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THURSDAY, OCTOBER 16, 1913

PROGRAM FOR TO-DAY

CONVENTION MEETINGS

- 9:30 a.m. Joint Session of Accountants' and Engineering Associations, Engineers' Hall, Convention Pier.
9:30 a.m. Closing Session of Transportation & Traffic Association, Greek Temple, Convention Pier.
12:30 a.m. Session of Engineering Association, Engineers' Hall, Convention Pier.
2:00 p.m. Closing Session of American Association, Greek Temple, Convention Pier.

ENTERTAINMENT

- Golf, Blind Handicap-Medal Play, Country Club, Northfield, N. J.
11:00 a.m. Concert by William Fenrich and Orchestra, Lobby, Convention Pier.
3:00 p.m. Afternoon Concert by William Fenrich and Orchestra, Lobby, Convention Pier.
9:00 p.m. Promenade Concert and Ball, Ballroom, Convention Pier.

The Savings of Welfare Work

Those railway companies that are accustomed to look at welfare work from the point of what it costs rather than from what it saves will find some food for reflection in the figures presented by J. J. Burleigh, chairman of the committee on welfare of employees. Mr. Burleigh, who is one of the vice-presidents of the Public Service Corporation of New Jersey, states that its expenditure of \$104,818 in the year of 1912 for health, accident, old age and life insurance for 13,421 employees has actually been more than compensated by its saving in expenses due to the platform employees alone, although the latter number but 3654 men in all. The one great cause for this splendid showing is the fact that the inauguration of the several forms of insurance cut down the resignations of trainmen by 31 per cent as compared with the preceding year. Furthermore, those who are personally acquainted with the conditions on this property know that immediately after the company announced its welfare scheme hundreds of former trainmen who had left the service with excellent records applied for reinstatement. Consequently, the company has not only saved the cost of breaking in more than a thousand men but must also have a much larger proportion of experienced operators than is usually the case on large properties. The saving in the cost of training new men is estimated by Mr. Burleigh at the exceedingly low figure of \$20 per man, but a far greater saving is that which follows from the reduction in accidents. It is a rare recruit indeed who does not get into one or more costly scrapes during his first year. Such figures as the Public Serv-

ice Corporation has been able to disclose prove conclusively that the average workman is wise enough to remain in continuous, loyal service with the employer who shows some regard for his future as well as his present interests and also that the employer himself will actually save money in a tangible way by following such an enlightened policy.

Importance of Express and Freight Traffic

The experience on most interurban lines has been that passenger business develops rapidly for the first few years but that later on it increases only as fast as the population of the territory served. This failure to show a permanent rate of increase is especially evident where the electric interurban lines traverse a widely diversified territory, and to meet the growing cost of operation as the property ages and renewals are necessary it generally becomes obligatory to look to other fields than passenger traffic for increasing the gross income. Freight and express traffic offers the most fertile ground for additional revenue, for though there is keen competition for this business there also is so much of it that both steam and electric lines have equal opportunities. The electric lines, however, are in a position to offer a class of freight service with which the steam roads cannot compete and after having established reliability of service the freight and express traffic may be had for the asking. However, the matter of rates at which it may be profitably handled is a serious problem. After a local freight business has once been developed and it is found that rates must be increased, an unorganized attempt to do so will meet with immediate rebuff. On the other hand, organized action as suggested by the committee on express and freight traffic yesterday could undoubtedly force the establishment of a separate classification for electric lines, and there is no doubt that the higher rates would make unnecessary a large number of exceptions such as exist with the present classification, thus eliminating much of the unprofitable part of the business. An organized movement for uniform rates also would prepare electric lines for interline freight traffic, which is certain to increase as extensions are built and connections are made to the lines of other electric interurban companies. In addition, it might remove some existing false impressions regarding the motor truck, which cannot compete on long hauls and which is a competitor for short-haul business only in a few isolated cases where a house-to-house delivery is necessary to meet competition in handling certain commodities.

Rules for Fire Prevention

Rules for protection against fire, or rather for the prevention of fires, are so widely known in their general form as to be, from the standpoint of their detailed construction, almost superfluous. The difficulty with them is that their existence is not continually brought before those who should not only know them but should be governed by them. For this reason the recommendation of the committee on buildings, presented at yesterday's meeting of the Engineering Association, to the effect that rules should be posted in all conspicuous locations in all risks is one that ought to be implicitly followed.

The proposed code is complete and simple. It is probably the equivalent of those in use in the majority of shops and carhouses to-day, and its introduction ought to be easy. Its enforcement, however, is quite another matter, and for

this reason the form for a fire inspector's report which was submitted with the code of rules may be used to exceptionally good advantage. A special inspector is quite likely to take himself seriously enough to make a really careful survey of the premises, and if his reports are conscientiously followed up one of the prolific causes of fires may be absolutely eliminated.

It is perhaps unfortunate that the most important clause in the form for inspectors' reports, that relating to cleanliness of the premises, is left until the last. This, it would seem, is really of more value in determining the manner in which rules were carried out by employees than the knowledge offered by the remainder of the report, which deals solely with the condition of apparatus. As a matter of fact the very best kind of inspection for apparatus is the use which it gets in fire drills. In these no chance exists for careless or hurried examination. If a valve is stuck shut, the fire brigade finds it out very quickly, and it has to be remedied before the drill goes on. If a hose nozzle is once missing, the nozzle-men are made morally, if not actually, responsible, and it is safe to say that they will see to it that the same trouble does not occur again.

Fire drills are admittedly a foolish-looking procedure, and they unvariably produce a certain amount of ridicule, yet, in the end, their occasional occurrence affords a pleasant change from the daily routine, and in the majority of cases employees really enjoy them. Certainly there is no other organized performance in which more enthusiasm can be worked up by the exercise of a reasonable amount of patience and persistence.

Mr. Sergeant's Paper

Mr. Sergeant discussed yesterday a matter which is of vital interest to all large surface railway companies. He used the Boston Elevated Railway system as an example, but the same situation, although in a less acute way, confronts most of the large electric railway systems in this country. The situation is accentuated in Boston because of its narrow streets and topographical conditions, but every city which suffers from congestion is bound to have the same problem presented to it for solution.

Mr. Sergeant's position is that the evil is not one which the railway company should be made to remove unaided. It is, it is true, one beneficiary of the relief from congestion but by no means the only beneficiary or, indeed, the principal one, and it ought not to be expected to defray all of the cost. If, for example, an underground or elevated terminal for a route or for several routes will cut down the running time on those routes 10 per cent or 15 per cent, the railroad company will make a saving in its platform charges and in some other expenses, but each patron will also be directly benefited, and the community served will reap great advantages from greater valuations in taxable property in the outskirts of the city. When the good to all of these different interests is considered, the improvement may be worth while, although the benefit to be derived by any one of them would be insufficient to warrant it in alone making the improvement.

The figures submitted in the paper in regard to the cost of subway construction in Boston will be a surprise, we believe, to many even among those familiar with the cost of great works of this kind. Undoubtedly the hilly nature of the city and the tortuous character of its down-town streets were considerable elements in the cost of subway construction in Boston, but there is no doubt that under even the most favorable conditions subway construction is enormously expensive, and it should not be employed except as a last resort. At the same time, we infer from Mr. Sergeant's remarks that the experience in Boston has indicated that elevated construction is not very much less expensive owing to the damages for noise and interference with light which can be obtained by abutting property owners.

In regard to the solution of the problem, there is but one answer, and that is that the city itself should undertake this work on some sort of a partnership basis in which the railway company would be a preferred partner. Such a plan up to a recent period would have been considered revolutionary from both a railway and a civic standpoint, although it does not differ in principle from the plan of bonuses or subsidies under which many of the early transportation lines were built. The contract for subway construction in New York, however, made recently between the city and its two principal transportation systems constitutes an excellent modern instance of this kind of arrangement. Without such a plan the extensive transportation system now under construction in New York City would have been impossible. The city and the companies are partners in the enterprise, and the companies have first claim on the net receipts until a certain return is obtained on their existing investment. After that both share in the profits. Some such plan must be followed in most other cities before any plan for the removal of congestion by expensive subway or elevated structures can be adopted.

Proper Capacities for Modern Boilers

One of the features of the exceptionally able report presented by the committee on power generation is the manifest desire of the committee to awaken interest in the advantages offered by forcing steam boilers. This appears in two of the four papers included in the report, and the reasons submitted in its support are indisputable. The point has, of course, been brought out before, but, as in all other matters pertaining to steam engineering, conservatism has apparently prevented it from being generally accepted and put into practice.

There are, perhaps, contributory reasons besides conservatism for this lack of action. It is common belief that tubes are more likely to fail in a boiler which is being forced than in one operated at the commercially inadequate manufacturers' rating of 10 sq. ft. of heating surface to the boiler-horsepower, although recent examples have shown this to be incorrect, and it is obvious that one boiler which evaporates two or three times as much water as another in a bad-water district will require a proportionately greater amount of washing. Yet neither reason would seem to account for the present practice of cluttering a boiler room with a lot of costly boilers when half as many would make ample steam for the plant.

In the matter of existing furnace design, it is true, much room for improvement exists, for it is practically a physical impossibility to incorporate in most boiler settings a grate or stoker of sufficient size to get the desired capacity out of a boiler without a very strong draft, an abnormally high furnace temperature and the consequent difficulties of operation. In many cases, as pointed out in one of the papers, the chain grate is handicapped by this condition, which causes a fusion between the brickwork in the furnace walls and clinkers in the fuel bed so that the fire at the sides is pushed off the grates. The re-design of existing standard boilers and settings appears in consequence to be necessary. This may be voluntarily inaugurated by the manufacturers, although it is hardly likely.

On the other hand, there should exist a persistent demand for boilers with ample steam-disengaging space and for settings with room for sufficient grate area to evaporate 7 lb or 8 lb of water per square foot of heating surface without necessitating a rate of combustion in excess of, say, 20 lb of coal per square foot of grate. If such a demand could only be developed and maintained for a short time, it is certain that the manufacturers would for self-protection be obliged to meet it. Unfortunately, the demand does not exist to-day, but the committee on power generation is doing a most excellent work in pressing the point.

Conventionalities

G. E. Watts—some name, eh!

Whad'ye mean, Ich gebibbil?

Gaelic for: "I should worry," of course.

A word to the unwise,—P. Edward Wisch is snooping around here.

The Brill lighting puzzle was unraveled before a ravished multitude on Wednesday night.

S'funny how the report of the committee on heavy electric traction is always so light.

General Joseph Busch (dont forget the c) called yesterday to say that he was here. All right, Joe; we gotcha.

The mixture of ocean air and illuminating gas from a leak near our booth brings regretful recollections of last year at Chicago.

The Cornell lunch will be held to-day at the Shelburne. Cornellians should register with H. C. Hallaway, spaces 350-5, before noon.

R. C. Cram, who was banished from Connecticut to Brooklyn some time ago, still feels his disgrace, if his anxiety to drown his woes in tangoing is any criterion.

B. M. Lathrop, of the Colorado Springs & Interurban Railway, says that Pike's Peak had nothing on his peak during the tourist season at the Springs.

Guy E. Tripp, chairman of the board, and E. M. Herr, president of the Westinghouse Electric & Manufacturing Company, arrived last night at the convention.

It's easy to understand why Tom McDonald doesn't have those Cooper heaters in operation. When Tom gets talking everybody in the immediate vicinity shucks his coat.

One of George C. Killeen's many friends tried to put over a wheeze about the way in which he killed the evenings: Thus, "Kill e'en." Do you get it? Neither did we.

Edgar S. (Mary Ann Oho) Fassett, free nowadays from thoughts of single-truck and double-truck cars, is startling his friends with one of those nobby hip-length top coats, y' know.

Allen F. Edwards, who has just been appointed vice-president in charge of purchases on the Detroit United Railway, is in town, but all we can say about him as we dash madly to press is that he's a right good-looking guy.

An excellent reason, weighing 12 lb. and of the male persuasion, has prevented Joe Downs, of the transportation department Public Service Railway, from attending the convention. They say the baby will be named Aera.

There are four halls on the pier—engineering hall, claims hall, accountants' hall and the net haul. The first three are convention places of assembly, and the last is a fishing expedition peculiar to Young's Million Dollar Pier.

P. N. Jones, the well-known automobilist, who has just purchased five new cars, 1914 (double-deck) model, went back to Pittsburgh yesterday to start a new M. U. F. campaign. What! Don't you know that? Move up front, of course.

Harry le Beau Ransom has been restless to enter the Perpetual Chairmanship Sweepstakes ever since he read that item about "Nate" Garland and "Pa" Wilkinson. No one can beat Harry when it comes to keeping the ladies happy.

It is being noised around that W. M. Archibald, of the Houston (Tex.) Electric Company, fell off the water wagon and as a result is carrying a cane and a slight limp. He wants to explain that it was a regular tank wagon and not the other kind.

His corpulence T. E. Fischer, formerly vice-president and general manager of the Illinois Traction System but now a consulting engineer who can advise us why we should or should not build electric interurban railways, is among the late arrivals.

H. L. Garbut complains that we misspelled his name in a recent issue, and as this was by no means intended as a slight to Mr. Garbot, we hasten to apologize, and we wish to assure Mr. Gerbutt that henceforth his name will be spelled correctly as follows: H. M. Gurbott.

One of the wags of the convention after reading the item in yesterday's DAILY about the order for near-side cars placed by General Manager Livers, of the Charlottesville & Albemarle Railway, said: "It strikes me that the color of those cars that Livers bought is slightly bilious."

Charles H. Bigelow is showing Mrs. Bigelow her first convention. Mr. Bigelow is chief mechanical engineer of the Millville Traction Company, which operates a line between Millville and Vineland, the famous grapejuice town of New Jersey and the home of the Wilson-Bryan cocktail.

A fine testimonial (portrait included) was recently given to E. F. Schneider, general manager of the Cleveland, Southwestern and Columbus, when his notable accident prevention work was described and commended in a recent issue of the *American Magazine*.

Some brute beat it to our hat after lunch on Wednesday at the Traymore. If he will call at our booth, he will be rewarded by seeing us in a nice, new cap. This covers our bald spot very nicely, thank you. Indeed, we hope that our hat is as satisfactory as a cover for its present solid ivory support.

The sad news of the sudden death of William C. Wood, president of the New York Switch & Crossing Company, is being commented on at the convention by many of his warm personal friends. Mr. Wood was connected with the electric railway industry for over twenty-five years and he was unusually admired and respected.

In answer to numerous inquiries as to the location of Cornell Hawley's exhibit of a center-entrance car we wish to announce that Mr. Hawley has a tackless blueprint which he shows with tireless energy to timeless people who want truckless cars on trackless roads for stepless operation. He claims with the utmost sobriety that he has a real American patent on the car.

Alphonse Chopin Terwilliger recently sold a music box similar to the one which is successfully keeping the sea lions in the Pier Aquarium subdued, little Johnnie Livers, the Charlottesville (Va.) managerial wonder, being the purchaser. Notwithstanding, the two are still fast friends according to a Burns Agency report dated Boardwalk, Oct. 14, 3 a. m.

E. W. Olds, one of the organizers of the Engineering Association and its second president, is being welcomed to the convention by his many friends. Mr. Olds is now living in Pomona, Cal., where he has a large orange plantation, but one of his sons, who has come with him to Atlantic City, seems to be a chip of the old block as he is engineer of maintenance of way of the Havana Electric Railway Company.

A number of the men in charge of the registration booth in the headquarters of the association are representatives from the accounting department of the Public Service Railway of New Jersey. Their services are generously put at the disposal of the association by President McCarter and Messrs. Young and Boylan, and their efficient work has been of great help to the secretary. It is a good thing all around because it gives them incidentally a good opportunity to attend the convention.

Albert Thode, or, as he is known to all Europe, "Elektrothode," is one of the most interested inspectors of the exhibits. Mr. Thode is the head of Albert Thode & Company, Hamburg, which is one of the greatest electric railway supply houses in Europe. He was so pleased with his first view of an electric railway convention exhibit in 1912 that he has come again to pick up specialties for European electric railway use. There is no truth in the rumor that he will buy the trained seals, for his ocean trips have made him quite familiar with raucous retchings. Mr. Thode is planning to remain in the United States for about one month. During convention week he is stopping at the Chalfonte, but for the rest of his stay he will be found at the Vanderbilt Hotel, New York.

Although it was unscheduled, the most important social event on Wednesday afternoon was the presentation of a magnificent memento of the convention to Al "Steeplechase" Green. This took place in the Galena parlors before a large delegation headed by W. O. Wood, who said in a few well-chosen remarks that the price of the gift had been raised by general subscription as a deserved recognition of the invaluable services of Mr. Green on the entertainment committee. Al expressed his thanks in a speech replete with feeling, and upon opening the beautiful plush case, he found a splendidly gilded brass watch from the 5 and 10 cent store.

W. W. Cole, formerly of Elmira and now with Day & Zimmerman, of Philadelphia, has brought nine of his construction engineers to the convention, and they are putting in most of their time in examining exhibits which are of especial value to construction engineers. Mr. Cole personally is particularly interested just at present in fare boxes and says that it would take many weeks to visit all the factories where fare boxes are being built and acquire as much information as may be obtained in a few hours on the pier. The same condition applies to other branches of the work. Last year his firm placed a number of orders as a result of the inspection made of the exhibits at the 1912 convention.

The last time that E. G. Connette, of Buffalo, was in attendance at any annual convention of the American Electric Railway Association he was present in the capacity of transportation engineer of the Public Service Commission of New York, First District. He is present at this convention as a mere electric railway president. From this it will be seen that Mr. Connette has experienced all the vicissitudes of life. He knows how it feels to regulate and how it feels to be regulated, how to be elevated and how to be abased. It is said that Mr. Connette is planning soon to publish a book on his experiences with the Public Service Commission. According to the same rumor the only reason which has prevented the appearance of the volume up to this time is that Mr. Connette is uncertain whether to select as a title "Gates Ajar" or "In Darkest Africa."

As we do the Jumbo-slide to press, the idea drifts over our lumen of consciousness that our columns have not as yet been graced with any reference to those softly rolling, delightfully comfortable and eternally omnipresent chairs on the Boardwalk. Well, the height of superfluity may be the completely bald-headed man with a dozen combs, but this doesn't apply in the case of the rolling chairs. And although the happy occupants must soon lose that delicious feeling of "nothing to do till to-morrow" that fills their souls as they meander along the Boardwalk, still the pleasure while it lasts is undeniable. And say—we wonder if any of the chair committee has ever surprised a big 300-pounder being softly urged along on wheels, as it were, by a little black midget. The expression overflowing his face as if he were caught in something awfully devilish is enough to pay the committee for its labors in offering such satisfactory transportation facilities.

FINALS IN THE LADIES' BRIDGE TOURNAMENT

The bridge tournament for ladies which was held yesterday afternoon was not completed until 7 o'clock, the play being exceedingly close. At the close of the third round early in the afternoon the winners at the four tables were as follows: At table No. 1, Mrs. F. D. Lyman, of Montreal, Canada, with 1163 points; at table No. 2, Mrs. Warren L. Boyer, of Kingston, N. Y., with 631 points; at table No. 3, Mrs. W. F. Ham, of Washington, D. C., with 1358 points, and at table No. 4, Mrs. Frank J. Newbury, of Trenton, N. J., with 730 points.

The final round was played by these four ladies and in this Mrs. Frank J. Newbury won the championship prize, which consisted of an elaborate silver dressing table set. Mrs. Lyman won the second prize, a silver vanity box, and Mrs. Boyer was third and won a silver puff box, Mrs. Ham taking fourth place and a prize consisting of another vanity box.

The prizes are to be formally presented to the winners at the promenade concert and ball which will be held to-night in the ballroom, Convention Pier.

STEEPLECHASE NIGHT

There have been many joyous evenings at A. E. R. A. conventions, present and past. Sunshine has been seen in plenty. The radiations of mirth which have always been described as radiating from the merry throng have often radiated. Yet never before in the long history of A. E. R. A. entertainments has anything equaled the new stunt of our ingenious entertainment committee, Steeplechase Night. It was, indeed, some party.

It would be impossible, as the regular newspapers used to say about Mrs. John Jacob Astor's dinner-dances, to describe the magnificent scene in detail. It was as a matter of fact quite impossible because we lost our notebook going through the "philandipringstotum," "together with 68 cents in change, so that any catalog of the events would have to be made from a memory obscured by slides, whirls, dips, loops and bumps—especially bumps.

A striking spectacle was afforded when many long streamers of colored tissue were thrown across the roof-beams over the dancing floor and hung down from them in a swaying grill-work of color through which were thrown brilliant shafts of calcium light. The evolutions of the dancers seen through this screen made a shadow-dance effect that was really remarkable.

Possibly the chief center of interest was the Mississippi ball game, at which prizes were given to successful contestants. These were awarded to every man who succeeded in throwing baseballs with sufficient accuracy to break clay pipes held between the teeth of manikins in the six windows of a screen about 25 ft. away from the throwers. Ladies were given prizes for throwing baseballs through the windows, and they developed a surprising degree of accuracy. No rules prevailed, and everyone took as many shots as he or she desired. We know of no one, in fact, who failed to get at least one prize except Walter Jackson, who—poor prune!—had to go over to Phillie to get this issue to press, and W. G. Kaylor, the chairman of the sub-committee in charge of the Steeplechase entertainment, who got stuck in the soup bowl late in the evening and couldn't get out.

One of the best features of the evening was the elimination of the usual confetti nuisance and the fact that the "ticklers" were devoid of wire ends was very much appreciated. The official announcer was in rare voice. Some of his jokes were actually devoid of moss, but owing to the previously mentioned loss of our notebook, they cannot be published in full.

However, the crowd seemed to enjoy best the various

stunts pulled off by themselves. A few of the people noted on the different pieces of apparatus were E. T. Munger and H. G. Pearce, who had a clinch on the human roulette wheel but went through the "down and out" chute to the cellar at that. Frank Hedley got safely through the "tube" as might be expected. He said it was very rough going and weakened once but made the trip. C. A. Cadle went over the "turkey-trotters" in grand shape and B. F. Wood made the "soup-bowl slide" in perfect style. H. Gulick went down the "Jumbo slide" mostly on his ear. He survived.

ALWAYS IN GOOD HUMOR

MORE MATUTINAL MEDITATIONS AND MIRTHFUL MEANDERINGS
FROM OUR MARTIAL MARVEL OF MISANTHROPY

Some of the boastings of sales down our aisle recall this incident: Several colored converts were being baptized in the river in very cold weather and as one emerged from the water a buck on shore yelled: "Is de water cold, Sam?" "Bress de Lord, no; warm as de sunshine," replied Sam. "Dip him again, min'ster," shouted the buck "Dat nigger lies yet."

When B-y W-d apologized to the eaddy yesterday for not being in good form, the boy said: "Oh! you've played golf before, have ye?"

Had three unique experiences this trip—for the first time in my long and eventful life I had the berth in the stateroom (not the sofa), rode in the end seat in the bus and made a newspaper man laugh.

Have you seen the sign in the corset shop in M-B corridor: "All sorts of ladies' stays here?" Makes you think of the man at the ball who said to his pal: "I can see your wife's back from Chicago."

Those who used to laugh at "Bime bye, she blow some more" will enjoy this:

"MONTREAL, Sept. 3, 1900.

"DEAR MISTER: I Have the honor to tole you that the Reverend Messieurs of the Grande Seminary have ordained me with instruction to poursuivre you for the scandalous nuisance that was caused to that vicinity by the parroquet which you have on you residence which make such abominable fracas. The Reverend Messieurs are interfered with when they make their devotions and when the band of the Grande Seminary of pupils begin for play and your dam parroquet was begin for screech it is dreadful. Also one of the neighbors on the same street with yourself was very mad. He can't sleep on the afternoon and when he go for play the piano your bird yell and spoil his improvisation. Altogether you must put away that bird. Please give me that understanding without delay, otherwise I must institute the procedures. Receive the assurance of my consideration. Your obedient servant,

"J. DE LATROUMANILLE,

"To Henry Russel, Esq."

This cool request recalls the squib in "North Shore Ballads":

"Miss Lucee had a parrot,
And she kept it in the garret,
And she fed it on a carrot,
And she called it J. Iscariot—
Tidy yum, Tidy yum!
And the parrot had a feather
That turned blue in stormy weather,
Or turned red—I don't know whether
It was one or it was t'ether—
Tidy yum, Tidy yum."

