tired wheels are also shown.

THE WHARTON EXHIBIT

The exhibit of Wm. Wharton, Jr., & Company, Inc., adjoining the main lobby, is unique. Instead of showing the usual variety of special track work, there are exhibited quite a number of pieces which have been in actual service a long time. These pieces were secured from the company's customers and information was obtained of the service which they had given. These records and the appearance of the pieces give most striking testimony of the excellence of the designs and constructions, especially of the great wearing qualities of Wharton manganese steel. The manganese steel parts or centers in all the pieces exhibited are perfectly tight and solid, after having sustained a large amount of traffic, while the adjoining parts are entirely worn away. The whole exhibit tends to prove the general uniformity and reliability of the Hadfield treated manganese steel, of which this company has the exclusive use.

There is shown a manganese steel keyed-in center frog which had been subjected to the traffic of 2,865,000 cars in eight years. The center is absolutely tight and good for considerably more service; the adjoining rails are worn so that they are cut through by the wheel flanges. A solid manganese steel T-rail frog was in service five years under heavy traffic of an elevated railroad for the entire period and actually outlasted twelve plain rail frogs without allowing for increased traffic. A heelless tongue switch, which has seen over four years of service, during which time about 1,650,000 cars passed over it, illustrates the reliability of the metal and the design. There is also exhibited part of a track crossing from slotted underground conduit work. This was in service six years and four months, during which time the tremendous traffic of approximately 5,200,000 cars passed over it. Another exhibit is a cast manganese steel girder rail which has seen over seven years of hard service, equal to the life of three and a half Bessemer rails; it shows little wear and was removed from the track on account of changes and not because it was worn out. There are several other pieces with similar records.

Some new, recently manufactured samples of girder rail work in solid manganese steel and keyed-in hard centers are also displayed to prove the present-day excellence of Wharton work.

NEW ALLIS-CHALMERS TRACTION BRAKE COMPRESSOR

Among the exhibits made by the Allis-Chalmers Company is its new Type AA-7 air compressor for air brake service. In general the motor follows railway motor construction. One feature is that the armature is constructed upon a sleeve which enables the shaft to be pressed out and a new one to be inserted without rebuilding the armature. The commutator is similarly assembled. The field frame is split, allowing the entire armature to be taken out with little difficulty. The gears are of the herringbone type. The pinions are hard and tough and the wearing qualities are greatly increased by the use of the high carbon steel and heat treatment. The crank shaft is drop-forged and heat-treated. The cylinders of the compressor are fitted with interchangeable bushings. This construction gives a close-grained homogeneous iron in the cylinder bushing and permits replacement of bushings due to wear without reboring the compressor body. In fact, an interchange of bushings and pistons can be made with the compressor in place on the car if desired. The cylinder head is of pipeless construction; that is, the suction and discharge ports register with ports in the compressor body and the suction and discharge pipes connect directly to the compressor body. By this construction the cylinder head may be removed without interfering in any way with the piping. A combination of splash and forced lubrication insures an abundance of oil

at all points of friction in the compressor. While primarily designed for air brakes on electric cars and locomotives, it is equally suited for stationary work of any description where compressed air is required up to 100 lb. pressure.

THE LORAIN EXHIBIT

In its exhibit this year the Lorain Steel Company has displayed the "Tadpole" tongue switch in great variety in addition to an interesting exhibit of manganese-steel switch pieces. The "Tadpole" switch is shown in the well-known "Guarantee" brand in 9-in., 7-in. and standard T-rail sections, also in the cast-iron bound design in 9-in. construction and 7-in. and 9-in. construction in solid manganese steel. In this array of tongue switches will be found designs to meet every condition of track service, from the 350-ft. radius switch for steam or interurban railway traffic to the lesser radii necessary in carhouse entrances. The exhibit further contains solid manganese steam crossings in several types and shows the use of manganese steel in the varied forms of frogs, mates, crossings, switch points, etc.

The electrical welding department shows a new form of head-supported electric weld rail joint which is being adopted by most of the users of this form of rail joint. It consists of the usual form of splice bars with an extension reaching nearly to the underside of the railhead, the space between the bar and rail being filled with hot spelter in wedgelike form which prevents any movement and which gives support to the head at and on both sides of the rail joint proper. The company is represented by P. M. Boyd, secretary and treasurer; Carrol Burton, assistant to president; E. B. Entwistle, chief engineer; Frederick Glenton, H. C. Stiff, W. Milt Brown, H. F. A. Kleinschmidt and A. L. George of the general office; and Major H. C. Evans, F. J. Drake, Joseph MacCarroll, A. L. Verner, W. W. Kingston, A. S. Littlefield, D. P. McGough, S. P. D. Ellis and James M. Brown of the sales offices.

AUTOMATIC BLOCK SIGNALS

From the exhibit of the Union Switch & Signal Company, space 300, those interested in the matter of light signals have an opportunity of observing them at a distance of 1000 ft. and under daylight conditions. Types of this variety of signal are installed on the roof of the Hotel Columbia and are controlled from the exhibit. Light signals also are in operation on the tower at the entrance to the Pier. At the Aquarium a style "B" semaphore signal, a duplicate of that on view at the company's booth, is in constant operation. The working models of single track automatic block signal installations, which are, perhaps, the most important feature of this exhibit, show clearly the operation of signals, controlled by continuous track circuits. Most of the layouts are arranged in accordance with conditions shown diagrammatically in the report of the joint committee on block signals for electric railways and therefore should be of special interest to railway men. In this connection the company is distributing Bulletin No. 57, which treats the subject in a very extensive manner.

ADDITIONAL LIST OF EXHIBITORS

Lubricating Metal Company, New York, space 187. "No-Heat" bearing, metal. Represented by T. H. Soule and Howard Crane.
Steel Tie Specialty Company, Cleveland, Ohio, space 189. Kohlmeier clips for fastening rails to steel ties. Represented by James B. Hoge and M. F. Kane.
Whittier Mills Company, Chattahoochee, Ga. "Spiral" waterproof trolley and arc lamp cord at space 43½. Glenn H. Thomas, sales manager, is in charge.
Kerite Insulated Wire & Cable Company, New York, spaces 316-318, Building 3. Kerite insulated wires and cables. Representative, J. A. Renton.