J. H. STEDMAN.

TOTAL REGISTRATION MANUFACTURERS' AND RAILWAY ASSOCIATIONS

At the time of closing the registration booths of the Manufacturers and Railway Associations Wednesday, the total number registered was 2840. This number is 440 more than the total second-day registration at the 1911 Atlantic City convention and 490 under the second-day registration at the 1912 Chicago convention. A comparison of the detailed figures with those of 1911 shows that each of the associations made a substantial increase in attendance except the Claims Association, which is the same as two years ago. There also is a marked loss in the number of guests registered, as compared with former years.

QUALIFYING ROUNDS AT GOLF

The committee on golf met yesterday evening to allot handicaps for to-day's medal play on the Country Club links at Northfield, N. J. Mr. N. M. Garland, chairman, stated that there seemed to be a healthy interest in the play thus far during the week, although the high winds which have prevailed since Monday have not afforded the most ideal conditions on the links.

The golf finals will be held to-morrow, the qualifying rounds having been completed to-day.

Forty entrants have qualified for the final round and it is expected that about ten post entries will be received in addition, thus making a good field for to-day's sport.

Thus far no exceptionally low scores have been made owing to the high winds and indifferent putting greens. However C. H. Bankard, Jr., a son of C. H. Bankard, purchasing agent Baltimore & Ohio Railroad, turned in a score of 78 notwithstanding the very unfavorable conditions. Mr. Bankard, it may be remembered, played well toward the finals of the National Championships some years ago, and it is likely that he will be scratch man in to-day's tournament.

The Country Club course has this year been placed in excellent condition, except for the putting greens, and a number of new hazards have been provided in addition. For the benefit of those who have not yet played over it, it may be said that the eighteen holes give a total length of 6016 yds., par for the course being 72 and bogey 82. There are several natural hazards including a brook, and there is an "island" green about 100 ft. across, which is fully as difficult as the famous heart-breaker at Baltusrol.

COMPARATIVE LITERATURE

(From Collier's)

A sort of street car which has gained steadily in use during recent years is that in which one pays the conductor a fare immediately upon getting on board. Such cars have an inscription upon the front to make clear the scheme. In New York this reads:

"PAY AS YOU ENTER."

In Philadelphia it runs:

"FARE READY, PLEASE."

In Boston the corner waiter is greeted by the announcement that the approaching conveyance is a

"PREPAYMENT CAR."

Ornamental elevated stations will be constructed at Fort Hamilton Avenue and at Eighth-sixth Street and Bay Parkway on the proposed rapid transit line through New Utrecht Avenue, Brooklyn. The Public Service Commission for the First District of New York has sent to the Art Commission designs for these two new stations. The stations will be built of steel in accordance with the approved plans of the commission and will be finished with concrete.

WEDNESDAY JOINT MEETING OF THE ACCOUNTANTS' AND TRANSPORTATION & TRAFFIC ASSOCIATIONS

President Dana Stevens of the Transportation & Traffic Association called the joint meeting of the Accountants and the Transportation & Traffic Associations to order in the Greek Temple at 10 o'clock yesterday morning. First Vice-president M. W. Glover of the Accountants' Association also presided as co-chairman.

The first order of business was the report of the committee on fares and transfers. As F. T. Wood, New York, the chairman, was unable to be present, the report was read by J. V. Sullivan, Chicago Railways Company. An abstract of the report is published elsewhere in this issue.

President Stevens said that while he realized that a universal system was impracticable if not impossible, he felt that a very full discussion would be of great benefit to the members present.

F. A. Boutelle, Canton, Ohio, said he would like to hear from someone who did not register transfers.

E. E. Strong, New York State Railways, Rochester Lines, said that this system had followed the practice of registering transfers, using double registers. The conductors were also required to turn in transfers in separate envelopes sealed each half trip. He had been on roads where single registers were used and he favored the practice of double registers.

C. N. Huggins, Portland (Ore.) Railway, Light & Power Company, said that his company registered transfers on a multiple register and also required conductors to inclose transfers in sealed envelopes.

H. A. Nicholl, Union Traction Company of Indiana, said that about 95 per cent of the fares on their lines were cash, the other 5 per cent being transfers. Transfers were registered and checked periodically. The conductors dropped the transfers in a box each trip.

James E. Gibson, Metropolitan Street Railway of Kansas City, said that that company did not register transfers. Conductors placed the numbers of transfers on their trip sheets. The results were checked up carefully at irregular periods. Conductors placed the collected transfers in envelopes at the end of each half trip but deposited them only at the end of the day's work.

J. V. Sullivan, Chicago Railways Company, said that transfers were not registered in Chicago, but that he believed in the adoption of this practice in almost every other city, where the systems and traffic would be smaller.

James Adkins, United Railways of St. Louis, said that his practice was to compile lists and to examine the transfers as carefully as possible periodically. Any action that was to be taken as a result followed through the superintendents. Conductors sealed up transfers at the end of each half trip. He was strongly in favor of a non-registering system for transfers.

Thomas P. Kilfoyle, Cleveland Railway, said that his company was not in favor of registering transfers.

M. R. Boylan, Public Service Railway of Newark, N. J., said he would like to hear a discussion on the use of fare boxes. He had been making inquiries recently and found that about 7500 registering fare boxes of various types were in use by approximately thirty-five to forty companies.

J. E. Duffy, New York State Railways, Utica-Syracuse Lines, said that he was like a good many representatives of other companies. He was using about all the types of fare boxes on the market and had not yet arrived at a conclusion as to which was the best. These included both non-registering and some of the different types of registering boxes.

W. F. Ham, Washington Railway & Electric Company, said that his company was probably one of the few that had not experimented extensively in the use of fare boxes.

That, however, should not be taken as a condemnation of the use of fare boxes, but simply as a statement that as regards the local situation in the city of Washington the fare box did not seem to work. That seemed to be due to the fact that about 80 or 85 per cent of the business was done on tickets, leaving only about 15 per cent to be done on a cash basis. So far as his experience had gone, they felt that they could do better without the use of the fare box. To show, however, how different people reached different conclusions, Mr. Ham said that about the same time that his company did away with the fare box the Capital Traction Company, operating in the same city, adopted it, and this company had practically the same conditions to contend with that his company had, so there was no unanimity of opinion in Washington as to whether fare boxes were good or bad. From his experience he did not get good results, and while he thought that they did not have the best kind of a fare box still there was nothing in it that looked particularly attractive and it was decided to give up the use of the device.

In answer to a question from J. E. Duffy, Mr. Ham said that his company used both registering and non-registering boxes.

S. C. Stivers, American Cities Company, said that none of their companies used fare boxes. For a while the non-registering type of box was used but this was abandoned.

Mr. Huggins said that in Portland about 800 cars were operated, of which 250 were pay-as-you-enter cars. The non-registering lock fare boxes had been used on the pay-as-you-enter cars for about two years.

At the end of that time the company had reached the positive conclusion that it was bad practice, because the increased cost of handling and counting the money more than offset the benefits. In a very small way the company experimented with a coin-registering box, but inasmuch as it did not take care of the tickets it was abandoned. The company was now operating the pay-as-you-enter cars without fare boxes, and this had proved very satisfactory. The company concluded that it would be best to wait for the Public Service Railway and other Eastern companies to make reports on their experiments.

Mr. Adkins said that his company first used the registering type of fare box and found it unsatisfactory. Then it used a closed non-registering box, but it was trying now to get back to some other system, which would be less expensive. As far as the use of the fare box was concerned, taking it all in all, it was found to be advantageous.

E. G. Connette, International Railway of Buffalo, thought that it would be enlightening to give one instance of his experience in the operation of a small line in the system. Only six cars were operated on this line, and early this year a recording fare box was installed with the one-man car system and the fare collected as the passenger passed into the car. He thought that the resulting benefits were great and attributed them to the efficiency of the fare boxes.

Howard F. Eaton, Brockton & Plymouth Street Railway, said that that company was now using a type of registering fare box with lock. Of course the lock fare box entailed more expense. He believed that the registering fare box was desirable, provided it was used in connection with a register inside of the car.

D. A. Byrne, New York State Railways, Rochester Lines, said that this company was still experimenting and trying a type of closed box different from the one it had used previously. No decision had been made as to whether it would be more economical to use the box or to do away with it entirely.

Mr. Boylan said that when the Public Service Railway placed prepayment cars in operation it used a lock box. It had over 1000 boxes in use and found that it was very expensive to handle the money from them. He therefore got in touch with the manufacturers and suggested that they

devise some kind of a box that would eliminate this expense. The company had tried and had in use to-day four different kinds of registering fare boxes. He had eliminated the expense of handling and counting the returns from the lock boxes. The expense of handling the registering fare box was very small. He thought that the registering fare box was the proper receptacle to use for the collection of fares on prepayment cars. The company was still experimenting, however, and while it had now 1400 registering fare boxes in use, it was not in a position at this time to recommend any particular box, although it thought that eventually it would get a registering fare box that would take care of all of its requirements. The company has no ticket fares, although it has one school ticket, and this was increased to the size of the smallest transfer in use on the system. Such tickets are handed to the conductor in the same way as transfers, leaving the fare box clear for coins.

J. H. Wilson, Mobile Light & Railroad Company, said he found that two classes of fare boxes were needed, one for the railroad that had from 30 to 35 per cent of tickets, and another for the road that had a very large percentage of tickets.

Frank H. Brown, Rhode Island Company, said he had been using the Rooke system for the last six years and had found it very satisfactory. The company did not register transfers and had no tickets and had never had any trouble with the Rooke system.

Mr. Boylan asked if the company used the Rooke system on its prepayment cars and Mr. Brown replied that it did do so.

President Stevens said that his company in Cincinnati had experimented with probably every class of fare box on the market, including the Rooke system. Before attempting the use of the Rooke box he took the subject up with Mr. Potter, Rhode Island Company, where he understood they were using it very successfully. The Cincinnati company, however, tried it on one line and a good many objections developed, so that the experiment was discontinued after about sixty to ninety days. There was no question in his mind that with the prepayment type of car a fare box was essential, or at least very advisable. The question arose of getting a fare box that met local conditions. As one member had said, it was largely a question of whether it was a system of cash fares or ticket fares. That would largely determine the type of fare box to be used. In Cincinnati practically 97 per cent of the business was cash. He had used both the recording and non-recording types and was satisfied that sooner or later the company would get something that would meet its requirements in every respect.

J. E. Duffy, New York State Railways, Utica-Syracuse Lines, said that this company had experimented with a transfer-issuing machine, using the first commercial machine made by the Champion Recording Machine Company. It experimented with that for only a week or ten days and found that it worked out very satisfactorily. It did not go into the question of cost, but was experimenting simply to see whether such a machine for use on prepayment cars would be practicable. The machine issued a transfer, which printed the time of issue and the time to which the transfer was good, therefore determining without doubt, except in case of the failure of the clock, the time of expiration of the transfer.

Another speaker said that the experimental use of a similar machine adapted by Mr. Champion for one of the Rochester lines proved to be perfectly practicable. It could be operated rapidly even at the start. He believed that the practicability of the machine had already been demonstrated and that its success was purely a question of whether or not it would stand up in service and could be put on the cars at a cost that would make its adoption possible. This machine was used in connection with a closed fare box, but he could not see where that would make any difference as to its

success. It could be placed beside the fare box in such a way that a passenger paid his fare and on stepping forward received his transfer. The conductors and motormen seemed to be pleased with the machine.

Henry J. Davies, Cleveland Railway, said that during the period when the railway company property was leased to the Municipal Traction Company metal tickets were used. When the railway company resumed possession of the operation of the property it abandoned the use of metal tickets and substituted paper tickets. A careful examination convinced the company that the cost of dealing with metal tickets was very much in excess of that with paper tickets, particularly that part of the cost which came from putting up tickets after collection. A great many tickets were used now, but they were not sold at a discount. They were merely for the convenience of the public and conductors.

Mr. Boylan said that conductors on the Public Service Railway placed their transfers in trip envelopes at the end of each half trip. The conductors also noted on their day sheets the numbers of transfers issued and the transfers were deposited in a locked box at the carhouse and later turned in and forwarded to the auditor's office. There they were checked as to time and also compared with the particular trip on which they were reported to have been issued.

Charles H. Smith, United Traction Company of Albany, said that the system in use there was exactly like that in Newark, N. J.

J. C. Collins, New York State Railways, Rochester Lines, said that on that system transfers were collected and put into envelopes showing the number contained, the trip and the time. They were retained by the conductor until he turned in his money at the end of the run. A transfer band was placed around the number of envelopes and the number of transfers marked on the band. The receiver simply had to count the number of envelopes contained in the band and they were then forwarded to the auditing office, where they were counted.

H. J. Davies, Cleveland Railway, said that a method of checking transfers was followed in that city which he believed existed nowhere else. By reason of the mutuality of interest of the city and the company, 1 cent was charged for each transfer when it was issued and this was returned to the passenger upon presentation of the transfer for use. That practice ought to be in use on every railway of the country. It could be put into effect as a regulation of transfer issue and collection.

Mr. Boylan said that he thought the subject of the transfer issuing device was a very important one for investigation. Two machines had been made for the Public Service Railway and were to be put on cars this week. If the machines could be made practicable they would be very important.

D. A. Hegarty, New Orleans Railway & Light Company, said that he had used a transfer box, not for issuing, but for checking transfers. This box had a time stamp on it which registered automatically when the conductor put his transfers in the envelope and the envelope in the box at the end of every half trip. The envelope could not be withdrawn after it had been stamped. In answer to a question of Mr. Boylan, Mr. Hegarty said that these boxes were not in use at the present time.

President Stevens then announced the appointment of the nominating committee of the Transportation & Traffic Association as follows: J. N. Shannahan, W. N. Casey, J. E. Duffy, J. V. Sullivan and W. E. Boileau.

DISCUSSION ON EXPRESS AND FREIGHT TRAFFIC

The next order of business was the report of the committee on express and freight traffic. The chairman announced that the discussion on this subject would also cover in a general way the subject of express and freight accounting. The report was presented by the chairman,

F. D. Norviel, Union Traction Company of Indiana. An abstract is published elsewhere in this issue.

H. A. Nicholl, Union Traction Company of Indiana, said that that company was doing a general freight business, but that it did not find it very profitable on account of the high cost of operation. The package express business was easier to handle and the rates were higher. As pick-up and delivery service were not given and the business could be handled on regular cars schedules were not affected.

President Stevens said that the interurban lines ought to develop revenues in addition to those of the passenger service.

E. H. Hyman, Electric Package Agency of Cleveland, said he wanted to emphasize the point made by the committee in reference to low rates. He had always been of the opinion that a great many electric lines did business at rates that were too low.

C. D. Emmons, Chicago, South Bend & Northern Indiana Railway, said that the recognition of interurban lines by the steam roads and the establishment of through routes and joint rates would be an advantage in the future to interurban lines. He had been a constant believer in the development of the freight business and had said often that the future of the interurban roads depended on their care of it.

The report of the committee on a statistical unit for car operation was read by the secretary.

J. A. Emery, with Ford, Bacon & Davis, New York, then read a paper on "Statistical Units Used in Analysis of Electric Railway Accounts." An abstract of this paper is published elsewhere.

On the motion of Mr. Kilfoyle, a vote of thanks was tendered to Mr. Emery for his complete paper.

J. E. Duffy said that he had never heard so skillful an attempt to cover the subject.

T. B. McRae, Chicago Elevated Railways, said he thought some arrangement should be made whereby each operating man in each department would be able to get exactly the information that he wanted.

W. F. Ham, Washington Railway & Electric Company, said that the standard classification of accounts was a scheme of putting into a given account certain expenditures which would make that class of items comparable in all instances. It was possible to elaborate the system of accounts so as to give a great deal more information than was contained in the classification itself, but even that would not be all that accountants would want to know. One of the matters that entered into the discussion of the classification was the assignment of overhead charges. He did not know how many times it had been argued that the classification should provide that the company should add to the cost of track or whatever it might be a certain amount to cover the cost of power used for that purpose. The classification did not purport to be a system of cost accounts.

Mr. MacRae said he thought that too much emphasis had been laid upon the needs for which the accounting department existed. He thought that all of the accounting men should co-operate with the operating departments and give the information these departments wanted.

Mr. Ham said that no classification would meet all the needs of all of the companies, but that the association had adopted a classification on broad general lines that would apply to every company in the United States, large as well as small. It met differences in size, different conditions and wide differences in classes and types of construction. It was one of the greatest achievements accomplished by any association that the Accountants' Association, without governmental authority back of it, was able to devise a system of accounts which was generally acceptable to all of the companies.

Mr. MacRae said his idea was that the accountant should

take any classification he might use and through the addition of sub-accounts give the operating officials the information they wanted.

C. N. Duffy, Milwaukee Electric Railway & Light Company, said he thought that if a general manager of a company did not know what accounting information he ought to have it was the duty of the accountant to tell him. As he understood the paper, Mr. Emery did not criticize the classification of accounts, but rather the uses to which it was put.

Mr. Emery said that that was right.

Mr. Kilfoyle said that he used the classification and got very satisfactory results from it. By the use of a subdivision of accounts it was possible to give operating officials any information they wanted.

Chairman Glover said that in the system used by his company there were 188 accounts, and that made it possible to give the management such information as it wanted on various items.

Mr. Ham said that on behalf of the people who had prepared the classification he would say that they should examine the form submitted by Mr. Emery.

The committee on the statistical unit for car operation, in accordance with its recommendation, was discharged.

Chairman Glover said that, owing to the late hour, the report of the committee on "best methods of collecting and accounting for variable rates of fare" and the address of Edwin Gruhl on "Factors Affecting the Cost of Passenger Service" would be postponed until the Friday morning session of the Accountants' Association. All members of the Transportation & Traffic Association were invited to be present at that time and to participate in the discussion.

On account of the absence of L. T. Hixson, Terre Haute, Indianapolis & Eastern Traction Company, who was unable to be here, Chairman Glover appointed W. H. Forse, Jr., Union Traction Company of Indiana, to take the place of Mr. Hixson on the nominating committee.

The meeting was then adjourned.

YESTERDAY'S SESSION OF THE ENGINEERING ASSOCIATION

Yesterday's session of the Engineering Association opened yesterday morning with President Schreiber in the chair. The first subject on the program was the presentation of the report on electrolysis by Prof. A. S. Richey, Worcester, chairman of the committee on that subject. This report is published in abstract elsewhere in this issue. It was received with thanks and ordered to be placed on file.

BUILDINGS AND STRUCTURES

The next subject was the report of the committee on buildings and structures, which was abstracted by R. H. Pinckley after he had made the following preliminary statement:

"The committee on buildings and structures has been asked to investigate and report on the following subjects: (a) review of modern carhouse construction; (b) fire protection rules; (c) general specifications and form of contract for railway structures.

"The first subject, review of modern carhouse construction, has been thoroughly analyzed by the sub-committee, and its report gives a clear outline of the trend of modern practice in carhouse design and construction. As stated in the report, there are many considerations that affect the type of construction other than the promptings of strictly engineering analysis and judgment. The much debated question of outdoor versus indoor storage is often an important factor in determining the design, and a decision as to the number of cars to be stored under cover may be as strongly influenced by financial limitations as by the results of an efficiency study.

"The relation of the type of construction to the insurance rate is an interesting feature of the report. An appreciable annual saving can often be effected on existing carhouse buildings and the rolling stock stored therein by making changes and improvements that decrease the fire hazard. Insurance improvements for existing properties is a timely subject and one that might be assigned to a future committee for investigation. Another suggested subject is 'What Constitutes a Standard Building from an Insurance Standpoint.'

"The sub-committee on the second subject has formulated a complete set of general fire rules for posting in various properties. This sub-committee has also submitted a skeleton outline of organization and operating rules for local fire brigades and an admirable form for inspector's report. The report on general fire rules, which was submitted to the committee on standards, has been referred back to this committee to be taken up with the National Fire Protection Association and have further consideration.

"A preliminary report on the third subject, general specifications and form of contract for railway structures, was made by the committee of 1912. The report submitted at that time was not recommended for the consideration of the committee on standards, and it was referred back by the executive committee for further consideration. The sub-committee did not complete its report this year in time for presentation. After a review of the work of the 1912 committee in our general committee meeting, it was the consensus of opinion that this year's sub-committee be instructed to give preference to the general clauses in specifications and complete form for contract and bond, rather than to the parts of the specifications referring to specific classes of work. The grades of material and accepted standards of practice for the different items of construction vary so much in different localities that only broad general clauses for these details would serve as standard practice for all conditions.

"Another difficulty that confronts the authors of a general form for specifications and contract is the variation in the laws of the different states and municipalities. Laws relating to liability, liens, etc., may be made by the States, while laws governing design, materials and methods of construction may be made by the municipalities. Comparisons of both classes of laws for different localities reveal many inconsistencies. Confronted with such conditions, it is not surprising that the sub-committee finds itself somewhat cautious about making definite recommendations.

"It appears entirely feasible, however, to devise a general form for specification and contract, which would make provision for all of the essentials, if necessary leaving blank spaces to be filled in to suit the local laws and regulations where there is a possibility of such variation. Many of the larger companies and engineering firms have already adopted standard forms for specifications and contracts. These forms are usually drawn up in a broad way so as to include not only structures but all classes of construction work. While the sub-committee has made admirable progress, I believe that this subject could well be referred back for further study and that a future committee should endeavor to work out a form that can be recommended as a standard.

"In addition to the subjects mentioned above, it might be of interest for the committee on buildings to undertake subjects involving a study of structures other than buildings, such as 'concrete structures for interurban lines, including culverts, bridges and retaining walls; standard practice in the design of steel bridges for interurban lines, and wood trestles for electric lines.'"

Mr. Pinckley also read a letter from the secretary of the electrical committee of the National Fire Protection Association approving the recommendations.

Chairman Schreiber called attention to the fact that the

only real question before the association was whether to recommend the standard general fire rules proposed.

Mr. Adams read an extract from the report of the committee on standards stating that rules of this character do not admit of adoption either as standard or recommended practice but are of a nature to warrant their inclusion in the Engineering Manual. He suggested that before final approval was given to the code of rules it be referred back to the committee to be put before the National Fire Protection Association, of which the American Electric Railway Association is a member, with a view to bringing about the elimination of inconsistencies or provisions which may conflict with other adopted codes. Mr. Adams commended the point in the report referring to the matter of housekeeping, which is one of the most important things that men responsible for the care of buildings have to handle. He emphasized the fact that the more orderly the buildings the less risk there is from fire.

Mr. Schreiber replied that the rules would be taken up in consultation with the National Fire Protection Association.

Charles R. Harte, constructing engineer of the Connecticut Company, called attention to the fact that the topography of a site will occasionally permit a two-story carhouse with a grade entrance at both ends. While this is an unusual case, it is not impossible and should be considered in the report. He suggested amplifying the reference of the committee to special work, inferring that the committee did not intend to include the special work in the carhouse. The special work should be outside the carhouse structure, provided it does not take up too much storage room. He referred humorously to catenary construction, stating that catenary construction will transfer loads from one point to another, but these loads must eventually be taken care of. For every ounce of dead weight taken up by the catenary the corresponding number of pounds of anchorage must be put in somewhere.

R. C. Cram, Brooklyn Rapid Transit, said that often engineers have considerable latitude in the selection of the location of a carhouse and should choose a site which admits of proper and safe design, as judged from the special work and fire hazard standpoints. He instanced a carhouse recently constructed where the property was utilized in such a way that, after making the entrance from the street in the form of a "Y" into a single track at the end of which was a spur, six or eight branch tracks were taken off leading into the carhouse proper. The main spur track itself was roofed over, and the roofing was continued between the spur tracks and the carhouse proper without any provision for fire doors. The special work leading out of this gauntlet track was of such construction that several sets of switches were close to each other. With this construction it would be impossible, in case of a fire, to clear the carhouse of cars because they could not be put through the "neck of the bottle." The site of the carhouse should be so selected that there will be at least two or three free car lengths of track, so that cars may be run out beyond the building before they get into the congested special work layout. The industry was getting to the point of a general standardization of carhouse design, and this standardization should include the design of special work. Mr. Cram called attention to the apparent intent of the rules that these should be mandatory upon employees, and he recommended that the language should make this clear.

W. V. Burnell, of Houston, Tex., stated that his company was considering the construction of additions to its shops, and the question of whether a transfer table or special work should be used must be decided. The general "lay" of the land available seems to make the transfer table more suitable, but there was some question as to the wisdom of using it.

Mr. Adams on this point stated that from his experience in several shops he felt that the transfer table was a desirable adjunct, particularly where a group of buildings had to be

served. The transfer table undoubtedly reduced the cost of special work and met all of the requirements of a repair shop where the number of movements during a day was not great enough to produce congestion on the transfer table. In other words, the transfer table is satisfactory under ordinary conditions.

Mr. Burnell inquired about the matter of fire hazard and called attention to the fact that under certain circumstances it was impossible to get the cars out in case of a fire, and it was absolutely necessary to protect the cars in place by means of a sprinkler system. In one case which he recalled the sprinkler system was effective in confining a fire to individual cars.

Norman Litchfield testified as to the ability of a transfer table to handle cars, as fast as the main tracks could take them away, even from a three-story building. Cars could be handled well by means of transfer tables when the organization was sufficient to handle them. There was no use in posting rules unless there was an effective plan to force the men to imbibe them. In New York a regular system was in force by which one of the clerks or sub-foremen was detailed to read the rules aloud to certain groups of men on definite days, the roll being called to insure the presence of the men. Records were kept to show that each rule has been read to all of the men. This practice applied not only to fire rules but to all bulletins containing information which it was important to get to the men, and in cases where a record of the fact that the men have received the information was desirable. This was a quick method of bringing home the rules to the men, and foreigners could not be expected to understand the niceties of some of the language used in the rules, which they really cannot understand.

J. H. Hanna, Washington Railway & Electric Company, corroborated Mr. Adams' statements regarding spur tracks. In his work the transfer table had been a necessity, but his experience showed that the added cost of special work was not justified from the standpoint of fire hazard. Cars could be brought down from even a third floor amply fast enough with an elevator to take care of any operating schedule. With a carhouse of fireproof construction and a good sprinkler system there was not the vital necessity for getting cars out in a hurry. He expressed regret that the committee had not taken up the construction of carhouses having more than one story. He also stated that the door question is one of great importance.

Mr. Litchfield corroborated Mr. Hanna's statement regarding doors but said that he had tried one door built on the jack-knife principle which looked promising. It was divided in the middle half way up and was operated by a winch, so that when the door was open the door stood horizontally in two halves. The trouble with a rolling door was that it was difficult to get it high enough to clear the cars.

Mr. Adams stated that the car station with more than one floor was coming but that many companies did not realize how easily a second floor can be operated by means of an elevator and transfer table.

Mr. Cram referred to the lack of necessity for protecting special work from the weather. Very seldom is there a situation in which the expense of roofing it over was justified.

H. H. George stated that an additional reason for keeping special work off the street is that it is necessary to get a special franchise in many cases for every piece of special work that goes on streets.

In closing the discussion Mr. Pinckley stated that the purpose of the committee was to draft a set of rules that could be adopted as standard by all of the companies. In general he did not believe that it was necessary to locate carhouses on property expensive enough to warrant the use of two-story construction. It was not the intention of the committee to recommend the placing special work under roof, but only on private property. A reason for this was not mentioned in the discussion. It was often desirable to fence

in property and it was possible, by placing the ladder tracks and leads inside the fence, to reduce the number of gates necessary. There would be also less interference with the work of employees by outsiders. In regard to the discussion of special work versus transfer table there was a difference in insurance rates in favor of direct special work, which would be removed if the insurance companies understood the situation. In the matter of doors it was important to eliminate dead space at the front of buildings which was caused by doors of the folding type.

The last point mentioned by Mr. Pinckley called out a statement from Mr. Litchfield to the effect that some space was necessary between the ends of the cars and the doors, say 10 ft. or 12 ft. In reply Mr. Pinckley stated that he followed the insurance regulation requiring 3 ft. of space.

Chairman Schreiber then put the motion that the general fire rules be referred back as recommended by the committee on standards so they may be taken up by the National Fire Protection Association.

E. W. Olds, former president of the Engineering Association, made a short speech referring to his pleasure in attendance at the convention. Mr. Olds is back after an absence from the work of somewhat over a year.

HEAVY ELECTRIC TRACTION

The report of the committee on heavy electric traction was presented by E. R. Hill. It was received, and on motion referred back to the committee for further consideration.

POWER GENERATION

The report of the committee on power generation was then presented by B. F. Wood and W. H. Sawyer.

W. N. Smith said that apparently the smaller companies do not always realize the importance of getting all they can out of their coal. Even the managers of small plants where the kilowatt capacity does not exceed 5000 kw or 10,000 kw should use all the economies which the large plants do. As to the cost of reactance, in one large plant that item alone had cost \$1 per kw, and the cost of installation would be anywhere from 50 per cent to 100 per cent additional because the reactances were so large. It might be that small plants could install reactances for less money, but at present the cost appeared too high.

H. G. Stott asked whether it was not time to abandon the term "boiler horse-power" in regard to rating. Why not use the old practice of giving the number of square feet of heating surface? Everyone knew that the rating varied from normal 3½ lb. of water per square foot of heating surface to 20 lb. or even 30 lb. on some torpedo boats. The statement that forcing the boiler is dangerous to the tubes had been demonstrated to be a fallacy. He had carried out tests of boilers for long periods up to 400 per cent rating and had found that boilers which average more than 200 per cent rating are better than those which operate below rating and which are shut down frequently. When a boiler is shut down the sediment settles in the tube and forms scale, but when running at high range the rapid circulation cleans out the scale-forming matter and carries it over into the mud-drum. The curves due to losses of efficiency in extreme forcing of boilers should be plotted, but this inefficiency obtained only for two hours or at most four hours a day. Forcing boilers performed two functions—first, it reduced the investment in a large degree and, second, it reduced the operating expenses by cutting out a great many banked-boiler hours. The whole tendency was to get high capacity by forced draft and possibly by induced draft.

Mr. Stott, speaking of reactances, said that he had concluded that if they were used they should be used as now. Instead of employing the bare copper wire for the coils with insulators, he would insulate the coils with practically solid mica. In this way the reactance could be cut down almost 50 per cent. In regard to selective relays his company had come to the conclusion that the generator should

be designed to take care of itself under any conditions except those of internal short circuit. To take care of that condition he proposed to put a current transformer inside of each neutral leg, which would be synchronized with the other one. No matter what short-circuit occurs outside of the machine there will be a balanced condition in the relay. He referred to this as a modification of the Merz-Price system. Naturally, if one obtained a short-circuit the current could be killed on two legs, but it would cut the switch off the line the moment there was any trouble in the machine. So far as devices were concerned, he had found that the simplest solution at present was the use of a grounded neutral through resistance. The feeder relays are set instantaneously so that they cut out in the time required to get the oil switches out, namely, eight cycles or three-fifths of a second. In about 95 per cent of these feeder troubles the oil switches cut out at both the power house and substation ends, without any notification. The first indication is that the pilot light goes out on both ends and shows a green light. He used no protection for short-circuits between phases. In most troubles of that kind one phase went to ground, whereupon the ground feeder took care of it very satisfactorily without any drop of voltage or disturbance of the system.

J. W. Welsh said that reactances had been generally considered somewhat of a makeshift and were put in to give the oil switches and relays an opportunity to perform their functions. The loss from reactances was small, usually one-tenth of 1 per cent. The reactances for a 20,000-kw plant as used on 11,000 volt, three-phase No. 0000 feeder circuits cost only about \$1,000 for each reactance of 200 amp continuous capacity. This would be about 25 cents per kw. Each of the three reactors was about 3 ft. in diameter and 6 ft. high.

L. P. Crecelius said that his experience with sixty-cycle apparatus had shown that it causes less concern from reactance than 25 cycles. Mr. Welsh, however, differed from Mr. Crecelius as he believed that the question of damage on a short-circuit depended on the short-circuit that flowed and that in turn depended on the reactance in the circuit. In old apparatus the reactance was in many cases only one-quarter or one-fifth as much as in modern apparatus.

The discussion was concluded by B. F. Wood, who expressed the hope that the users and makers of boilers would endeavor to raise the efficiency curves of high-rating boilers.

Upon motion of W. N. Smith the report of the committee was accepted with thanks. The meeting was then adjourned.

YESTERDAY'S SESSION OF THE AMERICAN ASSOCIATION

The American Association held its second session yesterday afternoon at the Greek Temple. General Harries called the meeting to order at 2.30 o'clock and appointed the following committees:

Nominating committee: A. W. Brady, C. S. Sargeant, Simon Bamberger.

Committee on resolutions: John G. Smith, T. H. Tutwiler, W. O. Hay and Patrick Dube.

The report of the insurance committee was then presented with the report of the insurance expert. This report is published in abstract elsewhere in this issue.

The reports of the committee on public relations and the Aera advisory committee were then presented. A. D. T. Van Zandt, publicity agent Detroit United Railway, then read his paper on "Progress in Publicity." J. J. Burleigh, second vice-president Public Service Railway, then read the report of the committee on welfare of employees. The papers on "Profit Sharing with Employees," prepared by W. F. Ham, Washington Railway & Electric Company, and H. A. Bullock, Brooklyn Rapid Transit Company, were then read. These papers and reports are published elsewhere in this issue.

The next report in order was that from the committee on electrolysis, of which Calvert Townley was chairman. The president then read the following letter from Mr. Townley:

"In view of the invitation extended to our association by the American Institute of Electrical Engineers to participate in the organization of a national committee to consider the questions of electrolysis and in the absence of the receipt of instructions to the contrary from our executive committee, this committee has deferred the development and plans for any comprehensive consideration of the question until the organization of the national committee above referred to, which is not yet complete. Meanwhile, we are informally advised that the committee on electrolysis of the American Electric Railway Engineering Association has been giving attention to the technical side of the question and will submit a report of its proceedings."

Professor Richey's report on electrolysis, to which Mr. Townley referred, is printed on another page.

C. S. Sargeant, vice-president Boston Elevated Railway, then read his paper on "Some Financial Aspects of the Relief of City Congestion by the Construction of Subways and Viaducts," the report of the committee on company sections being deferred until Thursday morning.

There was no discussion on Mr. Sargeant's paper. The meeting then adjourned.

REPORT OF COMMITTEE ON INSURANCE*

BY H. J. DAVIES, CHAIRMAN; F. A. HEALY, A. H. FORD, E. J. COOK

Only 216 members responded to the data sheet for 1912. Their reports show: Amount of fire insurance carried, \$179,881,945; amount of premiums paid, \$1,198,564; amount of fire losses, \$224,895; amount recovered, \$180,691; ratio of recoveries to losses, 80.34 per cent; premiums per \$100 of insurance, \$0.66%; losses per \$100 of insurance, \$0.12½; recoveries per \$100 of insurance, \$0.10; ratio of losses to premiums, 18.76 per cent; ratio of recoveries to premiums, 15.08 per cent.

A comparison of the ratios of losses to premiums in the last three years with the ratios of earlier years, as shown by the committee's annual reports, indicates a betterment of the risks. Construction is better; old buildings and the cars in them have been protected by automatic sprinklers and in other ways; improved facilities have been installed for extinguishing fires in rolling stock in open yards, and there has been considerable improvement in the cleanliness of carhouses and other buildings—in what the insurance people call "housekeeping." Lower rates have followed, of course. Improvements by other companies will further reduce the losses by fire and the average cost of insurance.

Several hundred gentlemen are meeting in Philadelphia this week to discuss the subject of fire prevention. This association was invited to attend the convention. Your insurance expert and the chairman of your committee on insurance had the pleasure of attending Tuesday's sessions as your representatives. The chairman of the committee had the honor also of being a representative there of the National Chamber of Commerce. In the call of that convention it is stated that of all the countries in the world the United States has the distinction of having the largest fire loss per capita of population. Let us continue to help to lessen the disgrace of that unenviable distinction.

In the discussion of the general subject of fire prevention it has been said that nearly every fire that has ever occurred could have been prevented. There are unavoidable accidents, perhaps, but there is no such thing as unavoidable carelessness. As common carriers we are required to exercise the highest degree of care toward our passengers. It is to our interest to exercise a very high degree of care also in regard

*Abstract of report presented before the American Electric Railway Association, Atlantic City, N. J., Oct. 13 to 17, 1913.

to our property. If we permit a fire to occur, we lose in several ways: First, probably, by inability to collect the entire value of the physical property destroyed, as indicated by the ratio of recoveries to losses last year; secondly, by loss of business; thirdly, by increased expense until the plant can be put in condition to operate again at full capacity; fourthly, by having to pay a higher rate for insurance than would be charged if, by reason of good construction and good defence against fire, we were entitled to a lower rate. We can obtain a lower average rate if we deserve it.

Send in your data sheets that we may make full and accurate statements to the association and to the insurance companies of values and losses. Your committee hopes to obtain for electric railway property a still better reputation than it now has among insurance men. The truth can be more accurately shown by reports from all than from half of the members.

The steam railroad companies have recently organized a fire-prevention bureau. We hope to receive an invitation to co-operate with them. If we do not, we shall ask them to unite with us.

We believe that, as your committee has from the beginning urged, it is more important to prevent fires than to collect insurance, and its name should be changed to "the fire prevention committee."

S. L. Tone, of the Pittsburgh Railways, who has been an efficient member of this committee for several years, has resigned from the street railway business and from the committee to serve his State as a member of its Public Service Commission for a term of nine years.

In our next annual report we expect to present, after careful study, an analysis of the causes of fires, as disclosed by all data sheets received since the organization of the committee, and possibly some practical suggestions for the prevention of similar fires.

Your insurance expert has had a busy year and has made to us a report of his work which we have asked him to read to you.

REPORT OF HENRY N. STAATS, INSURANCE EXPERT AMERICAN
ELECTRIC RAILWAY ASSOCIATION

My position as insurance expert of the association and as a member of the National Fire Protection Association has enabled me to deal directly with the Central Traction & Lighting Bureau and with various committees of other insurance associations in behalf of our member companies. The good results accomplished during the past two years are apparent.

We have secured a better understanding with the old-line insurance companies, and we now have the co-operation of the factory mutual insurance companies, which are insuring at actual cost the major part of the properties of a number of large electric railway and light companies.

Your insurance expert enjoys the respect of and friendly relations with leading insurance representatives of both stock and mutual insurance companies. The insurance bureaus are striving earnestly to agree upon conditions and rates of insurance that will prove satisfactory to the member companies of our association. I am confident that the results already secured can be maintained; and that even greater benefits will follow through the co-operation of our own Bureau of Insurance with other insurance organizations.

You now have a successful insurance department doing effective work and it should be maintained. There is no sufficient reason for not making your Bureau of Insurance a negotiating office for all the insurance of all the member companies of the association.

For the good of the service and for the purpose of making more effective the work of its Bureau of Insurance, I recommend that each member company submit to this bureau copies of the schedules used in writing its insurance. Comparison of these schedules with the schedules

of the present members of this bureau will give your insurance expert information that will prove very effective in his negotiations with the Central Traction & Lighting Bureau, local insurance agents and other insurance organizations to obtain the most favorable conditions and lowest rates of insurance. The co-operation of our association along these lines will prove a powerful factor in obtaining the results most desired.

As a further protection and for the convenience of our member companies, I recommend for their use specific schedules of insurance on all items except rolling stock. This should be written under a blanket item. This form of schedule has already been adopted by some of the large traction companies. The item, the rate, the amount and the premium should be printed in the schedule for each item.

Your insurance expert and his assistants are the only members of the association who give their entire time to a study of these insurance subjects and to working out detailed plans and carrying out suggestions of your committees for the benefit of our member companies and in aiding them to adopt the well-established principles of protection and inspection that go far toward reducing the hazards of fire and reductions in their rates of insurance.

During the past two years I have traveled more than 50,000 miles in the interest of some of our member companies. A part of this work has been accomplished with personal financial loss. Much credit is due the committee on insurance, the building committee of the Engineering Association, the executive committee and the secretary of our association for assistance rendered your insurance expert.

There is no field of electric railway work where more valuable results may be produced by co-operation than in that of insurance and protection against fire.

LANTERN SLIDES WITH "SAFETY FIRST" MESSAGE

Recognizing the value of the motion picture houses as an advertising medium, the subsidiary companies of the Federal Light & Traction Company, New York, N. Y., have arranged to run "safety first" lantern slides in the moving picture houses in the various cities where they operate electric railways.

The slides, which are made in colors, have painted on them the dial of a clock with movable hands affixed thereto. The picture operator in his little booth, ascertaining the correct time, sets the hands of the clock on the lantern slides accordingly and the slide is then flashed on the screen.

Many persons attending a theater find it difficult to read the time from their watches in the darkness. As women make up a large part of the audiences they find the slides of great value in keeping track of the time of day. Most of the picture show proprietors are glad to run the slides for the clock feature alone.

Attracted by the novelty time-telling slides, the readers are sure to read the "safety first" notices thereon. The Federal companies have supplied the picture shows with twenty-five different slides.

The managers of the companies under the control of the Federal Light & Traction Company report that the public has evidenced considerable interest in the novelty.

The most important electric street railway system in Peru is the Associated Railway, Light & Power Company, Lima, commonly called the Electric Trust (Empresas Electricas Asociadas), which has the monopoly of the three industries for Lima, Callao, and their suburban towns. Its water-power stations are located near Chosica and at Santa Rosa, on the Rimac River, with auxiliary steam plants for cases of emergency.

REPORT OF THE COMMITTEE ON BUILDINGS AND STRUCTURES*

R. H. PINKLEY, CHAIRMAN; GEORGE WESTON, C. L. CRABBS, L. C. DATZ, W. T. BOUGAN, H. A. FISKE, W. B. INGHAM, D. G. KNIGHT, H. G. SALISBURY

This report consisted of three parts, namely;

Part A—Review of modern carhouse construction, prepared by Messrs. Knight, Salisbury and Datz;

Part B—Fire protection rules, prepared by Messrs. Crabbs, Fiske and Dougan;

Part C—General specifications and form of contract for railway structures. Of these the first two are published in abstract. The sub-committee assigned to the third subject was unable to complete its report in time for inclusion with the others.

REVIEW OF MODERN CARHOUSE CONSTRUCTION

The proper general arrangement of the modern terminal is now pretty well defined. It is generally conceded that the double-end plan is desirable, as a layout that will provide continuous operation without backing of cars or turning of trolley poles. It is very important to keep this point in mind, particularly where any single-end cars are used.

Although the all-fireproof carhouse, particularly with brick walls and concrete roof, has gained strong favor in the last few years, there are still advocates for the carhouse with brick walls and mill construction roof. The latter in a way is due to the requirements of the insurance interests, as it must be remembered that it is just as important to protect from fire the contents of the building as the building itself. The importance of this consideration is illustrated when it is explained that a carhouse for thirty cars may have a value of \$45,000 and the equipment a value of \$200,000. If a company wants a low blanket insurance rate covering cars as well as building, the building should be equipped with an automatic sprinkler system, whether it is of fireproof construction or mill construction and the rate will be practically the same for either type.

A building holding 100 cars would probably cost for the mill construction \$150,000. The same carhouse built with a reinforced concrete roof would cost \$180,000, or \$30,000 more. The example quoted is simply by way of illustration, as the exact values change for each special case. The smaller the difference of first cost, the more desirable is the fireproof building. In either case it can generally be shown that a sprinkler system will save its cost through reduction of insurance rates. The cost of maintenance of the fireproof building is, however, less than that of the one with the mill construction roof.

One of the most important considerations in the shop portion of carhouse terminals is the provision for pit tracks. The tendency with some companies is to increase the percentage of pits under the operating tracks. A few years ago pits that took up 50 per cent of the operating tracks in a carhouse were rare. Some of the latest terminals to-day are being constructed with more than 50 per cent of the operating tracks over pits. For example, the new Luzerne carhouse of the Philadelphia Rapid Transit Company has 60 per cent of operating tracks with pits, and the new Hilton carhouse of the Public Service Railway 75 per cent.

It is still the general opinion that it pays only to heat the shop portion and offices. Generally, it is best to install the low-pressure gravity return system, but where the runs are long it is better to install the vacuum return system. In one of the latest carhouses of the Philadelphia Rapid Transit Company, the washing of cars is done with warm water, and the carhouse proper is not heated and is also open at both ends. For lighting the carhouse, on account of the low ceiling type design that is now so popular, the use of incan-

descent lights to conduits is the general practice. Sometimes arc lights are installed on poles at the front of the building and in the open storage yards, to give a general illumination.

For natural ventilation windows are not relied on, but louver skylights and ventilators are installed in the roofs of each bay; in some cases the skylights are continuous. The natural light effect may be improved by finishing the inside of the carhouse in white, using a dark-colored paint only around the walls on the inside to a height of 6 ft.

It is now considered good practice to install the very best of track work at carhouses. Indeed, this is necessary if it is expected to maintain the floors in good condition. If it is possible, only a small amount of special work should be in the street, merely the necessary lead tracks, and the principal entrance special work should preferably be on private property. In the carhouse both girder and T-rails are used. The girder or high T-rail has the advantage for very long spans on the pits, and the girder rail is better for floors and paving. Grooved rail is objectionable in a carhouse on account of its groove becoming filled with dirt and other obstructions.

FIRE PROTECTION RULES

Fire rules should be printed on substantial carboard of any stock or standard size not less than approximately 12 in. by 18 in., framed under glass and posted in all conspicuous locations in all risks. Printing should be in two colors, red and black (main heading, paragraph headings and final clauses in red), and all type should be prominent so as to be easily read.

General fire rules have value largely in their constant impression upon employees of the general principles of fire prevention, and continued instruction in detail is necessary, and the organization of fire brigades is one of the most ready and thorough means to the latter end. Attention in this direction is called to the publication of the National Board of Fire Underwriters, entitled "Suggestions for the Organization and Drilling of Private Fire Brigades as Recommended by National Fire Protective Association." These pamphlets are easily obtainable.

A form for organization and distribution of employees selected for fire duty should be prepared. This should preferably be printed of size and style uniform with the general fire rules and similarly framed and posted. The names of employees selected for various duties should be written in the blanks under the respective classifications of service and, in case of changes in the personnel, the roster should be kept to date. This form may, of course, be amended or elaborated providing for the organization of hose companies, hook and ladder companies, chemical companies, etc., and contain reference to the points at which the various members of companies should report for duty at alarm of fire.

Frequent inspections by a competent and thorough inspector are necessary and some definite system of inspection should be carried on by those in charge of properties outside of regular watchman service and of inspection by underwriters and their representatives. Such supervision, to be complete, should follow some preconceived routine descending to the most minute detail, and for the purpose the use of inspection reports is recommended in such forms as will provide for attention to every feature of the subject.

Accompanying this sub-committee's report were three sections which covered, respectively, general fire rules, organization form for fire brigade and inspector's form of report.

RECOMMENDATIONS OF THE COMMITTEE ON BUILDINGS AND STRUCTURES

It was the recommendation of the committee on buildings and structures that the general fire rules as given in Section 1 of Appendix B of this report be adopted as recommended practice. It was the sense of the committee on standards that rules of this character did not admit of adoption either as standard or recommended practice, but were

*Abstract of report read before the American Electric Railway Engineering Association, at Atlantic City, N. J., Oct. 13-17, 1913.

of a nature that would warrant their inclusion in the "Engineering Manual." It was recommended, however, that before final approval be given to the suggested code of rules, the same be referred back to the committee in order that they may be put before the National Fire Protection Association, of which the American Electric Railway Association is a member, with a view to bringing about the elimination of inconsistencies or provisions which may conflict with other adopted codes.

PROGRESS IN PUBLICITY*

BY A. D. B. VAN ZANDT, PUBLICITY AGENT DETROIT UNITED RAILWAY

Some years ago the Detroit United Railway published a small four-page leaflet weekly. Its chief function was to assist in the development of the passenger business of the company, particularly the interurban travel. Its issue was some 25,000. As time went on the company felt the publication was not broad enough in its sphere. Our next important step was the publication, in the fall of 1912, of a series of newspaper advertisements—a campaign of street railway education. This series lasted somewhat over a year. The advertisements were then grouped in series of threes under a standing front page entitled "Some Problems in Street Railway Service," and published in pamphlet form. Of these pamphlets we issued 30,000 every three weeks, the advertisements of every three weeks forming a new issue. The series of advertisements consisted of fifty-six articles in popular language treating of such topics as:

"Why the Street Cars Sometimes Pass You By."

"Why the Rush Hour Jams the Cars."

"The Story of the Freight Car."

"Fighting the Snow So All May Ride."

"D. U. R. Not All in Detroit."

"Building a Mile of Street Railway."

It was not long before we became pretty well convinced that we were missing a portion of the good results we believed we were entitled to by reason of our advertisements being buried in the mass of other advertisements in the newspapers. Coincident with the publication of these advertisements and their reproduction every three weeks in pamphlet form we began a series of front window posters. These met with instant success because they drew the immediate attention of the riding public. These were posters 12 in. by 19 in.—as large a size as our variety of cars could accommodate. These posters frequently drew editorial attention and many times were paraphrased in the press.

It did not by this time mean a leap in the dark to start our own publication. Finally we cast the die and with it we cut loose from other forms of advertising in Detroit, except our own issues of timetables and folder maps. Every test made by us has demonstrated that a railway can make a wider and more thorough distribution of its information to the public through the medium of its own cars than it can in any other form. It is a better distribution not alone because it is more thorough but because it is less expensive.

Speaking more directly of *Electric Railway Service*, our purpose is to produce an intelligent, readable newspaper discussing railway facts. We are, of course, mainly interested in the problems of our own city and interurban system, to which most of the space is devoted. We do not, however, confine our discussions to our own properties and problems. *Electric Railway Service* is distributed almost entirely through the interurban and city cars, the only exception being the placing of a few in waiting rooms.

Fifty thousand copies of the first issue were placed in the cars, but the weekly average is now 100,000. An allotment is made for each carhouse in both city and interurban property based upon the number of cars, the class of riders

and, of course, the proved demand. The demand shifts from week to week in different localities, in no small measure depending upon the chief topics discussed. Carhouse foremen make reports and the men specially engaged in distributing the weekly in the city carhouses check the distribution so that there shall be at all times an absolute knowledge of the circulation conditions on the various divisions. Finally the distribution is checked by myself and my assistant.

The folders are placed in specially constructed boxes in the cars. These boxes hold from fifty to seventy-five and are kept filled by the distributors as long as the supply lasts. We have found that, on pay-as-you-enter cars especially, the front boxes have a much greater demand than those in the rear, so it is the policy to keep the folders constantly moving from the rear to the front in order that the larger circulation may be had.

Our original expectations were that no small portion of the circulation would be among passengers more or less casually reading what we had to say and thus whiling away the time spent in the car. But such has not proved to be the case. The big percentage of distribution we find is to men and women who take the folders from the front boxes as they leave the cars and place them in their pockets for reading and studying at their leisure.

A special poster is used every week in the cars to advertise special features of the forthcoming week's edition. Every Wednesday night the old folders are removed from the box, and on the same night the new posters are put up on the front windows of the cars with the reading matter facing the passengers. It is thus arranged to have the boxes empty all Thursday so that no confusion as to issue will result. On Thursday night the Friday folders are placed in the cars ready for the demand of the morrow. The poster remains from Wednesday to Wednesday, being in sight all the time that the papers are in the boxes in addition to the one day when there are no papers in the car.

So much for the progress of publicity with us. I do not claim that we have arrived at the ideal, but I do claim that we are accomplishing excellent results, though years of misrepresentation are not to be overcome in a day. But you must print the truth. And it is a mighty uncomfortable street railway in these days that is afraid to print the truth. Political demagogues have charged public utilities with committing many crimes, but the greatest crime the public utilities have committed has been against themselves—the crime of non-publicity.

REPORT OF THE COMMITTEE ON HEAVY ELECTRIC TRACTION*

E. R. HILL, CHAIRMAN; E. B. KATTÉ, J. H. DAVIS, HUGH HAZELTON, W. S. MURRAY, J. M. BOSENBURY

The committee on heavy electric traction reported that it had co-operated with committees of the American Railway Association and the American Railway Engineering Association in the matter of clearances for automatic stops but that no decision had been reached. It recommended that the ensuing committee, in co-operation with the committees of other associations, investigate the question of these clearances and report further on the matter.

OVERHEAD WORKING CONDUCTORS

On the question of clearances and locations for overhead working conductors the committee submitted the information that was recently presented to the American Railway Association by its committee, for the information and consideration of the members of the American Electric Railway Engineering Association. This was published in full in the *ELECTRIC RAILWAY JOURNAL* for May 24, 1913, page 935.

*Abstract of a paper read before the American Electric Railway Association, at Atlantic City, N. J., Oct. 13-17, 1913.

*Abstract of report read before the American Electric Railway Engineering Association, at Atlantic City, N. J., Oct. 13-17, 1913.

REPORT OF THE COMMITTEE ON EXPRESS AND FREIGHT TRAFFIC*

F. D. NORVIEL, CHAIRMAN; A. R. PIPER, G. W. QUACKENBUSH, F. W. COEN, C. V. WOOD, J. M' MILLAN

That the electric lines are irrevocably committed to the handling of freight and express at some rate and in some manner seems to be beyond argument from the number of lines, as compared with the whole, which are now handling this traffic, and for this reason the committee feels that it is its duty to bring forward the question of a classification suitable for the electric lines, the division, number of classes and the rates to be made on some uniform basis, either a mileage or zone system being used and an exception sheet being made, which may be uniform for the exchange of traffic as between all electric lines.

In order to show briefly and in an abridged form the answers which are made to the questions on a data sheet by the various roads a tabulation of the replies has been made. In the divisions of the states as arranged, local conditions are approximately the same on all lines in each division.

	Local and Interline	Local Freight	Only Express	Do Not Handle	Total
Eastern States	24	12	..	3	39
Western States	17	5	1	2	25
Southern States	2	..	1	3
Middle States	28	9	1	..	38
Totals	69	28	2	6	105

The answers to the inquiry "Do you maintain a pick-up and delivery service?" may be summed up as follows:

	Pick-up and Delivery	No Pick-up and Delivery	Do Not Answer	Total
Eastern States	9	27	3	39
Western States	2	21	2	25
Southern States	1	1	1	3
Middle States	4	34	..	38
Totals	16	83	6	105

The above would indicate that of the total number of lines represented eighty-three did not believe in a pick-up and delivery proposition, while sixteen lines have this service. In all but one instance it is usually limited to one or two of the larger stations and on only one line are the automobiles and drays owned by the company using them. As to the use of the auto-truck, of the 105 roads represented only four lines have placed them in service.

The question requesting expressions of opinion as to a uniform scale of class rates on a mileage basis, the committee believes, was not wholly understood in all cases by the lines answering. However, a careful perusal of the answers given would indicate that as a whole a uniform class rate on an agreed mileage basis in small zones, somewhat on the plan of the parcel post, might be worked out satisfactorily and to the interest of the electric lines. Further, the character of franchise rights (this refers particularly to the use of streets through cities and towns), as indicated by the answers to this question, is such as to deny the broadening of the freight traffic to a point where its volume would be sufficient to warrant a large expenditure for equipment and station facilities without practically rebuilding nearly all of the traction lines.

One section of the data sheet contained inquiries as to the advisability of adopting the "official classification" or the classification applicable to the territory in which a road is located, also as to the advantages to be derived from following steam railroad practice in the matter of using per diem charges for cars used on foreign lines. Inquiries were also made as to whether or not the companies recommended

representation by electric railways on classification committees, also as to whether the members favored the adoption of the national car demurrage rules, the current storage rules and rates of steam railroads and rules for the settlement of freight claims now being used by steam railroads.

The replies to the questions outlined above indicate that a very large majority of the companies replying are in favor of the adoption of the rules and practices referred to.

Regarding the system of way bills (i. e., the unit way bill as against the blanket way bill), it is not believed that uniformity in this particular is essential. Many roads find that it is wise to use both systems, the "unit" way bill for various reasons being especially adapted to the needs of electric lines covering local shipments for small country towns where much of the freight is delivered directly to the consignee at his store door. The answers to this question taken as a whole would indicate a leaning toward the standard steam railroad blanket way bills for interchange of freight either with electric or with steam roads and the committee would recommend that member companies make this standard a uniform one.

As to the matter of uniform exceptions to the classification, the committee realizes that every line has certain local conditions to contend with which would make it almost impossible to follow out any general rule for a large territory, especially for local business on its own line. A close scrutiny of the answers to this question would indicate that many of the lines which have voted "no" would have voted "yes," provided it had been understood that these exceptions would only apply on interline business as with other roads, and that they were at liberty to make such local exception as might be necessary for the operation of their own lines.

The Central Electric Traffic Association has recently issued, through its chairman, a joint exception sheet covering C.E. T.A. territory for the use of all lines in the interchange of freight business. Many of the lines thought that it was impossible to adopt some of the restrictions in this exception sheet on their own lines for local business, but many of these same lines have subsequently adopted this joint exchange sheet for use in this way.

In the matter of the establishment of a weight and inspection bureau, a respectable majority of the lines voted "yes." Several conditions for handling freight as regards correct weights and inspection are deplorable, and yet the expense necessary for an organization of this kind cannot be borne by the electric lines on the volume of freight business now being handled. However, at certain large centers a weight and inspection officer can be advantageously placed and be the means of saving a large sum to the line or lines so employing a man. This plan was tried out at the Indianapolis terminal with the remarkable showing of about 15 per cent gain in revenue on the same volume of business, resulting in a gain of five times the expense incurred.

The question of industrial switches seems to the committee to be one of very great importance and should receive further attention. There seems to be no general plan for the placing of this aid to industries, hardly any two roads following the same plan; in fact, the answers would indicate that very few roads put in two switches under the same conditions.

As to the kind of freight handled, many lines stated that they handle all kinds of freight while a general analysis of their report would indicate that this was not entirely the case, as in most answers there was usually the word "except," which would indicate that there was some break in the chain of possibilities as to the general freight business.

The question of public demands and the profitableness of the freight business are other points which should be carried forward for further and closer investigation. Very few of the lines would give an unconditional answer that it was profitable to handle freight, most of them commenting that

*Abstract of report read before the American Electric Railway Transportation & Traffic Association, at Atlantic City, N. J., Oct. 13-17, 1913.

it would be so if "proper facilities," "belts around cities and towns," "freight houses," "side tracks," "steam road connections," etc., were provided. In other words, that the business was not now profitable, but it might be made so.

The committee is hardly in sympathy with this pessimistic view. The electric lines have a field entirely their own and are capable of giving a service to the public far superior to that now rendered by any steam road. This need not be confined wholly to short distances, but may be extended to 100 or 150 miles and even further, and the service rendered would be so much quicker than that of steam roads that special recognition would be given by the shipping public commensurate with such service.

There are only a very few electric lines represented in this report which are equipped to handle sufficient cars in one train to justify the tonnage at the rate received, and it is possible for the electric lines to handle any of this business without a visible loss only because of the fact that much of the freight handled by traction lines is of such a character as to take a high-class rate and is delivered in quantities so small that minimums apply.

The usual compensation for electric lines on the class of freight now being handled will approximate closely 3 cents per ton per mile hauled. The committee has been unable to secure any general figures from the Indiana lines, but, quoting from the report made by the Public Service Commission of Ohio, the freight tonnage and freight revenue of steam lines show a gross earning of 0.5 cent per ton per mile haul. This is a figure which interurban lines are gradually approaching, under the system of accepting all classes of freight on the same basis of revenue as that received by the steam roads. It is hard to conceive how any traffic man can figure a net earning on this basis with the expensive and limited methods which electric railways employ in handling freight and express, such additional expense being caused largely by franchise conditions.

Recently the Interstate Commerce Commission conducted an extended investigation as to the relative merits of the wooden boxes versus the corrugated fiber container for package purposes. This showed that for packages handled in fiber containers the risk is five times greater than for those packed in wood, even on steam roads, where the custom is not to pile freight as high and in as promiscuous order as is the case with the electric lines, for the reason that the electric lines must handle practically all classes of freight in one car. Yet one road, member of the C.E.T.A., issued exceptions on many articles shipped in fiber containers, especially bottled goods, glassware, or heavy single articles, and was finally forced to withdraw these exceptions as being "unjust and discriminating." The foregoing proves the justification of the stand taken by this company, and demonstrates further the real need of representation by the traction lines classification committees.

Under certain conditions traffic arrangements with the steam roads might be advisable. Just recently under the Indiana Public Service Commission law, passed by the last Legislature, an interchange between a steam road and a traction line was ordered by the commission. In this case, however, a certain state institution situated on the traction line having a traction line switch (but no steam road connection) ordered the steam road to deliver certain commodities in car loads to the traction line for delivery. This the steam road finally consented to with the reservation that it was not to be considered as a precedent to which reference might be made when other like requests should come before the commission. Isolated cases of this kind might be wisely put into effect, provided as in this particular case the delivery were made by a belt connection and operated over a section of the interurban tracks, where it had a private right-of-way, and not through any city or town. This is only a forerunner of what may be expected in the future from commissions and electric railways should be prepared to decide knowingly

whether indiscriminate connections of this kind would be desirable or not.

There are some roads, as indicated in the answers to the questions in the data sheet, prepared to handle all classes of freight (and possibly at a profit) on the steam railroad basis. These lines are few and far between, however, and as in every case it would be necessary to develop a special tariff to cover such interline business, a general proposition of tightening up on the character of freight accepted and the rate at which same can be handled profitably would seem advisable for the traction lines as a whole. That this view is partially taken by members of the Interstate Commerce Commission is evidenced by their decision on the matter of through rates and through traffic between Louisville and Indianapolis over a traction line making this link, where their orders only cover first, second, third and fourth class, not compelling or even asking that the traction lines should consider the proposition of handling freight taking a class rate lower than the ones mentioned.

A brief summary of the whole situation would be in order preliminary to the recommendation of the committee as to what should be further continued in the investigation for the succeeding year.

The preponderance of answers in the affirmative would indicate that it is the intention of a large majority of the traction lines communicated with to handle freight and express.

Replies indicate that the lines as a whole are opposed to pick-up and delivery, and that if it was maintained it would only be in order to take care of a special situation.

The use of auto-trucks has not been general enough to permit any suggestion as to augmenting freight service with this auxiliary. All lines, with one exception, were against the owning of drays or auto-trucks, for any service.

It would seem that a majority of the lines represented would be in favor of a uniform scale of class rates on some basis, to be agreed upon later.

On the question of franchises, as these are largely controlled by legislative conditions varying widely as between different states, it would seem that this subject should receive further attention from our legal departments.

All questions referring to the adoption of certain rules and regulations now in use by the steam roads have been voted on in the affirmative by a very large majority of all lines represented; in fact it would appear that a majority of lines were using these rules at the present time.

The answers to the query concerning the desirability of the unit way bill as against the blanket way bill would indicate general approval of a double standard, the unit way bill for local use and the blanket way bill for interline traffic.

There are about the same number of lines in favor of a uniform exception to the official classification, as against it. Our recommendations would be that for interline business some form of uniform exception sheet should be agreed upon in order to facilitate traffic as between the different electric lines.

There is undoubtedly a crying need of some form of checking weights of outbound and inbound shipments and inspections relative to classification and the committee would recommend that further consideration be given this subject.

A wide variation of conditions makes it impracticable for the traction lines as a whole to have one set form of agreement for the placing of such private sidings, and from the nature of the work, each individual case must be handled on its own merits.

APPENDICES

Appendix A submitted with the report consisted of a reproduction of the data sheet sent out by the committee to the member companies. Appendix B consisted of a compilation of the answers received from different roads on the questions submitted in the data sheet.

REPORT OF THE COMMITTEE ON POWER GENERATION*

B. F. WOOD, CHAIRMAN; G. H. KELSAY, G. W. KNOX, W. H. SAWYER, J. W. WELSH, NORMAN READ, WILLIAM ROBERTS, L. P. CRECELIUS, G. C. HALL

The committee states that on account of the low first cost and high economy of steam turbine generating stations the possible economy of gas engines and gas producers is so small that there is little general interest in this subject for the member companies. From information in the hands of the committee it is the belief that with gas engine plants costing \$90 per kw, or more, as compared with steam turbine plants at \$50 per kw, the saving in the higher economy of the gas engine would not be sufficient to offset the additional fixed charges, except in cases where the cost of coal was from \$6 to \$8 per ton.

The report was accompanied by three appendices, A, B and C, covering the subjects of peak loads, boiler settings and furnace design, automatic relays and distant control of valves. Of these two are published in abstract. That on peak loads was prepared by B. F. Wood, that on automatic relays by W. H. Sawyer, J. W. Welsh and G. C. Hall, and that on the distant control of valves by William Roberts.

PEAK LOADS

In the reports of this committee for the years 1910, 1911 and 1912 the important bearing of fixed charges to the total cost of plant output for various load factors was clearly brought out, as operating costs do not materially change for the various load factors. Except in a few cases where there is an excessive and unnecessary amount of standby apparatus installed, the only portion of the power station in which a reduction in first cost and the related fixed charges can be made is in the boiler room. Here the reduction in cost must be made by securing an increase in the steaming capacity of the boiler plant.

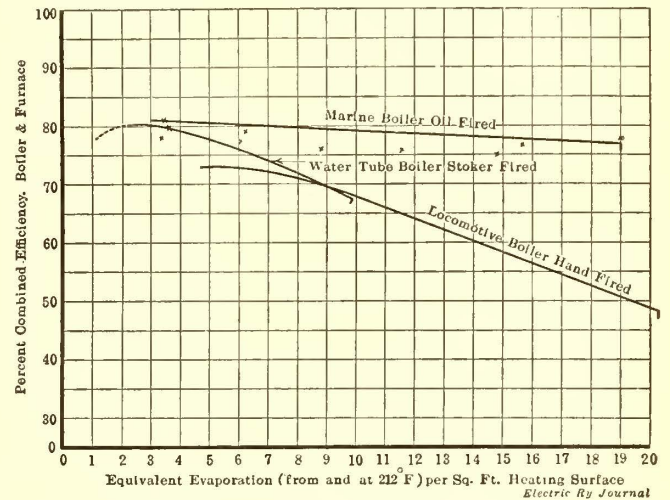
Curves showing the combined efficiency of boiler and furnace when operating at various rates of evaporation per square foot of heating surface are shown in the accompanying illustration. All of these curves are continued to the present known maximum rate of operation. The curve showing the performance of the marine boiler represents work recently done under the direction of the Navy Department at the League Island Navy Yard, and, so far as known, represents the highest performance, both as to rate of evaporation and efficiency, yet obtained with this type of boiler. The performances of the locomotive and marine boilers are included to show the great possibilities for improvement in power plant operation, both in the direction of securing greater output from the installed boiler plant and better economy in its operation.

By reference to the curve, it will be noticed that the combined boiler and furnace efficiency at the usual rating for stationary boilers, 3.45 lb. per sq. ft. of heating surface per hour, is 80 per cent; if the boiler and furnace are worked at double rating the efficiency is 74 per cent. This performance, of course, represents conditions obtaining at a constant rate of working, and in the every-day operation of power stations the combined efficiency rarely exceeds 70 per cent, which is due to the losses that occur during the period of light loads when boilers are banked or held in reserve. By operating at higher rates during peak-load periods the number of boilers that must be banked at the time of light loads will be less, and consequently the losses that occur at such times will be reduced.

To show that the total cost of plant output is not increased, but on the contrary is decreased, with the higher rates of the working of the boiler plant, it may be said that the boiler room portion of the ordinary power plant costs about \$30

per kw when boilers are installed on the basis of operation at rated capacity. The cost can be reduced to about half this amount if the boilers are installed to operate at double rating during the peak-load periods, thus reducing the first cost of the plant by, say, \$12 per kw. The saving in fixed charges on this amount, at 12 per cent per annum, would therefore amount to \$1.44 per year on each kw of installed capacity.

Estimating the yearly load factor at 27.5 per cent, which corresponds to an annual output of about 2,500 kw-hr. per kw of installed capacity, the saving in fixed charges becomes 0.58 mile per kw-hr. The coal consumption per kw-hr. of the plant will be increased in an inverse proportion to the boiler efficiency at the two rates of working, and there will be required, if the plant is worked at double rating during peak loads, 80/74 of the coal at normal rating. Such a plant would operate at 2 lb. of coal per kw-hr. under normal operation, requiring therefore 5000 lb. of coal per year per kw of installed capacity, which at \$2.50 per net ton amounts to



Relation of Steam Boiler Efficiency to Capacity

\$6.25 per year. The annual cost for fuel at the higher rate of operation would therefore be 80/74 of \$6.25, an increase of 50 cents per year for fuel. The net gain at the higher rate of working would therefore be nearly \$1 per year per kw of plant capacity.

SUGGESTED ARRANGEMENT OF AUTOMATIC RELAYS AND APPARATUS TO PROTECT POWER PLANTS FROM SHUTDOWN

The success of any method of protecting a power system from shutdown is dependent upon the selective elimination of the faulty section of the maintenance of service in the remainder of the system with the least possible disturbance in voltage and frequency. The problem of cutting out an overloaded section under normal conditions of load and power factor is simple. The real test of a protective system is its ability to isolate a damaged section when a short-circuit or other trouble occurs with attendant circumstances of heavy power surges, low power factor and reduced voltage.

To limit the heavy rushes of current which occur at times of short-circuit and to prevent shutdowns, a form of self-inductant reactance should be employed in conjunction with a suitable form of automatic relay. This reactance, unless inherent in the apparatus, would preferably take the form of an open coil without iron in the magnetic circuit and have a cross-section designed to secure the maximum self-induction, such as can be easily secured and installed at comparatively low cost; these coils to be placed directly in series in those parts of the system in which it is desired to limit the short-circuit current.

Where modern turbo-generators are installed, with at least 6 per cent internal resistance, additional internal reactance may not be required. In most of the earlier machines, both

*Abstract of report read before the American Electric Railway Engineering Association, at Atlantic City, N. J., Oct. 13-17, 1913.

turbines and transformers, the internal reactance was made as low as possible for the purpose of improving the regulation, but with the result that the short-circuit current was in some cases as high as forty or fifty times full load current. This, of course, is the maximum instantaneous current at the moment of short-circuit and dies down, decreasing quickly as the armature reaction builds up, counteracting the field flux and reducing the generator voltage. Reactance in the generator leads, besides protecting the generator from external short-circuits, has the additional advantage in case of trouble in the generator itself that it interposes an impedance between the bus and the fault, thereby reducing the shock on the system.

In the case of short-circuits occurring in the feeders or transmission circuits beyond the generator buses, a reaction located in the feeder itself is the most economical point of installation from the standpoint of minimum voltage drop under normal operating conditions, for the generator reactances are all in parallel between the source of electromotive force and a short-circuit on any feeder, while a feeder reactance is in series between the generator and a short-circuit on the feeder. Another advantage of having part of the reactance in the feeder circuit is that the busbar voltage is subjected to less disturbance when a short-circuit does occur, owing to the interposition of the reactance between the bus and the short-circuit, and the stability of the system is hereby increased. An additional advantage results when a feeder is used as a tie line to other generating stations or when it feeds synchronous apparatus, as a reactance in this line limits the amount of reverse power fed back from the other stations when a short-circuit occurs on one station feeder.

In stations of large capacity having sectionalized busbars and tie lines to other stations, a reactance between the bus sections or in the tie between stations or groups of machines permits a much greater total generating capacity to be operated in parallel with the same factor of safety in switching equipment and limits the area of the system over which any disturbances extend.

To overcome the objection of poor regulation and power factor caused by reactance there is sometimes installed an additional short-circuiting switch so connected as to shunt the reactance and provided with an automatic instantaneous device to open the switch and cut in the reactance in case of short-circuit. The objection to this, however, is that the reactance is out of the circuit when trouble occurs and therefore does not necessarily reduce the shock to the system.

GROUNDING NEUTRAL

Where the generators are Y-connected on large underground systems, a further protection from shutdowns due to surges may be secured by grounding the neutral. This limits, even when solidly grounded, the normal voltage between any conductor and ground to approximately 58 per cent of that between conductors—thus protecting the insulation of apparatus. A resistance inserted in the ground connection limits the flow of current and shock to the system and, for the underground systems, grounding the neutral through resistance is in general advisable, but, to take the other extreme, grounding the neutral on long-distance overhead systems is, in general, not advisable—the primary difference in the two extremes being the fact that one is an underground cable on which a fault to ground generally rapidly develops into a short, whereas the other is an overhead circuit of three separate wires and fault to ground can often be located and remedied without interruption of service; also on underground cable systems there are generally more spare cables.

RELAYS IN MAIN GENERATOR LEADS

To isolate the affected portion of the system and protect the station from shutdown, reverse current or reverse energy relays operated from transformers in the generator leads, for the automatic operation of generator oil switches, should be installed. These relays should have the following operat-

ing characteristics: (a) Should permit of limited reversal without relay tripping in order to allow leeway for motoring when the generator is first put on bus before picking up load. (b) Operation at predetermined reverse load setting should be instantaneous. (c) Must not operate on overloads. (d) Must operate on reversal even with low voltage and low power factor. (e) Must not operate on over-voltage.

In general, overload relays should not be installed to operate generator switches, and where they are installed, they should be equipped with a definite time-limit feature, arranged so as not to operate under any condition of short-circuit, except at a given time setting.

In order to cut off from the bus a generator having an internal short-circuit, an adaptation of the Merz-Price system of balance current has been proposed consisting of two transformers on each leg of the generator winding, one of the two being outside of the generator and the other being inside the star connection. Normally these two transformers are in opposition and no current flows through a relay placed in the circuit, but in case of internal short-circuit there is more current flowing in one transformer than in the other and the relay will operate, cutting the generator off from the bus and opening the field circuit.

RELAYS IN FEEDER CIRCUITS

At the power house end of feeders, relays of the overload type, with adjustment for the time limit, should be used. When feeders are operated in parallel at the substation end relays of the reverse energy type should be installed at the substation. On systems having substations fed directly (substations not in tandem or on ring system) and where the service is not such as to demand that the power supply be maintained at all hazards, inverse time element relays should certainly be employed at the generating station rather than the use of definite time relays. In cases of larger and more important but relatively short tie lines between generating stations, reverse current or energy relays should be installed in each station, interconnected so as to operate immediately upon reversal of energy or current at one end of the line. In general, for transmission and long tie lines, inverse time element relays should preferably be furnished of such characteristics that under all conditions of overload or short-circuit the successive relays maintain their selective sequence.

DISTANT CONTROL OF VALVES

Some remarkable developments have been made within the last few years in the distant control of valves either by electricity, air or steam. The perfecting of these different systems of control after an initial attempt has been exceedingly rapid and the electrically operated system has perhaps been the more pronounced in its advancement and adoption.

Several very interesting installations have been successfully completed with special reference to the operation of valves between boilers and headers and sections of the header, thus permitting any break in the pipe to be isolated by closing the necessary switches, which may be placed at any remote point for convenient operation. In one installation, a plant of fifteen boilers, the cut-off valves from the boilers to the main header are controlled from the engine room with the switches conveniently placed, numbered distinctly and in plain view. In case of the loss of a tube, some one formerly had to mount the boiler and endeavor to locate the valve, frequently among clouds of steam, and by the time the valve was located and the boiler cut out the steam would be down on account of other boilers discharging more or less into the boiler with the damaged tubes. Employees have been scalded through this method or want of method of operation.

In another plant, operation of the turbines is carried on from the switchboard and steam is admitted and controlled electrically on all units. The governors of all the turbines are also controlled electrically, while in another part of the plant air is used for remote control of valves for shop purposes.

REPORT OF THE COMMITTEE ON FARES AND TRANSFERS*

F. T. WOOD, CHAIRMAN; J. V. SULLIVAN, E. C. DEAL, F. L. HUBBARD,
G. K. JEFFRIES, W. B. THOMAS.

The committee on fares and transfers presented in its report the results of an investigation of the matter of fare boxes, in which replies to data sheet inquiries were received from sixty-three companies. Of these, thirty-one reported gross receipts annually of less than \$1,000,000, the remainder being properties of larger size. Sixty per cent of the smaller companies and 80 per cent of the larger ones reported the use of prepayment cars, a total of forty-five, or 71 per cent of the whole number. The practice of the forty-five companies operating prepayment cars was shown by the replies to be about equally divided as to the use or non-use of fare boxes. A further equal division was found between the locked and non-locked box, the former being the type which renders fares inaccessible to the conductor, and the same result was found in regard to the use of fare box registers. Four companies using a non-registering locked box used a fare register on the car and six companies did not use such a register under such conditions. Nine companies used fare registers besides registering fare boxes, and two did not.

The reasons given for use of fare boxes of the various types are as follows. Eight companies favor the registering non-locked fare box because the change is available for the conductor and four others give other reasons. Two companies are using both types of boxes, but each prefers the registering fare box because it delivers money to conductors and gives them available change. Seven companies favor the locked fare box mainly on account of its cheapness and simplicity.

One company is experimenting with both types, and one is experimenting with a registering non-locked box. Two companies using the locked box give no reason for preference. Most of the locked non-registering fare boxes will receive any coin, three take pennies, nickels and dimes, and one nickels, dimes and quarters. Twelve of the registering non-locked boxes take pennies, nickels and dimes; two take nickels and dimes only.

TRANSFERS

In the matter of transfers it was found that the majority of the smaller companies, such as issued less than 60,000 transfers daily, did not issue transfers on transfers, but the larger companies did so, though in the majority of cases the re-transfer privilege was limited. The majority of the smaller companies registered transfers, although the reverse was the case with the larger ones, a separate or double register being used in most cases for this purpose.

Most of the companies which follow the practice of registering transfers reported more or less effort to verify collections with register readings, and discipline for failure to register transfers in the same manner as in the case of failure to register fares. The general consensus of opinion seems to be that it is impracticable to do more than check the matter of transfers issued, destroyed or given away in a general way, particularly when a large number of transfers is involved.

There is a somewhat surprising difference of policy observed in checking transfers to determine if they had been properly honored by the conductor. Certain of the roads receiving but a few thousand transfers daily check them out with care as to date, time, direction, etc., while some roads receiving less than a thousand transfers a day either make no check at all or at infrequent intervals only.

About half of the companies reported that a conductor who has improperly honored transfers is called before the

superintendent or his representative. Two companies give demerits in such cases. Several report that men are cautioned and subsequently disciplined for repetition of offense, while twelve companies charge conductor on short list for each such irregularity.

The percentage of transfers given to conductors and not issued varies between the approximate limits of 15 per cent and 50 per cent, although in some cases this difference is reported to be actually nothing. The proportion of issued transfers which are finally collected varies between the approximate limits of 75 per cent and 95 per cent, decreasing on the larger roads.

From the replies received the committee was of the opinion that the transfer which provides for the cancellation of the month and day by punch and notch marks is well adapted for use on those lines where the number of transfers honored daily is relatively small. The transfers which are stamped or printed with a figure to indicate the day of the month are somewhat more subject to waste. The transfers which are perforated by a machine before being given to a conductor are not quite as economical as either of the other two types of transfers, but obviously involve less waste than those which bear the printed day, date and month and are only good for one particular day. The dated transfer which may be used only on one day involves more waste than any of the preceding types of transfers mentioned, and as it involves the use of more than one standard form of transfer, it opens the way to additional abuse; but there may be certain local conditions which offset these undesirable features. The coupon transfer is expensive, but it appears to possess marked advantages in those cases where a person is permitted to transfer more than once.

Where a relatively small number of transfers are collected each day a reasonably thorough check of the date of the tickets, the time of presentation and the point at which they were honored will be productive of good results in the maintenance of discipline and in minimizing fraud. Where the number is large the opportunity for imposition and pecuniary loss is correspondingly greater, and in those cases where transfers are not registered a systematic audit with a comparison of transfers issued by each conductor is desirable, men going over the whole system once in ten days. Where the number of transfers amounts to several hundred thousand or more daily and transfers are not registered, periodical checks at somewhat less frequent intervals should be made, and such checks should be supplemented by special tests through the co-operation of the secret service department.

This report had as Appendix A the conclusions of a sub-committee regarding methods by which overlap zone fares may be simplified and the prevailing methods of registration and accounting of fares on both city and interurban lines. The sub-committee believed that overlap zones should be avoided if possible, and if they already exist some steps should be taken to eliminate them, a neutral zone between a 5-cent and a 10-cent district being likely to give rise to many disputes.

Of twenty-eight companies answering the questions as to the basis for computing published fare rates ten reply "Two cents per mile"; five others say, "City limits 5 cents"; four others, "Five-cent fare zone basis," while several others are indefinite. The minimum interurban fare of the great majority of companies answering is 5 cents, a few charging 10 cents and one on a basis of 1¼ cents per mile. Nearly all the companies collect fares through to destination, but there are seven which collect in zones.

There is also submitted in the report a communication from the representative of a large interurban system stating that plans were under way for the abolition of payment of cash fares on the trains of that line. This appears in the report as Appendix B.

*Abstract of report read before the American Electric Railway Transportation & Traffic Association and Accountants' Association, at Atlantic City, N. J., Oct. 13-17, 1913.

REPORT OF THE COMMITTEE ON WELFARE OF EMPLOYEES*

J. J. BURLEIGH, CHAIRMAN; D. F. SHERMAN, J. D. CALLERY, DANA STEVENS, H. T. EDGAR, C. S. KRICK

It must be recognized that if men are to be kept for long periods in a given service their employment must be made attractive and inducements must be offered beyond the prevailing day's wage. In addition, if a man gives the best years of his life to an industry, he has some right to expect that industry to provide for his sustenance when his days as a producer have passed. The committee is convinced that the activities embraced within the general term "welfare work" are productive of satisfying and even profitable results, and it desires to submit for the consideration of the managements of member companies some of the forms which these activities may assume.

The sick benefit is a form of helpfulness which reaches a large number of individuals and yields a return in faithfulness, good will and loyalty on the part of the employee. The committee recommends the adoption of such a plan where it does not now exist and suggests that it include the following provisions: That a short period of service, about a month, be required before eligibility to benefits is attained; that no benefits be paid for an illness of less than one week; that benefits amount to not more than half wages when half wages exceed \$7 per week, nor less than \$1 per day; the period of payments may be limited or not as desired; medical service may or may not be provided; only permanent employees should attain eligibility to benefits.

A sick benefit fund may be created, maintained and administered entirely by the company or jointly by assessments upon employees and contributions from the company, preferably in the former manner. Where the fund is financed by the latter method, a mutual association should be formed having a governing board composed of both company officers and employees, with the company management in control.

Death benefits and insurance are effective features of welfare work. With a prospect of a life insurance payment to their dependents, men will be prone to remain in the service and give to the employer their best efforts. Benefits should be paid for death from injury as well as from illness, unless the death is the result of industrial accident or occupational disease otherwise compensated for.

The committee recommends that "service annuities" or pensions be paid entirely by the company under well-defined conditions, among which are the following: voluntary applications should be granted at from sixty to sixty-five years of age, and compulsory retirement may be provided for at the age of seventy; a longer period of service should be required to permit voluntary retirement than in the case of compulsory retirement. From twenty to twenty-five years is suggested for the former cases and from fifteen to twenty years for the latter. The suggested basis of service annuities or pensions is from 1 to 2 per cent of the employee's average yearly wages for the ten years preceding retirement, multiplied by the number of years of continuous service. This should constitute the yearly payment and may be subject to a minimum of not less than \$240.

Accident benefits are payments for industrial injuries and occupational diseases. In a number of states such payments are provided for by workmen's compensation acts, and where such are in force, and an automatically fixed compensation feature is elective, its adoption is recommended. Such legislation is based upon the theory that the industry should bear the burden of its mishaps and we are convinced that it will operate for the best interests of all concerned. Where, however, under the company's sick benefit plan, for a like

disability, the employee is entitled to an amount in excess of that provided by a compensation act, the company might elect to pay an additional amount sufficient to make the total payment equal to that to which the employee would be entitled under the company's plan.

The committee believes that where the employee's interest in the welfare of the company is that of a shareholder or quasi-partner, such conditions make for the greatest efficiency of the individual and as a corollary the greatest success of the enterprise. Where these conditions obtain the employees are entitled in some degree to a partner's return.

Any compensation paid to employees in the form of profit sharing should be considered an addition to the ordinary wage schedule. Ordinarily, profit sharing should not be paid in cash but should reach the employee in the form of securities of the company or, in the case of a subsidiary company, in securities of the parent company. Where good reasons exist, exceptions may be made in the application of the foregoing rule. Employees receiving securities under this plan should be required to retain same for a definite period, and ownership interest is not secured. Dividends accruing from profit-sharing securities should be paid in cash in the manner of other dividends, the money being available to the recipient for any desired purpose. The opportunity for participating in profit sharing should be open to all employees under given conditions.

The committee realizes that much good may be accomplished by encouraging thrift among employees and believes that by the establishment of savings funds such an effect can be brought about.

The making of loans is an effective way of establishing closer relations between employer and employee since it prevents the employee from falling into the hands of loan sharks when for legitimate reasons he is in needy circumstances, because of which his efficiency might be affected by worry over his pecuniary difficulties. In this connection the committee suggests: That the sums loaned be small, say \$25, \$50, or \$100, that no interest be charged upon the loan, that the return of the money in regular instalments be rigidly required, and that the employee be allowed to make his payments voluntarily rather than to have a deduction from his wages, unless at his own request.

The committee also recommends that well-appointed quarters be provided containing reading and recreation rooms, suitable games, lunch rooms, baths, sleeping accommodations and assembly rooms for social affairs and entertainments, and that these club rooms be located preferably at each carhouse where the carhouses are large. Clubs should be established and maintained either solely by the company or in connection with a mutual benefit association, but always under the direct control of the company. Various forms of entertainments, lectures and meetings should be held at intervals, and on these occasions the company's officers should take the opportunity to speak to the men and to manifest a personal interest in their well-being. All forms of athletic sports should be encouraged among the employees and friendly rivalry between the various divisions or carhouse crews encouraged.

The committee desires to place a stamp of disapproval upon systems of discipline which do not aim for concurrent effort. The old system of suspension and consequent loss of wages should be abolished since it cripples the service, frequently fails to improve the employee, causes his family to suffer and often embitters the employee and imbues him with the spirit of revenge.

The various phases of welfare work which have been suggested call for a considerable outlay on the part of the employer. The committee does not expect the adoption of all of the plans but strongly urges that as many as practicable be undertaken, because the entire outlay, in many instances, will be more than compensated for by returns which

*Abstract of report read before the American Electric Railway Association, at Atlantic City, N. J., Oct. 13-17, 1913.

can be directly calculated in dollars and cents. In addition, benefits will accrue to which a money value cannot be assigned but which, nevertheless, will increase income effectually.

It has been estimated that, assisted by the employing company, mutual associations can pay approximately 50 per cent of wages of the employee during illness at a cost approximating 1 per cent of his wages, and that death benefits ranging from \$300 to \$500 can be paid with a weekly contribution of from 10 cents to 15 cents.

One member company, the Public Service Corporation of New Jersey, which assumes the entire cost of what it regards as four types of insurance, namely, health, accident, old age and life, finds that last year it expended \$104,818.12. This company has 13,421 employees, of which 3,654 are trainmen, and since its welfare plan has been in operation the resignations among the latter have decreased each year, thereby indicating that the company is retaining experienced men in the service. During the year 1912 the decrease in the number of trainmen leaving the service as compared with the year 1911 was 31 per cent. The company's statistics show a saving of about \$20 per man in training expenses and an enormous saving in accident costs by the retention of men for one year or more, the combined saving on trainmen alone having been practically the entire cost of the welfare work. It is evident, therefore, that with economies effected by other employees, the figure reached will more than compensate for all the company's welfare work, including payments made to injured employees under the compensation act.

FINANCIAL ASPECTS OF THE RELIEF OF CONGESTION BY THE CONSTRUCTION OF SUBWAYS AND VIADUCTS*

BY CHARLES S. SERGEANT, VICE PRESIDENT BOSTON ELEVATED RAILWAY COMPANY, BOSTON, MASS.

The provision of suitable and adequate urban and suburban transportation for our rapidly growing cities presents many problems to street railway managers, but none more difficult of solution than that commonly called "congestion." Unfortunately the street railway company is too often looked to as solely responsible for the inadequacy of the streets, and elevated or subway lines are demanded at its expense. The average citizen has no conception of financial problems and no especial interest in their working out. Good service is what he deems a reasonable demand upon the traction company without consideration of practical difficulties. Undoubtedly many are inspired in making these demands by their knowledge of the New York subways with their marvelously competent operation and great financial success. Civic pride makes the home city to them as important as the metropolis, and they are not sufficiently well informed to perceive the difference in conditions, nor can they conceive why an underground railway is not possible in their city. The traction manager, seriously concerned about the increase of his labor account and the poor service resulting from slow movement, is eager to adopt relief measures, and perhaps is over-sanguine of their financial success, and thus may enter upon costly construction work without carefully analyzing its effect upon his net income.

Underground city railways have not as a rule been highly profitable, and often have not been self-sustaining. The noise and heat do not tend to popularize this mode of transit, which people make use of more from necessity than choice. Upon the other hand, elevated roads, while more agreeable to the passenger, are very objectionable to abutters upon the line, and the payment of damages to them, if required by the statute, greatly enhances their cost. Such cost figures as I

may give in this paper will be drawn entirely from local conditions in Boston and vicinity, and should not be taken as a standard or criterion for other localities where different conditions prevail. Some of the costs which have been experienced in Boston are subjoined in a table as follows:

	Opened to Public Travel	Length of Two-Track Main-Line Structure*	Cost*	Cost per Mile of Two-Track Main-Line Structure
Tremont St. Subway.....	1897-8	2.357	\$4,653,524	\$1,974,000
East Boston Tunnel.....	1904	1.409	3,496,696	2,482,000
Washington St. Tunnel (including approaches)....	1908	1.380	9,416,013	6,823,000
Elevated System, Dudley St. to Sullivan Sq.....	1901	10.624	21,414,577	2,016,000
Forest Hills Extension...	1909			
E. Cambridge Extension	1912			
Cambridge Subway Route (including Beacon Hill Tunnel, Cambridge Bridge).....	1912	3.819	9,878,889	2,587,000
Totals		19.589	\$48,859,974	\$2,494,000

*Excluding cost of shops and yards and mileage of tracks therein.

Particular attention is directed to the comparison of cost between the Tremont Street subway and the Washington Street tunnel, so-called. The Tremont Street subway was the first built, and for a very considerable part of its length was built under the Common and Public Garden. But one station approach in addition to the northern terminus was constructed on private land. On the contrary, the Washington Street tunnel or subway, while built mainly under public streets, was for a portion of its route carried under private land, and no less than ten of the station entrances and exits were placed on private land on account of the narrowness of the streets. This resulted in a cost per mile of nearly three and one-half times that of the Tremont Street subway, and is a good illustration of the essential government of subway costs by local conditions.

Under exceptional circumstances where the geography of the system concentrates a very great traffic over a considerable length of route, subways may be financially possible for the traction companies. But for cities having a wide spreading radial system of track with perhaps only a congested center, the elevated or underground railway can only be carried through that center, or more probably cannot be afforded at all, if the expense is to be borne by the street railway, that is to say, by the fares paid by the users at prevailing rates.

METHODS OF USE OF SUBWAYS

Where the distance for which traffic is to be buried is short, one must reach the conclusion that surface cars should merely be diverted underground through the congested center, on account of the difficulties of transferring passengers at a point of maximum traffic to a different system or train service, yet this method of use is necessarily restrictive of speed on account of the number of train units, or of capacity if a high speed is required. Therefore neither the company nor the public can realize the fullest advantages from the heavy investment. If, on the other hand, a sufficient length of line is constructed, its operation by trains offers the desirable and economical solution, giving the maximum of speed and capacity with a minimum of expense for train service. Both of these methods are in use in Boston.

FINANCIAL RESULTS

The total investment in structures for rapid transit lines, so-called, as distinguished from the surface railways, in operation in the Boston system now amounts to \$51,018,000, including terminal yards, shops, etc., of which nearly \$17,000,000 has been provided by the city of Boston, which owns all of the underground facilities (subways and tunnels) in Boston, and is now engaged in the building of additional subways and tunnels which may reach a further outlay of over \$15,000,000. All of this trackage is leased to the Boston Elevated Railway Company at rentals usually of 4½ per cent or 4%

*Abstract of a paper read before the American Electric Railway Association, at Atlantic City, N. J., Oct. 13-17, 1913.

per cent of the cost, rates which are calculated to provide sinking fund as well as interest. The railway company is therefore paying both principal and interest as a rental, although the subways remain the property of the city.

In addition to the fixed charges one must not overlook the heavy operating expenses. Station operation is a burden from which street railways have usually been exempt. It constitutes a new element of operating expense, and there is in addition the maintenance, lighting and ventilation of the subways. These expenses go far to offset the savings of train service.

But what shall be said of the revenues? In 1897-8, when the first subway was opened in Boston, the passenger revenues of the entire system were \$8,967,000. In the last fiscal year they were \$16,268,000, an increase in fifteen years of 81.42 per cent, which is only normal. Our experience has been that no addition to rapid transit facilities has accelerated the normal growth of business. It is true that without them the usual increase could hardly have been realized for lack of physical space in which to do the business, but from the point of view of net financial results the change has been for the worse. This is not only due to the heavy burden of fixed charges but also to the general extension of the length of rides made possible by the new facilities and to the universal fare maintained by through service and free transfers.

The public has benefited enormously at the cost of the investor. Nothing can well be of more consequence to a community than low-priced and convenient transportation facilities. Some one should provide them, but the burden should not all fall upon the stockholders of the street railway company or upon the users of the system; something should be paid by the city, which reaps an enormous benefit in increased taxable valuations and in freer movement of traffic upon the streets, and something should be left to future generations, for subways are built for the future.

WHO SHOULD PAY FOR SUBWAYS

Since it is the duty of the city or the state to provide adequate streets, why should we not conclude that, when it becomes necessary to segregate a particular class of traffic for its relief and the relief of the streets, it is the duty of the city or state to bear the burden? All should have a right to sufficient street accommodation for their needs. But some one will say a rental should be charged. Is it not true that any such rental is in the nature of a toll? Tolls have generally been abolished, toll bridges and turnpikes are now mostly free. Taxpayers rather than users maintain them. The cost of the recent great improvements in highways has not been levied in tolls upon automobile owners and other users. I think it must be conceded that any rent or tax laid upon the business of a street railway is in the nature of a charge or toll for the use of streets, and this use is for the great public, not for the stockholders of the traction company, unless they are entitled to such profits as they may reasonably make from their investment. When, as in Massachusetts, the profit of the stockholders in such enterprises is limited by one means or another to mere legal rates of interest and those are by no means guaranteed or assured, an element is introduced which logically requires the city or the state to provide at least the space or way needed for carrying the traffic, whether it be on the surface, overhead or underground.

The method pursued in Boston of leasing the city-owned subways to the operating street railway company results in the transfer to the street railway company of all the risks of the enterprise, and establishes the subway rental as a charge against net income prior to the dividends to which the stockholders are reasonably entitled upon their money already invested. It seems to me that this is fundamentally wrong; that, when these new means of transportation are desired by the community, the benefits to the community should be recognized, and the city at least made a partner

in the undertaking and its risks, especially so because any possible profit can be obtained only in the future.

The American people are usually reasonable in the long run and it may be hoped will take into account all the elements of this great problem when important transit plans are being considered. The contracts for the new subways and elevated lines in New York show an encouraging recognition of the principle that the municipality is at least concerned as a partner in the enterprise of supplying these enormous new facilities.

My conclusions may be summed up as follows:

The general welfare in many cities may require large outlays for special rapid transit facilities by elevated or subway lines which are too costly to be remunerative to the investor unless too heavy a charge is laid upon the users.

Such provisions will increase the value of real estate for taxable purposes, and therefore should be paid for in whole or in part by the city.

If existing traction companies are called upon to operate them or to contribute to their cost, their existing investments should be a prior claim upon the income.

PROFIT-SHARING PLAN OF THE WASHINGTON RAILWAY & ELECTRIC COMPANY*

BY W. F. HAM, VICE-PRESIDENT AND COMPTROLLER WASHINGTON RAILWAY & ELECTRIC COMPANY

This company has been deeply interested for many years in welfare work among its employees and their families and may, perhaps, be considered a pioneer in such work.

Its Relief Association was organized in 1900, not only to furnish health, accident and death benefits to its members, but to provide a social organization in which its members and their families might take an active interest.

The association has since established a savings department where members are privileged to deposit savings which draw 5 per cent interest per annum; a loan department where members can borrow money at 6 per cent interest per annum; a bonding department in which fidelity bonds are furnished to members at prices considerably less than those charged by the regular bonding companies; a central club room equipped with bowling alleys, pool tables, music, game and reading rooms; and most recently a branch of the public library, whereby members are given all facilities of the main public library.

Also, since 1900 the company has maintained an efficient medical department whereby all employees receive free medical attention.

Rest, reading and recreation rooms have been established at carhouses; annual excursions and entertainments have been given for members and their families.

A pension system was inaugurated in 1907 for the benefit of employees grown old in service.

A graduated scale of wages for trainmen was put in effect early in 1912 in order to encourage longevity of service, and a little later, after a careful study of the merit and demerit system of discipline, the plan was adopted.

Early last year the management decided that the time was ripe for the adoption of some plan by which the uniformed employees of the company should share in its profits. Good service was being rendered the public and the stockholders, after years of waiting, were receiving a small return upon their investment. It was decided that the trainmen should share in whatever improvement could be made over the results of the year 1911. Naturally, the company desired to formulate and adopt the plan which would be most simple and most effective in stimulating the men to greater efficiency. As will be noted from the plan, as described, the

*Abstract of a paper read before the American Electric Railway Association, Atlantic City, N. J., Oct. 13-17, 1913.

company has made its uniformed employees salesmen on a commission, with a guaranteed salary.

It was found that during the year 1911, of the gross passenger receipts, after deducting the 4 per cent tax paid the government, 22½ per cent was absorbed by trainmen's wages and 3½ per cent by settlement of damage claims. It was, therefore, decided to set aside 26 per cent of the gross passenger receipts, after deducting the above-mentioned 4 per cent tax, as a fund to cover trainmen's wages and settlement of damage claims. Whatever remains of this 26 per cent, after payment of wages of conductors and motormen and settlement of damage claims, goes into the profit-sharing fund for distribution.

Although the details of the plan were not decided upon until May 1 and announcement was not made until that time, the plan was made effective beginning Jan. 1, 1912.

Among the objects of the plan were:

First, to call to the attention of the men and the public the payment of the tax of 4 per cent of our gross receipts.

Second, to encourage the men to get their fares and to popularize the company, thereby increasing the passenger receipts per car mile, and

Third, to draw to the attention of the men and the public the high cost of damages and to encourage the men to do everything possible to reduce the liability of accidents.

One of the features of the plan which seem to have appealed most strongly to the men was the cash distribution made promptly at the end of the year. Although the plan was not announced until May 1, up to which time little, if any, improvement had been made over the corresponding period of the preceding year, at the close of the year \$19,123 was accumulated in the fund and distributed to 801 men on Jan. 2, 1913, as shown in the accompanying table.

58½ men in service one or more years	\$28 72	\$16,772 48
17 men in service 11 months	26 34	447 78
4 men in service 10 months	23 94	95 76
6 men in service 9 months	21 54	129 24
18 men in service 8 months	19 15	344 70
14 men in service 7 months	16 76	234 64
20 men in service 6 months	14 36	287 20
18 men in service 5 months	11 97	215 46
19 men in service 4 months	9 57	181 83
26 men in service 3 months	7 18	186 68
20 men in service 2 months	4 79	95 80
55 men in service 1 month	2 39	131 45
801		\$19,123 02

The company feels that the plan is a success and that it tends to encourage the men to do their part and to feel that the company is glad to share with them in its increased prosperity.

It is gratifying to state that for the six months ending June 30, 1913, the profit-sharing fund is \$5,655 greater than for the same period the previous year.

J. C. Fritts, master car builder of the Delaware, Lackawanna & Western Railroad, presented a paper, "Freight Car Troubles," at the regular meeting of the Central Railway Club, on Sept. 12, 1913. The object of the paper was to call attention to the cause and effect of freight car troubles and to suggest such changes as appeared to the author to be necessary for economical maintenance. The conclusions drawn by Mr. Fritts follow: First—Reinforcing the older types of cars that will not stand the expense of a steel underframe, with a long metal draft arm that extends through and over the body bolster. This in turn to be reinforced, or backed up with good, heavy compression timbers. Second—On such cars as will permit of the expenditure, the application of a carefully designed steel underframe. Third—In all cases apply the draft gear that will destroy the greatest amount of shock with the entire elimination of recoil. Fourth—The adoption of a standard specification for the testing of draft gear to determine its shock absorbing capacity, and amount of recoil, before purchasing. Fifth—Substitute for the present wooden roof an all-metal one as soon as it has been demonstrated what the proper construction should be.

STATISTICAL UNITS USED IN ANALYSIS OF ELECTRIC RAILWAY ACCOUNTS*

BY JAMES A. EMERY, WITH FORD, BACON & DAVIS

I wish to make a plea that operating men give more attention to the forms of accounts. The president and directors of a company are concerned with the summarized figures of the income account, but the details of revenue and expenses are prepared for the information of the manager. Here, from the manager's standpoint, lies a failure of our accounting system, that our classification is based on the character of the expenditure rather than on the object for which the expenditure is made.

It seems the height of absurdity, for example, in the electric light and power business, to draw careful distinctions between the elements of demand and output in making rates and then to pay absolutely no attention to this distinction in the records of cost of service. To determine or check the important figures upon which the charges to customers are based, it is necessary to go through a painful process of analyzing expense and construction accounts. There is no reason why central station expense accounts should not be kept in such a way that we may know every month the cost of maintaining a kilowatt capacity in readiness to serve, the additional cost of generating and distributing 1 kw-hr., and the cost per customer of those operating expenses which vary directly as the number of customers.

In street railway accounts likewise there is much opportunity for improvement. We spend millions of dollars per year for special work, yet few managers can tell how much it costs them, as the labor cost is not segregated. Our standard system of accounts does not provide means of ascertaining the costs of the important items of painting cars or of repairs to trucks or of repairs to air-brake equipment. In setting up depreciation or renewal reserve accounts we do not specify and allow for parts to be replaced under maintenance. We lump in one account all payments for damages and have no way of telling directly how much is paid to passengers and how much to the general public or employees; how much is paid in settlements and how much in judgments.

A street railway must provide:

1. During the rush hours, a number of passenger-space (seats and standing spaces) miles.
2. During the between-rush hours, a number of seat miles, or, on smaller properties, car miles.
3. During the night and early morning hours, a number of car miles to maintain reasonable headways, with little regard to the volume of traffic.

Therefore, a system would show high efficiency of design and operation when the cost per space mile during the rush hours is low and when the cost per seat mile during the night and early morning is low. It is manifestly out of the question to apportion costs on the above basis, and our problem is to determine the practicable basis which comes closest to it. We should like to find a unit which when divided into our costs will tell us, without substantial qualification, if the operation of a property is efficient and if the engineering design and construction are good.

The various units commonly considered, in the order of their relation to each other, are:

I. DOLLAR OF GROSS EARNINGS

It is very important that we should know in simplest terms what proportion of the money received goes to each item of expenditure. Percentage of gross earnings should therefore be used, whatever units of service are chosen. In comparing one property with another on this basis, however, care should be taken to see that the average rate of

*Abstract of a paper read before the American Electric Railway Transportation & Traffic Association and Accountants' Association, at Atlantic City, N. J., Oct. 13-17, 1913.

fare, average haul, density of traffic per mile of track and load factor are not widely different.

II. REVENUE PASSENGER

The use of this unit would eliminate the variance due to difference in rates of fare, and the cost at which a company carries a passenger is in general a fair measure of the efficiency of design and operation, if values or factors for the principal fixed conditions of average haul, density and load factor are known.

III. PASSENGER MILE

Presentation of the cost of transporting one passenger one mile would eliminate discrepancies in average length of haul. It is not practicable, however, on a city system to calculate passenger mileage regularly, and it must be remembered that service cannot be proportioned exactly to the passenger mileage.

IV. SEAT MILE OR SPACE MILE

In stepping from the passenger mile to the seat mile or space mile, we introduce the first factor dependent upon operating efficiency. A manager, by lack of attention to schedules or traffic, may operate more seat miles than are necessary. His maintenance of track and line and general expenses which do not vary directly with the seat mileage will therefore figure lower per seat mile and his operation on the seat mileage basis would actually appear efficient when it may be poor. If, however, we can establish standards of proportions of seat miles to passenger miles for various traffic densities and load factors, a statement of such proportion, together with the cost of service per seat mile for a given system, would furnish a practically complete basis for judgment of its efficiency of design and operation.

The use of the space mile is hardly worth considering, for, while it ought to be understood that standing space must enter into rush-hour calculations, its general use would be popularly offensive. Space mileage is a measure of service for not over 25 per cent of the traffic of the day and the spaces per car vary in a considerable degree as the number of seats.

V. CAR MILE

Our friend of long standing, the car mile, is implanted in our imagination and habits of thought, and to give it up would involve something of the readjustment which would attend the adoption of the metric system in general business. Car mile figures are generally in convenient denominations and the unit is the most appropriate for many equipment records. Compared with other units under consideration, the car mile has the same merits as the seat mile, but at the present time it labors under the serious objection that there is such great variation in the capacity of cars. Although the average car is approaching a standard of from forty to fifty seats, there is always likely to be considerable variation. The car mile is a measure of about 25 per cent of the service provided by a street railway. Differences in size of cars and speed may not produce great variance in total operating expenses per car mile.

VI. TON MILE

The ton mile has some merit as a unit for judging efficiency of operation. A considerable portion of the operating expenses varies directly as the weight moved, but our unit should show efficiency of design as well as operation, and the ton mile side-tracks one of the most important features of design.

For example, if for a given railway property the operating expenses per ton mile be low, it would appear that the operation is efficient. This might not be the case, for if unnecessary weight were put into the cars through poor design, the ton mileage would be abnormally high and the operating expenses per ton mile abnormally low. Ton mileage is more difficult to calculate than seat mileage, on account of the live load.

VII. CAR HOUR

When used side by side with the car mile, the car hour indicates only the effect of speed. It has some advantage over the car mile in comparing revenue statistics, for it shows clearly the advantage in higher speeds and furnishes a more accurate, quick basis of comparison of the net earnings of various routes than does the car mile. For use in analyzing the details of operating cost, however, it is not so accurate a gage of efficiency as the car mile. As operating expenses per car hour are constant multiples of operating expenses per car mile, it seems wasteful to use them side by side for details. The car hour is not a direct measure of any part of the service.

The relation of the element of speed to revenue and expenses is intricate. It is certainly cheaper to haul a given number of passengers between two points at high speed than at low speed. It, therefore, would seem that at a less cost we can furnish what passengers prefer and would even pay more money for. Why, then, are our rates on suburban or high-speed lines at least as high as on city lines? The answer is found in the element of density of traffic. We can move 100,000 passengers over a given piece of track very much cheaper per passenger than we can move 10,000.

This balancing of factors explains the remarkable uniformity of operating expenses per car mile on systems widely different in size and character. It also brings to mind the fact that differences in size of cars may not make great differences in the cost of operation per car mile for handling the same volume of traffic; for, while most items of operating expenses are greater per car mile for larger cars, the item of platform wages, with some others totaling about 50 per cent of the operating expenses, is proportionately smaller. Speed is governed by all three elements which control the destiny of a street railway.

First—It is in part fixed by physical and legal conditions over which neither construction engineer nor operating manager has control.

Second—It is dependent on the design of track, rolling stock, power plant and distribution system. An effort to obtain higher speed in the design would have saved many properties from bankruptcy, and the neglect or failure to design for the highest speed practicable has crippled many others.

Third—The average number of car miles per car hour depends upon schedules, discipline and condition of equipment. Higher speed increases revenue per car hour and increases expenses per car hour. It has no effect on revenue per car mile, but it decreases expenses per car mile. It has no effect on total revenue but it reduces operating expenses. The car mile therefore brings out this important element of operating efficiency more clearly in the operating expenses, while the car hour has a similar advantage in relation to revenue.

VIII. NORMAL MAXIMUM CAR OPERATED

In electric lighting and power supply a large portion of the cost of production varies directly as the maximum demand. To a less extent this is true in the street railway business. Our loads fluctuate quite as much as do those of central stations, but it is not commercially, or indeed, in many cases physically, possible to provide corresponding service. We therefore furnish seats during the non-rush hours and passenger spaces during the rush hours. Even with this help our service factor or ratio of average cars to maximum is low, and a considerable part of the outgo of a street railway is proportioned to the number of cars that have to be put on the streets during the maximum hours of travel. The car is a convenient and common unit of equipment costs. It is therefore of interest and value to know how much money a car takes in per year and how much its operation costs. This unit, however, does not lend itself to useful analysis of the details of revenue or of many of the operating expenses.

IX. CAR TRIP

The compilation of the number of trips is worth while as it leads up to the average length of trip and thus gives an indication of the average length of haul.

Train miles or train hours have very little utility for electric railway work, as few operating expenses vary with the number of trains operated. Where the motormen on lines operating multiple units are paid higher rates of wages than the other trainmen there is some difference, but, after all, we are trying to operate car hours and car miles cheaply and we do not have much control over the rate of wages, so that if wages of motormen per train hour are high it simply means that the rate of wages is high and gives no indication of efficiency of operation.

TRAILERS

In the writer's opinion, trailers should be treated exactly as motor cars if they provide the same passenger capacity. By so doing the economy or lack of economy in using them may be shown.

RÉSUMÉ

Reviewing the advantages and disadvantages of the various units, we see that percentage of gross earnings is always a useful basis for the analysis of operating expenses; that the unit revenue passenger would be satisfactory if proper values could be determined for varying length of haul, density of traffic and load factor; that the passenger mile is not practicable on account of the approximations necessary in calculating the passenger mileage; that the seat mile and car mile may be completely satisfactory as a basis of comparison if the efficiency of operating schedules can be determined; that the car hour is useful for comparing revenue; that the ton mile is not generally useful, and that the normal maximum car applies to a portion only of the operating expenses.

If operating schedules be held to a standard of efficiency with relation to the average length of haul per passenger and density of traffic, then these two factors are eliminated and cost per seat mile on one property becomes directly comparable with that of another. The seat mile is a somewhat inconvenient unit for analysis of both revenue and operating expenses, as the values are so small. To use it practically, therefore, we should have to use multiples of possibly 50 or 100. A reasonable method might be to establish a car standard of forty or fifty seats and modify the car mileage accordingly, producing a unit which might be called "forty-seat car mile." This unit would give a good basis of comparison between properties, not only in total cost per unit but in each of the details. There would probably be objection to such a unit on the score of cost of compilation. This extra cost, however, could be made slight by the use of tabulated equivalents.

COMBINATION OF UNITS APPROPRIATE TO GROUPS OF ACCOUNTS

There is no unit, however, which furnishes completely satisfactory bases for comparison of all items of operating expenses or even of all groups of items. That is to say, the "forty-seat car mile," as applied to track maintenance accounts, shows the maintenance necessary for the passage of one car over a mile of track. The density of traffic or number of car miles over each mile of track has a considerable effect on the cost per car mile. That is, if the car mileage per mile of track is low, certain fixed expenses will be higher per car mile. If, on the other hand, the car mileage per mile of track is high, there will be more wear and tear and certain of the maintenance costs will be higher per car mile.

It is so difficult to judge off-hand the opposite effect of these factors on the cost per car mile that many people who have to consider such matters go back to the fundamental basis of maintenance of trade per mile of track. Similarly maintenance of equipment is properly figured per car, power per kilowatt hour, platform wages per car hour and other operation of cars per car; and general expenses may be fully treated in the same manner as overhead charges on

construction work; that is, as a percentage of all other operating expenses. The important item of damages might better be classed by itself and figured per passenger.

If the operating expenses of all companies were regularly analyzed in this manner, it would be possible to establish standard values for each group of accounts, making allowance for the variation caused by lesser differences in conditions. For example, the cost of adequate maintenance of way, track and line per mile of track could be determined for various amounts of car miles per mile of track. Further refinements might then be made for percentage of special work, percentage of paving, average weight of rail and average age of rail.

This will eliminate the principal conditions which are fixed naturally or by engineering design and thus may be shown the limits within which the operating manager should work. In the same way, normal cost of maintenance of equipment per normal maximum car operated may be determined for cars of various capacities and for various amounts of car mileage per car. Reasonable limits for the remaining groups of operating expenses may also be determined for varying conditions. It is suggested that the determination of such standards is a useful field for this association. It goes without saying that a manager searches every nook and cranny of his expense account to learn where reductions of any kind are possible, but it will always help him if he knows definitely what other people are doing on the same basis and he is often harassed by having details of his property compared unfavorably with others where the conditions are distinctly different.

The reduction of operating expenses to the above units would permit of ready and comparatively accurate computation of the net earnings of various operated routes or lines where many lines of different length and character are operated under one system. This might be done with profit once, twice or four times per year.

Such unit computation would have little value when applied to monthly expenses, and if used every month should be applied to the operating expenses for the past twelve months.

Units appropriate to smaller groups of accounts, or even to individual accounts, might be used if desired, as for example, the number of feet of special work applied to the cost of maintenance of special work for the car mileage applied to the damages other than passenger.

The suggested "normal maximum cars operated" is defined as the average for the four weeks of a month of the maximum number of cars run in regular service on the heaviest day of each week.

The suggested "service factor" is the ratio of the average number of cars to the normal maximum and is derived by dividing the total car hours by the number of car hours that would have been made by the normal maximum number of cars operating a full day of twenty or twenty-four hours. This factor corresponds to the load factor of a power plant.

DETERMINATION OF PASSENGER MILEAGE

An approximate determination of the passenger mileage on any line or system is not difficult or expensive. It is a reasonable assumption that the character of traffic on normal days of each season of the year is about the same from day to day and that the character of travel on one car will average the same as that of another. In making such a determination, therefore, it is only necessary to place observers on one car in every six or seven on a given line for an entire day and count the passengers on and off at each stop. The calculation of passenger mileage is then simple, and if done graphically shows other valuable information, such as the point of maximum load, the ratio of number of passengers carried past the maximum-load point to the total carried and the points at which turn-backs should be permissible. This can all be done at a cost of not over \$25 per route of average density of traffic.

REPORT OF THE COMMITTEE ON ELECTROLYSIS*

ALBERT S. RICHEY, CHAIRMAN; G. W. PALMER, JR., E. B. KATTE,
E. J. BLAIR

The electrolytic corrosion of earthed metallic conductors proceeds at a rate dependent upon the rate of flow of the current which leaves the metallic conductor for the earth. Theoretically, with an oxidizing anode the weight of anode corroded by one ampere in one second is equal to the electrochemical equivalent of the metal of the anode. This is 0.00029 gram for iron (ferrous) or 0.0010718 for lead. The amount of iron corroded by one ampere in one year is, therefore, approximately $0.00029 \times 60 \times 60 \times 24 \times 365 = 20$ lb. Similarly, the amount of lead corroded by 1 amp in one year is approximately 74 lb.

However, in a recent paper on electrolytic corrosion read before the American Institute of Electrical Engineers Messrs. McCollum and Logan show results of some very complete studies by the United States Bureau of Standards on the variations from the theoretical rate. Some of their conclusions are as follows, their term "efficiency of corrosion" being based on the above theoretical rate as 100 per cent. They state that the current density has a marked effect on the corrosion of iron in soils, the efficiency of corrosion being in general greater as the current density is lower. In saturated soil the corrosion may vary between 20 and 140 per cent for a range of current density varying from about 5 to 0.05 milliamp per sq. cm. Moisture content has also a marked effect on efficiency of corrosion, it being in general greater with increased moisture content up to saturation of soil. Temperature changes, within the limits commonly encountered in general practice, have no marked effect on corrosion efficiency, neither has the depth of burial of pipes, other conditions remaining constant. The amount of oxygen present has no appreciable effect on the efficiency of corrosion in the case of iron immersed in liquid electrolyte, but it has a marked effect on the end products of corrosion. If the corrosion is rapid and supply of oxygen small, there will be a preponderance of magnetic oxide, while if the rate of corrosion is low and the supply of oxygen abundant, the ferric oxide will predominate. Owing to the fact that the supply of oxygen around pipes buried in earth is always more or less limited, the character of the oxides formed gives some indication as to the rate of corrosion, and thus indirectly as to the cause of the corrosion if local conditions are properly considered. The efficiency of corrosion is not a function of the voltage, except in so far as the current density may be effected. Differences in potential as low as 0.1 volt to 0.6 volt show practically the same efficiency of corrosion as those of 5 volts to 10 volts or higher. Corrosion tests on a large number of different kinds of soils from widely different sources with average moisture content and current density indicated that corrosion efficiency between 50 and 110 per cent may usually be expected under most practical conditions.

RESISTANCE OF SOILS

With a given potential difference between two earthed metallic structures, the amount of current which will flow between them is dependent not only on the contact resistance but also upon the resistance of the soil. Relative to the latter, McCollum and Logan state that the resistance of soils varies throughout a very wide range, with variations in moisture content, the resistance of the comparatively dry soil being of the order of several hundred times the resistance of the same soil at about saturation. Above saturation, increase in moisture content has but little effect on the resistance of the soil. The resistance of the soil varies greatly with temperature within the ordinary range encountered in practice. In the case of the soils tested the resistance at -18 deg. C was over 200 times as great as at $+18$ deg. C. Even

at about freezing temperature the resistance will be several times that at summer temperatures. This has an important bearing on the magnitude of the electrolysis trouble that may occur at different seasons and also indicates that, where practicable, voltage surveys should not be made when extremely low temperatures prevail. [A table of the specific resistances of soils in different localities is included in the report.—Eds.]

CONTACT RESISTANCE

As soon as an electromotive force is applied to a buried pipe the current flow drops off rapidly with time, especially during the first few minutes, due to the setting up of counter-electromotive forces and the formation of film resistances. McCollum and Logan show the effective resistance as a function of time after the application of about 6 volts between two short lengths of cast-iron pipe buried about 12 ft. apart. The initial resistance of about 18 ohms practically doubled within half an hour after the voltage was applied and after that the resistance remained practically constant. In this case the effect of polarization and film resistance was practically as great as the total soil resistance between the pipes. However, a well-drained rock or concrete roadbed may in general be expected to offer much higher resistance to the leakage of current than one in which the construction is such that a large amount of moisture is retained.

TESTS

As the polarity of the earthed conductor is indicative of the tendency of current to flow, and electrolytic corrosion takes place only where the current leaves a current conductor for earth, the first set of tests is generally a set of potential readings and is called potential survey. It is permissible and the usual practice to use hydrants or service connections for a contact to underground piping system. These readings are usually made with a low-reading voltmeter, preferably with the zero indication in the center of the scale, and are taken in a large number of places throughout the system between the rails and the buried conductors (pipes or cable sheaths). The voltmeter used should preferably have a high resistance to minimize the effect of accidental poor contact. A Weston high-resistance zero-center voltmeter with scale ranges of 1.5, 15 and 150 volts is a very satisfactory instrument. Readings should be taken at intervals of a few seconds for several minutes at each point and notation made of the location and of the maximum, minimum and average readings. It is desirable to plot these potential readings graphically on a map, where the differences of potential between city water mains and street railway tracks are shown graphically plotted with the latter as a base line. It is also desirable to show on this map the size and location of the various pipe systems.

It should be remembered, however, that the potential difference between pipes and rails, even if large, is not conclusive evidence of stray currents, but is only an indication of the points at which current may be flowing from rails to pipes or from pipes to rails or between other conductors. In fact, a high potential reading is generally an indication of high earth resistance and consequently a small current flow rather than of a large current flow.

Tests to determine the direction of current flow in underground conductors may be made by measuring potential differences between two points in the underground conductor. A zero-center Weston millivoltmeter with scales of 10 and 100 millivolts is a satisfactory instrument for this test and connections may be made to the cable sheath in two adjacent manholes or on the piping system between hydrants or service connections 100 ft. or 200 ft. apart. These readings, which are clearly indicative of the direction of current flow, may be used in the calculation of the amount of current flow in the case of cable sheaths where the resistance per foot is quite accurately known and is not seriously affected by joint resistance. In the case of pipes, however, such readings can be used only as an indication of the relative magnitude

*Abstract of a paper read before the American Electric Railway Engineering Association, at Atlantic City, N. J., Oct. 13-17, 1913.

of currents because, especially in the case of the ball and spigot joint usually used in cast-iron pipes, the resistances vary so greatly that it is not possible to make any accurate assumption as to the resistance of a considerable length of pipe, including the joints.

CURRENT FLOW IN PIPES

In only one way can an accurate determination be made of the current flow in underground piping systems, this method with its modifications being a determination of the potential drop in a continuous length of pipe between joints, and the application of Ohm's law. Knowing the resistance of the pipe between the points of contact, knowing the weight of the pipe per foot, exclusive of hubs or joints, the resistance per foot may be calculated by dividing the resistance in ohms per pound foot by the weight per foot. The following is a table of resistances in ohms per pound foot of various pipe materials:

RESISTANCE OF VARIOUS KINDS OF PIPE.	
Kind of Pipe	Ohms per Pound-ft.
Cast iron	0.001440
Wrought iron	0.000181
Steel	0.000210

[A table showing the resistance per foot of various sizes and weights of American Water Works Association cast-iron pipe, American Gas Institute standard cast-iron pipe, standard wrought-iron pipe and standard steel pipe is appended to the report in order to simplify these calculations.—Eds.]

In making current measurements, it is necessary, of course, to have a perfect metallic contact between the pipe and the millivoltmeter leads, and it is therefore necessary to expose the pipe where current measurements are to be made. The best contact is, of course, obtained by soldering the leads directly to the pipe, especially where readings are to be taken over a considerable period of time. It is sometimes convenient to carry these millivoltmeter leads as rubber-covered wires through a conduit to a box at the curb so that later readings may be taken conveniently. In such cases it is necessary to have a calibration of the millivoltmeter including such leads.

Where measurements are to be made in a pipe the weight or resistance of which is not definitely known, a determination of the resistance and current may be made by one of the methods described in 1912 by Dr. Carl Hering before the American Institute of Electrical Engineers, which include the use of a galvanometer on a shunt around a given section of pipe from which the unknown current has been diverted by a battery and variable resistance through an ammeter.

DETERMINATION OF AMOUNT AND DISTRIBUTION OF CURRENT LEAVING UNDERGROUND METALLIC CONDUCTORS

The amount of current leaving an underground piping system for the earth and thereby causing electrolytic damage can be determined only by determining the amount of current flow in two locations on the same line of underground pipe. The difference in the amount of current on the pipe between these two locations will then be the amount of current leaving or entering the pipe between the two locations.

As the difference of potential between two points on the rails of an electric railway system is in a way a measure of the tendency to cause stray earth currents, and as many municipal and other public requirements are based on this figure, this test is an important one. It is not difficult to make, the essential matter being that of running a potential wire between the two points on the rail and then measuring the drop with an ordinary voltmeter. Where the company has telephone or signal circuits which may be temporarily disconnected these are often used for this purpose. In some cases a trolley feeder is used, but a spare feeder is not often available during the time when such tests are to be made. Often it is possible to arrange with the local telephone company for its co-operation in furnishing spare wires from a terminal box in one location through proper connections at the telephone exchange to a terminal box in another location,

and from these terminal boxes a continuation of the potential wire may be run to the voltmeter and rail. In using such circuits through a telephone exchange, it is important that all connections be removed on the terminal board which might serve to impress telephone battery current on the particular circuit in use. If the instrument used be of high resistance and if the telephone or signal wires used as potential wires be of copper, it is rarely necessary to allow for the resistance of the latter in correcting the voltmeter readings.

In many municipal or other public requirements a limit has been placed on the potential drop in rails, and in many cases this limit has been expressed in terms of a maximum permissible drop. That this is unfair and that the limit should be expressed as an average drop is brought out by Messrs. McCollum and Logan in their paper as follows: "It is evident that if the total amount of damages which results is proportional to the average current, the limitation of the average voltage is more logical than the limitation of the peak load voltage, since in the former case the cost of meeting the voltage limitation in any given case is proportionate to the danger involved irrespective of the station load factor; whereas if the voltage at peak load is the determining factor, the cost of complying with the requirement depends not only on the danger involved but on the load factor of the system, and the poorer the load factor the greater its cost will be. The rate of damage does not increase at fast as the voltage increases, because of the tendency toward lower corrosion efficiencies at higher current densities. This indicates that with a given average all-day current the actual amount of electrolysis that would occur would be less with a bad load factor than with a good load factor, and hence points to the undesirability of penalizing a high peak of short duration. It would appear very much more logical, therefore, in so far as the damage itself is concerned, to make the average all-day voltage the basis of the limitation rather than the voltage at time of peak load.

METHODS OF REDUCING EARTH POTENTIALS AND CURRENTS

The methods which have been most often used with success in this country to reduce earth potentials and currents have been three—the insulated negative return feeder system, the insulating joint system, and the drainage system.

In the first system the tracks are drained of current at radially disposed points about the power station by insulated negative return feeder cables. The negative busbar is not connected to the tracks nor to ground in the vicinity of the power station. Pressures as nearly equal as are required may be maintained at the track end of the return feeders by the use of rheostats on short feeders and boosters on long ones, or by greatly increasing the amount of copper in long feeders without the use of boosters or rheostats. The cost of the system increases very rapidly as the permissible maximum variation between the various portions of the track decreases. In a few American cities insulated negative return feeders have been installed in a portion of the city so as to secure an equi-potential condition of the track in an area where the amount of underground cables or pipes subject to damage is the greatest. This method is feasible and most often used where the railway company's power station or substation is located very close to the center of distribution of a system composed of several or many lines radially disposed about the center of distribution.

The insulating joint system requires cable sheaths or piping system to have insulating joints at frequent intervals. If the insulating joints be sufficiently numerous, this system may give good results, but there is some difficulty in applying them to an extensive system of underground cables, especially where the number of manholes is large and manholes crowded. Unless the number of insulating joints is sufficiently large to break up the potential around such joints to a very low value around each, there is also danger of current leaving the pipe or cable sheath on one side of the

insulating joint and entering it on the other to such an extent that more or less serious corrosion is caused on the positive side of the joint. If every joint in the piping system were an insulating joint, this method would probably be an ideal one, as it would so increase the total resistance of the pipe line that the current flowing along it would be practically nil. This is illustrated in the case of some cast-iron gas mains where cement joints of high resistance are used and on which mains practically no current can be found.

In the drainage system the pipes or cable sheaths in the positive district are connected to the negative side of the railway return circuits through low resistance cables. This system, as its name implies, drains the stray currents from the pipes or cable sheaths through metallic conductors so that practically no current leaves the pipe via the earth path. The drainage cables should preferably be connected directly to the negative busbar at the power station or substation, and should be of very low resistance. In many cases a meter is installed in the connection to the negative bus, and in cases where the station shuts down for a portion of the day there should be a switch in the bus connections and the circuit should be opened when the station is not in operation. If the drainage system is properly installed, it will maintain the piping system and cable sheaths throughout their length at a potential lower than that of the rails. An objection which has been raised to the drainage system is that by reducing the total resistance to the flow of stray currents it thereby increases their volume and thus increases the damage which may be expected from "joint electrolysis," or the electrolytic action which may take place around a high resistance pipe joint due to the stray currents leaving the pipe on the positive side of the joint and returning on the negative side. Some evidence is on record of such damage, but the cases where such damage has occurred are extremely rare and where noted it has been caused either by isolated exceptionally high resistance joints or excessive current flow on the piping mains.

Some city authorities have compelled the installation of the drainage system, and in many cases they have allowed its use where the water system is owned by the city. The drainage system is very simple and much cheaper to install than the insulating joint method on a system of cables or pipes which are already in place in the ground, and is the system which is in most common use in American cities, either alone or in connection with the insulated negative return feeder system.

C. P. Steinmetz (*Trans. A.I.E.E.*, 1907) has said: "I believe a sensible specification would be not to limit the return drop at all, but to require that the underground metallic structures must be made negative and maintained negative against the rail and then let the railway company look out for its rails, which would be the only structure in which attack takes place. All the water and gas pipes should be connected to the negative terminal of the dynamo and maintained negative. That is a complete protection for them."

J. L. R. Hayden (*Trans. A.I.E.E.*, 1907) has stated with regard to alternating-current electrolysis that it is not a phenomenon like direct-current electrolysis, on which definite quantitative general laws can be formulated, but is of the character of a secondary effect; that is, the action of the positive half wave is not quite reversed by the action of the negative half wave, leaving a small difference, rarely exceeding one-half of 1 per cent of the electrolytic action of an equal direct current. Alternating-current electrolysis varies from practically nothing to somewhat less than 1 per cent of direct-current electrolysis, varying with the chemical nature of the electrolyte and practically independent of the current density. Protection from alternating-current electrolysis may be absolutely obtained by the superimposing of a very small quantity of direct current upon the alternating, the amount of direct current being only 1.5 per cent of the alternating current.

REPORT OF COMMITTEE ON CHANGES IN CONSTITUTION AND BY-LAWS*

CHARLES L. HENRY, CHAIRMAN; C. N. DUFFY, H. C. DONECKER

Your committee submits the following recommendations: Recommended, that Clause III of the constitution be amended to include the following sections:
"Clause III.

"Section (c). Associations of electric railway companies, or of individuals engaged in or affiliated with the electric railway business in the United States or other countries, organized for the purpose of the advancement and protection of the interests of the electric railway industry and for the purpose of dealing with specific local problems affecting their respective countries, sections or localities, may, upon application, become sectional associations of this association, and the relationship between such associations and this association shall be governed and controlled as follows:

"1. The membership of such sectional associations shall be composed of company members or individual members who are members of this association.

"2. A committee of this association shall be appointed to promote the welfare of such sectional associations and is to be known as the committee on sectional associations. This committee shall be composed of the presidents of such sectional associations and such other members as the executive committee of this association shall appoint. The chairman of such committee shall be designated by the executive committee of this association, and such chairman shall be a member of such executive committee.

"3. Sectional associations shall be entitled to all the benefits and privileges enjoyed by members of this association, except the right to vote, without the payment of any membership dues other than those paid by the company or individual members of such sectional associations as members of this association."

These amendments have been put before the member companies in accordance with the provisions of the by-laws and also bear the approval of the executive committee.

This matter was brought to a focus by the railways of the Pacific Coast which wished to form an association and expressed a desire to affiliate in some way with the parent association. An invitation was extended to this association to have representatives at the organization meeting in San Francisco. This meeting was held on March 31, and our association was represented by Charles N. Black, first vice-president; Albion E. Lang, past-president, and H. C. Donecker, secretary. The Manufacturers' Association was also represented by E. H. Baker, vice-president; James H. McGraw, vice-president, and H. G. McConnaughy, secretary.

The Pacific Coast Association, being duly formed, passed a resolution as follows:

"That all companies or corporations engaged in the electric railway business in the three Pacific Coast States (California, Washington and Oregon) shall be eligible for full membership in the Pacific Coast Electric Railway Association, and in case the Pacific Coast Electric Railway Association becomes a section of the American Electric Railway Association, that its members shall also become member companies (if they are not already members) of the American Electric Railway Association."

Subsequently your committee met and drafted the changes noted above and which it was hoped would bring about the closer affiliation desired. It may be that future developments will suggest a different form of alliance between the sectional and other associations and the American, but at this time, in the judgment of your committee, the recommendations above cover the situation.

*Abstract of report read before the American Electric Railway Association, Atlantic City, N. J., Oct. 13-17, 1913.

RELATION OF CARRIERS TO THE DEVELOPMENT OF THE TERRITORY THEY SERVE*

BY PAUL SHOUP

The railways of this country have been both petted and abused, praised and reviled, rewarded and robbed, publicly aided and publicly regulated, but all the time used. On this use the fortunes, not of the few but of the millions, have depended. In so wide a field from which to illustrate the relation of the carriers to the development of the territory they serve, it is only possible to deal with the facts at hand with which familiarity makes for most certain knowledge.

The Pacific Electric Railway Company serves in Southern California four counties—Los Angeles, San Bernardino, Riverside and Orange. Heretofore the system has been separated into three sections, the major part centering in Los Angeles, with two isolated local systems, one in the San Bernardino Valley and one in the Riverside Valley. These two latter have been connected within the last few days. Within another six months this eastern section will be connected with the Los Angeles division. The system reaches 90 per cent of the towns and villages of the four counties named and serves more than 90 per cent of the population. It has 560 miles of roadway, of which 11.4 miles are four track, 274.5 miles single track and 115 miles spurs, sidings, etc., a total of 987.1 single-track miles. The scheduled trains aggregate about 2600 a day and more than 750,000,000 passengers are handled per annum in serving a permanent population of 750,000 people.

The speaker at a banquet which I attended recently, an attorney in no wise connected with railways, remarked that the one factor which had contributed most to the growth and prosperity of Southern California was its interurban railway system. The people of Southern California have recognized the value to development of interurban service not only by faith but by works. The Pacific Electric Railway is building a line between Upland and San Bernardino. For 90 per cent of the distance the right-of-way is through town lots, orange groves, vineyards and suburban property, and has been furnished by the communities, and, with the exception of perhaps 10 per cent, free of cost to the railway. A town that is interested in securing service has offered \$10,000 per mile cash bonus and free right-of-way. The citizens of San Bernardino and Colton, through the supervisors, have deeded to the company 40 ft. of the connecting avenue as a private right-of-way.

These are a few examples of a common understanding of what this interurban service means to the community. A most significant fact in connection with all these enterprises is that within my experience there has been no complaint made following the construction of the line. This, of course, implies good service, and reasonable rates of fare.

The electric railway service has become a part of both the home and the business life of the inhabitants of Southern California. It means innumerable conveniences that cannot be measured in money. Notwithstanding this fact, however, there are important results that have been secured in a financial way. For instance, Los Angeles County increased in population in the ten years ending in 1910 from 170,000 people to 504,000, or 196 per cent. Long Beach, from which the lines of the Pacific Electric Railway now radiate, increased from 2252 people to 17,809, or 690 per cent. Pasadena grew from 9117 to 30,291, or 232 per cent. The population of Venice, the closest beach point to Los Angeles, grew from nothing to more than 3000. In every one of these instances and many others that might be mentioned the interurban railway service has been a very important factor.

During the same period the tax value of Los Angeles County increased from \$85,000,000 to \$525,000,000, Orange

County from \$9,165,000 to \$28,397,000, Riverside County from \$9,422,128 to \$21,897,385, and San Bernardino from \$12,285,325 to \$35,585,056. The county showing the greatest increase in percentage had also the greatest increase in electric railway mileage both as to actual miles and as to percentage. Long Beach grew from \$1,500,000 in 1902 to \$21,000,000 in 1912, or 1350 per cent, and Pasadena from \$7,837,675 to \$42,264,860 in 1912. The large San Fernando Valley, lying northwest of Los Angeles, has been the last of the nearby valleys to be developed through the Pacific Electric service. The average assessment per acre ten years ago was about \$30, compared to \$300 last year. Perhaps the most remarkable rise in values has been in the beach cities. One case in Ocean Park has been cited where land sold seven years ago at \$30 per front foot and last week brought \$1600 per front foot.

In spite of the great general and financial benefits conferred by our service upon the rural and suburban population, we still have our troubles to overcome, such as the attack on interurban rates. These will cease when the people understand better that no matter how much co-operation they may extend in the matter of bonuses and free rights of way, capital cannot be invested in electric railway extensions unless its owners are assured that it will have fair business treatment from the community thereafter.

In summing up, I believe that this may be taken as a fundamental truth, that in undeveloped territories capable of intensive cultivation and adapted to dense population, the land owners and other business interests can well afford to give not only free rights of way but also cash bonuses to the extent of several thousand dollars per mile to secure the construction of interurban electric railways. Electric interurban railways create for other interests wealth out of proportion to the returns that the owners of the railways receive. This applies not only to increased land values but also to the creation of wealth in all forms that come with new city and territorial development.

Interurban railways should be built upon private rights of way and not on county highways, for if they are to be of service in developing territory it is essential that fairly high speed service be given. Except possibly between two centers of considerable population, unless the territory is to be benefited to the extent that the property owners can contribute free rights-of-way, then the prospective development is hardly such as to warrant interurban electric railway construction.

The landowners should help the development by subdividing within a reasonable time and placing on the market such tracts at reasonable prices.

The education of the people desiring the construction of a new line as to protection later on of the capital investment therein should begin before agreements are reached as to construction. The people should early be made to realize that the owner of capital has a right to expect in investing his money in electric railways that it shall be protected and that he shall have a reasonable chance for return thereon and a reasonable assurance of safety. With this point of view they should be then asked to agree as beneficiaries of the railway investment thereafter to protect the fares and freight rates agreed upon in order to secure good service; and this agreement should be made thoroughly known and become a written record.

The electric railways should remember, for their part, that good service is essential to their success and the only thing that will maintain for them the loyal co-operation of the public. The service should be frequent, should be certain and should take passengers to the business centers with such expedition that the suburban territory may, in a business and social way, be a part of the city's life. The greatest asset of any carrier is the good will of the public; and the development of this feeling in the public through good service is as important as the development of the material resources of the territory served.

*Abstract of address delivered before the American Electric Railway Association, at Atlantic City, N. J., Oct. 13-17, 1913.

OTHER ELEMENTS OF VALUE THAN FRANCHISE VALUES*

BY CLARKE M. ROSECRANTZ, GENERAL COUNSEL THE MILWAUKEE
ELECTRIC RAILWAY & LIGHT COMPANY

I do not understand that I am expected to suggest new or mysterious elements of value to be considered in determining the total value of a public utility company's property, but that I am to discuss certain elements going to make up the values of such utilities which do not naturally fall under the terms "physical value" and "franchise value," as they have been considered by the courts and public service commissions for the purpose of rate-making, taxation, municipal acquisition and private purchase or sale.

Upon the passage of the acts creating public service commissions, many petitions were filed for a reduction in rates. Some few petitions were filed by municipalities for the purpose of acquiring public utilities. These petitions made it necessary for the commissions to value the properties of the utilities and, being without any precedents, they were obliged to make their own construction of statutes under which they were proceeding. These statutes used language to the effect that in determining rates and in fixing the price to be paid where a municipality acquired a utility nothing was to be considered except the value of the property actually used for serving the public. The public, whether in its proceeding for a reduction in rates or for municipal acquisition, insisted that such language excluded everything except the physical property in its then condition. This would in almost all instances have fixed a value upon which rates would be determined so low that the utility could not make any return to its stockholders, if indeed it would have been able to pay the interest on its bonded debt.

So, too, in the case of the municipal purchase, the value so fixed would in almost all instances have been less than the bonded debt. If the act under which the commission was proceeding did not in terms exclude any franchise value from being taken into consideration, such value was nevertheless excluded. All agreed that the value of the property used for serving the public was all that should be considered. But no agreement could be reached as to the elements which should be considered in determining that value.

It would seem comparatively easy to determine what was meant by "value," and those interested in the questions raised naturally turned to the books for definitions and decisions. The definition given by lexicographers was not helpful. The definition given by economists, while abstractly true, afforded but little help.

The decision of the United States Supreme Court in the case of *Smyth vs. Ames* was seized upon by both parties to the controversy, and each was able to construe it and use it as a basis for arriving at widely different values for the same property. The municipality's value was little if any more than the cost of reproduction new less depreciation, while the utility urged and insisted that in addition to that value there should be added various sums for good-will or going concern value and the like. The commissions felt that it was unfair and unjust to limit the value of the property for rate-making purposes to the value of the physical property, and, feeling that nothing could be allowed for good-will, as in most instances the definition as given by lexicographers and the courts would not fit the condition with which they were confronted, cast about for some means of doing justice between the parties which means should not be deemed to be in contravention of the language of the statute under which they were proceeding.

In one of the earliest cases an element called "going value" was added to the value of the physical property, and the elements which went to make it consisted of the sums expended by the company for promoting business during its

early history if they had not been absorbed in the cost of operation or the dividends had not been unduly large; and where it was found that the utility had not been able to earn and pay a reasonable return upon the money invested, the amount so unpaid should be added to make up total value of the property. These two elements were added to the capital investment upon which the utility should be permitted to earn, and were considered in fixing rates for its service. The same commission which took this action also used language which could be construed as adding another element, under the term "going value," but did not define any method of determining it. It held that, although a franchise could not be considered, and while there was no such thing as good-will within the strict meaning of the word, nevertheless, as the plant was a going concern, it had a value over and above what it would have were it not a going concern, and that must be taken into consideration. Other commissions construing similar statutes reached a different conclusion and held that it was not proper to add the amount expended for promotion of business and deferred dividends to the capital, and took the position that, while such losses should be made good to the investors, nevertheless they should be made up out of the rates to be charged and not added to the capital upon which the company should be permitted to earn for all time.

In some jurisdictions it has been insisted that there is a distinction between the elements of value which should be considered when determining the value of the utility for rate-making purposes and for municipal acquisition, it being admitted that where a municipality was to acquire the utility a sum should be added to that found as the value of the physical property, which sum was that which was added by reason of the fact that the company was a going concern.

As the whole matter is of such recent origin, but little help has as yet been received from the courts. In the various cases which went to the United States Supreme Court, notably the *San Diego Land & Town Company* case, the *Knoxville Water Company* case and the *New York Consolidated Gas Company* case, the decision went upon the ground of whether the rate fixed by the state court was confiscatory. There are many cases wherein the fair market value of public service property was involved under franchises reserving to the municipality the right to purchase the plant at or after a stipulated time for the bare market value thereof. These cases, so far as we have been able to examine them, uniformly hold that, in the absence of a provision in the franchise to the contrary, the going concern element of value must be considered in ascertaining the fair value of the plant.

In determining value for rate-making purposes, it would seem that to the value of the physical property there must be added a sum which must be fixed with reference to the earning capacity of the utility, and, within limitations, further sums for promotion of business and the accrued deficit in earnings unless the rate be fixed so that those sums may be returned to the investors.

It is generally conceded that in determining the amount or value upon which a utility may be permitted to earn a reasonable sum should be included for working capital. This amount is usually only such sum as it may need to take care of its current accounts, discount its bills, etc. But in the actual operation of a utility, and particularly a traction utility, it is well known by the operators that a large sum must be set aside to pay claims commonly classified under the head of "injuries and damages." The larger the traction property, the greater this sum must be. Claims involving large amounts may be litigated for a number of years, and it would be unwise if an amount sufficient to meet them should not be set aside and carried in the same manner as working capital is carried. Otherwise the cost of operation of any given year might be so large as to prevent a reasonable return being made for that year. Should

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not utilities be permitted to carry such a sum as might be reasonably necessary to discharge these obligations, the amount of which cannot be determined until the close of the litigation? This may be called working capital if you please, but under whatever heading it may be classified it would seem that it should be considered as an element of value.

Another element of value which it would seem proper to consider for rate-making purposes is what is known as insurance reserve. Such reserves are as necessary as working capital, and it would seem that they should be so considered.

Under the present system whereby commissions have control of rates, it is necessary to set aside from earnings an amount to take care of the depreciation which is going on in the physical property. This amount is carried as the depreciation reserve and should represent at all times the difference between the cost of the property used for the public service and its then depreciated condition, and the utility must be ready to make good this amount in whatever manner it may have it invested—whether invested in additions or renewals, or in the securities of other companies. It stands for that portion of the original plant which through depreciation has been changed from machinery or other equipment into money, but it still represents the original investment, and the utility is as much entitled to earn upon it as it is upon that portion of its investment which still remains unchanged. To deny the utility the right to have the sums carried to depreciation reserve treated as capital invested in the business for the purposes of rate-making would be to deny it the right to a reasonable return upon all of the property used for the providing of the public service. Depreciation reserve should be considered an element of value by utilities and commissions in all valuations made for the purpose of fixing rates. No hardship can be inflicted upon the public by including this element of value, as the depreciation reserve is always under the control of the commission.

VALUATIONS FOR TAXATION

As distinguished from the valuation for rate-making purposes, we are met with a valuation for the purposes of taxation. At about the time commissions were organized for the purpose of regulating rates, powers were also given to such commissions, or to other similar bodies, to fix and determine the valuation of such utilities for the purpose of taxation. The laws requiring a valuation to be made usually provided that all of the property of the utility should be assessed. The physical value of the property was determined with reasonable accuracy, but when the valuation for taxation was made it was found to be far in excess of—in some instances several times larger than—the valuation of the physical property. So, too, in many instances, it was found to be at least double the amount of the valuation fixed for rate-making purposes. And it has been the experience of almost all of us, I think, who have had occasion to endeavor to ascertain the basis upon which such high valuation was made, that we were met with no detail, no description of a measuring stock, nothing which would guide us, and were merely told that that was the value of our property. And by studying the results from year to year it has become apparent that the taxing bodies proceed merely upon the doctrine of ability to pay, and it will be found that the value for taxation conforms to the gross value of the property if you take the net earnings and capitalize them at a rate at which money might be expected to flow into the business in the locality in which the utility is located. This basis is very similar to one of the methods suggested for determining value, rate-making and for sale, that is, the value as determined by the amount of net income. This tax must, of course, be treated as an expense, and, therefore, the public in the end pays it, but the valuation so fixed is not deemed by the public to be any criterion of value for the purposes of rate-making.

I do not wish to be understood as believing that utilities should not be taxed to the same extent as other property. They should contribute their just and proper share to the expenses of the government, and any subterfuge by which a utility succeeds in paying less than its just proportion is certain to result in some method of retaliation, either by reduction in rates or by means of harassing legislation which will take more out of the company's strong-box than would have been taken if it had paid its proper amount of taxes. As the taxing officers are apparently fixing the value for taxation purposes at an amount which approximates the exchange or sale value, it would seem that the utilities will be placed in a better position in their efforts to secure a high valuation for rate-making purposes, municipal purchase or consolidation. The public in the end is fair and no fair-minded man would feel that the utilities should be taxed upon a value which was considerably higher than that fixed for rate-making purposes or for municipal acquisition.

VALUATIONS FOR MUNICIPAL PURCHASE

The value of the utility about to be purchased by the public is viewed by the public and the utility from widely different positions. The public, in construing the language that it must pay for the property actually used by the utility for performing its public service, deems that property to mean only its tangible assets. In some communities they are more generous and concede that some amount should be added to the value of the tangible assets, because of the fact that the company is in operation and has a business developed. Either of these values so conceded by the public through its representatives would, in most instances, be less than the bonded debt. However, the courts, having in mind the constitutional limitation that when the public takes the property of the individual he must receive just compensation and that just compensation would mean such an amount as another desirous of purchasing and continuing the business would be ready to pay, have clearly indicated that when the public seeks to acquire a utility it must pay what we may call the exchange value.

PRIVATE PURCHASE

When a utility is to be purchased or consolidated it is important that no errors be made in determining the proper elements going to make up the value or sum to be paid and the amount to be allowed for each of those elements in fixing the total price. The investors considering the purchase deal with the securities outstanding against it and their market price, which is, of course, dependent upon their earnings past, present and prospective. They will also consider the regard in which the management is held, the condition of its funds of trust and whether the company is properly financed for future additions. They must also consider the demand for such securities. Great care must be taken not to give undue values to any of the intangible assets lest they be not allowed either in fixing rates or issuing securities when such questions are submitted to the bodies having authority in the premises.

As a result of the litigation construing the questions involved, we may say that we are gradually reaching common and equitable views as to what constitutes the value of the intangible property of public utilities. Good-will as such will not be considered. Going value is made up of various elements, namely, cost of promotion of business and deferred dividends when the question is one of reasonableness of rates, to which will be added a further sum for intangible values based upon the capitalization of the net earnings available for dividends. For municipal acquisition, the same elements will be considered and the same rules followed as would be followed if the sale were between private parties. The valuation for taxation purposes approaches the exchange value.

PHYSICAL VALUATION

[As the gentleman to whom the subject of physical valuation had been assigned was unable to be present, Mr. Rosecrantz was asked to discuss that topic briefly.—Eds.]

In making a physical valuation, cost is, of course, the best test, but few companies have accurate data of the original cost of more than a small portion of the equipment, including the visible and non-visible, upon which they claim they are entitled to earn, or for which they should be paid if the valuation is made for municipal acquisition. The cost when found is based upon price lists or other similar data and is at best but an approximation of the true cost. Such price lists or similar data can be and are properly used as a test to determine the propriety and weight to be given to the claims for value made by the utility or the commission.

The amount of the accrued depreciation is always the question toward which the fiercest fire is directed and about which the hardest battle is waged. This is because there are no common or accepted methods of determining the life of the various forms of property which go to make up the plant and equipment. Experts differ so widely in their estimates of the life of buildings, pipes, wires, conduits, machinery and the like that it is not strange that the decision by commissioners or courts satisfies no one. The experts rarely if ever agree upon the life of any given part of the physical property—even those testifying on the same side. If by any chance, they do agree, base their opinions upon such widely different reasons that one is reminded of the opinions of the United States Supreme Court in the insular cases, where, as you will remember, the justices, though concurring in the result, could not adopt the reasons therefor advanced by any of their brethren.

As an illustration of this wide difference of opinion, I may say that in a rate case in which I participated the expert called by the city insisted that the life of gas mains was at least upward of 1000 years, and based his opinion upon the discoveries made in the work of excavating at Nineveh, Pompeii and ancient Rome. As compared with this, the claims made by the companies' experts would lead one to think that the mains of which he had knowledge were of that delicate gossamer of which dreams are said to be made.

We are all familiar with the widely different claims of medical experts, whether the question is the extent of an injury or the capacity to make a will or commit a crime, and little credence is given to many of such opinions because of their fantastic character when viewed in the light of every-day experience. It would seem, then, that those interested in securing a proper and just valuation of their property must approach the question of accrued depreciation of the property of the utility with fairness and to that end call only such experts and offer only such evidence as will appeal to reasonable minds. Common ground must be reached and definite percentages, and the life of stones and mortar, machinery, overhead and underground structures and all other portions of the physical property must be fixed within reasonable limits.

Accrued depreciation is a matter largely of definition, and until the definitions are agreed upon those who are honestly endeavoring to determine the physical value of utilities may be likened to the mariner in charge of the vessel described by Lewis Carroll in "The Hunting of the Snark," who, you will remember, was guided only by the sound of the bell wielded by the bellman on board his ship, and it was found that at times the bowsprit became entangled with the rudder.

In all valuations of physical value we may as well recognize it as an axiom that only the depreciated value will be considered, that is, the then value of the physical property. All efforts to have the basis fixed upon the cost of reproduction new have been unavailing, and the courts are

committed to the rule that the cost of reproduction new, less depreciation, is the test of determining physical value. It would then seem of the highest importance that definitions for determining accrued depreciation be agreed upon, and that speedily and with fairness.

I wish to emphasize the importance of keeping accurate records of the cost of all items going to make up the physical property, including the charges which are urged by the utility when its rates are challenged or its value for municipal purchase is to be determined; for example, the cost of engineering, superintendence, insurance—both fire and accident—interest during construction, and the like, so that counsel will have something definite to present and urge when he is endeavoring to get the appraisal of your property fixed at a value which will most accurately represent the actual cost with proper allowance for depreciation. I know of nothing more trying than the position in which the counsel for a utility finds himself when he represents it before a commission or a court without proper evidence of the cost of the various items of the physical property and is expected by his client to procure a determination as to value which shall be in accord, or nearly so, with his clients' belief as to the proper and true value.

REPORT OF COMMITTEE ON STATISTICAL UNIT FOR CAR OPERATION*

C. H. LAHR AND C. B. BUCHANAN, CO-CHAIRMEN; E. L. KASEMEIER,
C. S. MITCHELL, A. L. DEWEY, NATHAN H. DANIELS, JR.,
J. A. EMERY, W. J. HARVIE

Your committee held a meeting during the midyear conference but is unable to report any definite conclusions or suggestions of units which would be an improvement over the car mile and the car hour now in such general use. The investigation carried on by your committee last year seemed to indicate more or less satisfaction with the units now used, and in view of this, your committee feels that it will be difficult, if not impossible, to develop a unit which would meet with the general approval of our member companies. Certainly the committee is not now in a position to do this, and from discussions it has had it does not think it at all likely that it will be in a position to offer anything of tangible value in the near future. The committee would, therefore, suggest that it be discharged and the matter taken up at some subsequent time should this appear desirable.

Government purchasing agents, designing and operating engineers, and the fuel departments of industrial concerns, large dealers in coal, and persons interested in the distribution and character of the different coals in the United States will find valuable information in a report just issued by the United States Bureau of Mines as Bulletin 22, entitled "Analyses of Coals in the United States, with Descriptions of Mine and Field Samples Collected Between July 1, 1904, and June 30, 1910." This report contains the analyses of 5,000 samples of coal taken from 1,500 coal mines and prospects situated in the various coal fields of the United States. All of the important fields and practically all of the more important mining districts are represented. The purpose of the bureau in compiling and publishing this information is to present reliable information regarding the chemical composition and heating value of the coals. The samples of coals were collected by experienced men according to a definite and uniform system, and were analyzed under carefully controlled conditions, so that there might be no question as to the relative merits of the different coals so far as this can be determined by chemical analyses and determination of heating values. Copies of this bulletin may be obtained from the Director of the Bureau of Mines, Washington.

*Abstract of a report read before the American Electric Railway Accountants' Association, Atlantic City, N. J., Oct. 13-17, 1913.

THE WELFARE WORK ON ONE CITY SYSTEM*

BY H. A. BULLOCK, STAFF ASSISTANT TO THE PRESIDENT BROOKLYN RAPID TRANSIT SYSTEM, BROOKLYN, N. Y.

The attitude of the Brooklyn Rapid Transit System on the subject of employees' welfare is thoroughly in accord with the general recommendations made by the committee on employees' welfare of the American Electric Railway Association. Tangible evidence of this endeavor is presented in the Brooklyn Rapid Transit Employees' Benefit Association, which was formed in 1901 and is one of the oldest organizations of its kind throughout the country. We agree with the committee of the association that welfare work must not be regarded as a form of charity and is too important in its influence upon operating conditions to be considered as a fad or treated primarily from the point of view of public advertisement. For a recent article describing the activities of our system in the welfare field, I chose the title "Maintenance of Men" and called attention to our recognition of the broad proposition that the maintenance of men is as important as the maintenance of equipment, or track, or structure, and should be provided for systematically on the basis of scientific study. I quote a single paragraph from the same article:

"The B. R. T. openly professes self-interest in all these things. It desires its men to co-operate also on the basis of their self-interest and seeks to educate its employees to an appreciation that the interest of the company and the interest of the men is a common interest, which alone can be satisfactorily served by the efficiency of the service which the B. R. T. System provides for those who patronize its lines."

This general declaration of attitude should be borne in mind as underlying any suggestion I may have to make on the particular subjects referred to in the report of your committee. To consider, then, that report section by section:

SICK BENEFITS

Our present plan of sick benefits, conducted by the Benefit Association, does not differ materially from the plan suggested by the committee's report. Sick benefits are obtainable only upon payment of dues in the association, and the total disbursements of the association to members or their families on account of illness or death exceed the amount paid in dues per man per year. The running expenses of the association are provided for by the activities of the men themselves in patronizing pool tables, bowling alleys, etc., in the club rooms in the various depots of the company, and by a system of indirect contribution applied at points where the operation of the association comes into contact with operating conditions in the company itself.

I might emphasize here our strong conviction against a benefit association or any similar organization which does not, in the regular order of things, produce sufficient revenue to meet the normal demands upon it. So long as the employees feel that their association is supported by themselves they will take pride in it and be jealous of its success. The moment it appears obviously to depend upon support given it by the company, the suggestion occurs to the employees:

"Why should we contribute at all if the company can afford to donate part of our benefits? Let us see if we cannot make the company assume all of the burden."

Therefore, in the support which the Brooklyn Rapid Transit Company has given to its benefit association, care has been taken to apply such support in directions where the company had a natural and necessary incentive for spending money. We provide, for instance, club rooms in our depots, rent free, lighted, heated and supplied with janitor service. We furnish and maintain the equipment, such as

pool tables, bowling alleys and the like. This means that the receipts at the rate of 1 cent a cue for pool and 1 cent a string for bowling are practically net profit, so that a substantial revenue approximating \$15,000 a year is derived from these particular activities of the men. We have an obvious reason for all of this expenditure. Club rooms are, in fact, the extra rooms of our depots. We desire the men to spend their loafing time between trips in these club rooms, rather than visit the saloons, which infest almost every district where a street railroad depot is located. The operating department notices, the make-up tables, bulletin boards—all are placed in the club rooms. The club rooms are in fact company property and serve a distinct company purpose, although at first sight their facilities appear to be solely for the entertainment of the employees. Similarly, the company pays the salary of a "welfare administrator" and contributes his services, without cost, to the Benefit Association as its president. Direct contributions of money are made only for the purpose of relieving actual suffering or to provide entertainments and prizes for international competitions, such as bowling tournaments and the like. We believe that this theory of conducting the support of our benefit association is the logical and proper one; we know it is successful in practice.

DEATH BENEFITS AND INSURANCE

The present death benefit of our benefit association is only \$200. We have under consideration a plan of group life insurance whereby, by means of the machinery for the writing of business and the collection of premiums which we can supply free, life insurance in substantial amounts, say \$1,000 per policy, can be supplied at rates well within the means of the average conductor, motorman or guard. I shall not undertake to discuss our plan in this particular at this time, inasmuch as it is not yet in effect, but definite proposals to provide the insurance have been submitted by two of the largest companies in the country, and the form of policy upon which this insurance would be based has been approved by the New York State Insurance Department. One thing in this connection I wish to say by way of caution. The only policy, to my mind, which should be considered in group insurance of this kind is a level premium limited payment policy in some form, which becomes paid up at a certain age within the working years of the employee and gives to the faithful who survive in service the actual protection to which they have been looking forward. I emphasize this point at the risk of over-burdening this gathering, because of the fact that group life insurance is new and is being talked up by the representatives of certain companies in much the same way that real estate is sold or de luxe editions are peddled. The term policy offers an abnormally low premium at early ages and appears attractive, but it is my conviction that it is full of dynamite, and my own experience demonstrates that it is possible to obtain a satisfactory and inexpensive form of level premium, limited payment policy, if sufficient persistence is shown.

PENSIONS

The pension system of our company has been in force now since 1910. It provides for the retirement of employees who have seen service twenty-five years or more. It operates automatically when an employee has reached the age of seventy and may be availed of in cases of incapacity at the age of sixty-five or over. We have now seventy pensioners on the roll receiving an average of \$27.10 a month, ranging from \$18 to \$40.30 per month. We consider these pensions purely as a service annuity earned by the recipients, and they are supported entirely by the company without contribution of the men.

ACCIDENT BENEFITS

I will pass over this topic, because the subject of workmen's compensation is still undetermined in the State of New York, and the uncertainty in this respect has operated to postpone

*Abstract of paper read before the American Electric Railway Association, Atlantic City, N. J., Oct. 13-17, 1913.

final action in the life insurance plan I have referred to, because in dividing the life insurance plan I have thought it wise to attach an accident insurance feature thereto.

PROFIT SHARING

No definite action has been taken along this line by the Brooklyn Rapid Transit System.

SAVINGS FUNDS

We thoroughly concur in the general observations of the committee regarding savings funds. There has been enacted in the State of New York during the last year an amendment to the banking law providing for the formation of credit unions somewhat on the lines of the Massachusetts statute. I believe that through some such organization as the credit union the best solution to the savings fund problem in large corporations will ultimately be found. The subject is too broad to enter into at this time, but I may say that in the credit union the savings function is provided in all the varieties presented by the savings and loan association, i. e.: straight savings accounts and the several kinds of instalment savings-investment accounts. Arthur H. Ham, director of the division of remedial loans of the Russell Sage Foundation, at 31 Union Square, New York, is in a position to supply information as to the credit union idea, and I am sure will be glad to do so to any who may apply to him.

There is also in operation in many cities a form of "poor man's bank," called the Morris plan, which includes many of the features of the credit union but does not involve the idea of a mutual organization. Although I have worked out a plan applying the credit union theory to our own situation, I am reserving my own recommendation until I can have opportunity to look more closely at the Morris plan in operation. I feel that a street railroad company should act slowly in this matter. It can relieve cases of actual need by well applied donations, and by means of its legal facilities it can do much toward rescuing any of its men who have come into the clutches of loan sharks. To take on a relation with the savings of its employees is so important a matter that our own company at least is proceeding with the utmost care and proposes to make sure that we have the best system obtainable before taking definite action.

LOAN FUNDS

The matter of loan funds need hardly be discussed in view of what I have said above. My personal feeling is that employees hesitate to disclose their necessities to their employer and will go to a loan shark before they will go to the employer for help. A welfare administrator or similar official, keeping in touch so far as possible with the employees and their families by means of systematic and well-directed social activities, can supply charitable aid in cases where it is needed. The ultimate formation of a proper form of savings and loan institution will do the rest.

SOCIAL AND ATHLETIC CLUBS, ENTERTAINMENTS, ETC.

It is our belief that all activity of this kind which represents a sincere desire of employees for collective amusement should be encouraged in so far as consistent with operating necessities, and that operating officials should make special effort to provide opportunity for such social and athletic activities.

I have already referred to the club rooms which we maintain in our depots and to the bowling tournaments. We also arrange for cheap excursions to the beaches for the families of employees in the summer time. We provide free entertainments at the Railroad Men's Building, which is the headquarters of our welfare establishment, at frequent intervals during the winter, and buy the equipment for depot baseball teams. We assist in the support of an employees' band. At one of our largest depots we have a house committee, elected by the men themselves, to keep watch over the use of the club rooms and assist in preserving the facilities there provided for the comfort of those men who desire to use them properly. This house committee has been an

unqualified success. It has made discipline easier at the depot in question, and, in the judgment of our operating officials, has been a most favorable influence upon the morale of the men. We look forward to the early establishment of these committees in a number of other depots.

MERIT SYSTEMS AND REWARDS

A merit system obtains throughout our company, personal records are kept, and the effort is made constantly to regard discipline not from the point of view of retribution but, so far as it is possible, from the point of view of correction and education, so that the offender himself may ultimately learn by his own mistakes and shortcomings. We employ a system of credits, as well as demerits, and promote on merit thus demonstrated.

SAFETY AND SANITATION

We thoroughly indorse the statements of the committee in this particular and are carrying on at the present time extended studies looking to the organization of a permanent safety committee within the company itself, embracing in its activities the entire force from top to bottom.

SICK BENEFITS

We have had free service to members of the Benefit Association throughout its existence. We found, however, in the course of a general investigation on this subject two years ago that the medical function was more or less intimately connected with operation through the intermediary of the sick excuse and that certain loose practices had developed which were having an unfavorable effect both upon operating discipline and upon the finances of the Benefit Association. As the result, I undertook a special investigation of the subject of medical attendance, and out of this investigation came a plan for a medical inspection bureau as a part of the operating department.

We assumed that when a man was actually sick it was as much to the interest of the company as to the interest of the man himself that he should be restored to healthful condition at the earliest possible moment. We knew as a matter of practice that the average employee taking cold or beginning to suffer from any other form of common complaint generally neglected his case for a few days until he felt pretty bad, then applied for sick leave, loafed around his home or some less desirable place for a few days more, and finally either became seriously ill or went back to work without having really recovered from his indisposition. We knew that a considerable number of men systematically worked the sick excuse as a means of recreation, doing an injustice not only to the company but to all those faithful employees who were thereby deprived of recreative opportunities. We had in the Benefit Association the nucleus of a splendid medical establishment, and we therefore took the staff of doctors of the association over directly into the service of the company and required that a man, when he reported sick at his depot, should go to one of two medical inspection offices located at convenient points on the system for examination. If a man thus reported sick, his depot officials could not require him to work. If he was diagnosed as sick by the doctor examining him, he was relieved from work and put under treatment until the doctor certified to his recovery. Facilities were provided for the examination of men reporting sick from their houses and for their subsequent treatment. In case of attempted faking, the doctors promptly notified the depots and terminals and summary discipline was applied. The system was, of course, worked out in harmony with operating conditions, and involved a close exchange of information between physicians and depot officials. The attendance thus supplied at the direct expense of the company continued to provide members of the Benefit Association with the medical attendance to which they were entitled by reason of their membership in that organization.

This system has been in effect since Jan. 1, 1913. In this period of over nine months we have reduced the sick list

throughout the system by nearly 25 per cent as compared with the corresponding nine months of 1912. This reduction has been accompanied by an increase in the number of new sick cases reported as compared with the corresponding months of last year, and our physicians, in providing the attendance above described to 9000 men in the operating department, have answered more than double the number of office and house calls that were answered in providing medical service to 7000 men under the previous régime, when it was optional with members of the Benefit Association whether they called on the doctors or not.

Thus it appears plainly that our gain in the reduction of the sick list has been accomplished by restoring men to work with shorter intervals of disablement than of old. In other words, we have improved the average health of our force. The medical inspection system has the entire approval of the operating department and is rapidly popularizing itself with the men themselves, particularly as we are undertaking to make systematic provision for recreative excursions to replace the fraudulent sick excuses that formerly were obtained for the purpose of recreation.

I personally consider this line of activity fundamental in any welfare establishment. The cost is surprisingly small, our own experience showing an average of not much more than \$1.50 per man per year. The results gained, in the judgment of men whose knowledge of operation is as broad as my own is limited, are most gratifying. I strongly urge that compulsory medical inspection be made an essential feature of any systematic planning for welfare of street railroad employees.

REPORT OF THE "AERA" ADVISORY COMMITTEE*

C. LOOMIS ALLEN, CHAIRMAN; A. L. LINN JR., L. P. CRECILIUS,
H. V. DROWN, H. E. REYNOLDS, W. H. HEULINGS, JR.

Aera ended the first year of existence with the July number.

The first volume contained 1163 numbered pages in addition to 268 pages, carrying indices, list of officers, etc., and advertising. Of the numbered pages, four were blank, leaving 1159 pages, the contents of which may be classified as follows: Association affairs, 276 pages; Question Box, 221 pages; communications, 18 pages; operating matters, 239 pages; public relations, 333 pages; relations with employees, 44 pages; yearly table of contents, 28 pages; total, 1159 pages.

The issues of August, September and October have devoted rather more attention to matters affecting public relations and relations with employees, and it should be the policy of *Aera* to give to these subjects a generous proportion of its space.

Beginning with the issue of April, the magazine has carried no advertising. The elimination of advertising was the result of a recommendation embodied in a resolution passed by the executive committee of the American Electric Railway Manufacturers' Association. The Manufacturers' Association was asked to contribute toward the expense of publishing *Aera* and the thanks of this association are due the Manufacturers' Association for their most liberal support.

Your chairman believed that the most effective results from *Aera* could be obtained if a trained, competent editor was secured. After considering the applications and looking over the field generally for a man to fill this position, an offer was made to Harlow C. Clark. Mr. Clark is a man of ripe experience in the newspaper field. For many years he was engaged in municipal government and chamber of commerce work, and he has brought to us a viewpoint fully developed from the public's standpoint and can ex-

press to the public and the employees who are dependent directly and indirectly upon this industry in language they will understand the corporation side of one of the most interesting problems that confronts not only we who are engaged in this work, but the general public.

The many letters of approval and encouragements, and the verbal congratulations, as each issue has been distributed, bear favorable testimony to the work Mr. Clark has done. Mr. Clark began his duties as editor with the May issue and devotes his entire time to the magazine and other publicity matters in connection with the association work.

To him we give full credit for:

(1) The articles in the editorial columns of *Aera*; (2) the preparation of the newspaper clipping sheets, their distribution, and the co-operation of the newspapers in using this material; (3) the publicity for this convention and the co-operation of the Associated Press.

Your committee believes that the general purposes of the *Aera* should be fourfold, namely:

First, to act as a medium of communication between the officers and members of the association in the presentation of matters affecting the organization; in the dissemination of association news and the creation of interest in association affairs.

Second, to educate the members of the association in the problems which the industry faces and in means and methods of solving such problems.

Third, to present to the public, in as great a degree as is possible, through *Aera's* circulation, the electric railway's side of the controversies that are being waged, and to educate the public to the fundamental facts affecting the industry.

Fourth, to practically assist association members in the technique of their work by printing such contributed articles as may be of benefit in illustrating methods and means.

Any publicity program that may be adopted by the association is closely allied to the second and third of these purposes, as here outlined. The education of officers and employees is as essential to success as is the education of the public, and no better means can be devised than such a publication as *Aera*, through which the leaders may talk directly to the men who must be looked to to carry out such policy of public relations as it may seem wise to adopt.

The education of the public is a by-product of *Aera*. If the magazine can be given a standing which makes it the recognized mouthpiece of the industry in matters affecting the relations between the companies and the public, it will gain a hearing in the press.

To give the magazine this standing, it is necessary that association members give it loyal support in the matter of contributions. *Aera* must depend upon association members for the great bulk of the articles it prints. It has no other staff than these afford, and it may be said with emphasis that no better staff could be desired. We believe that those men in the industry who speak with authority, whose words carry weight and who realize the necessity of bringing to the attention of the personnel of the electric railway business the questions with which that business is confronted, realize also that in *Aera* they have a medium which assures them a hearing. The importance of furnishing *Aera* with the right kind of matter cannot be too strongly emphasized. The committee desires to thank those who have contributed so splendidly to *Aera's* columns and to appeal to all members to not only respond to requests for contributions, but to volunteer articles which they think will be of interest.

This appeal applies equally to the Question Box, which has increased amazingly in size and usefulness.

The experience which the use of clipping sheets, made up of excerpts from *Aera*, has furnished is proof that if *Aera* can print matter of interest to the public, that the papers of the country will make use of it.

*Abstract of report read before the American Electric Railway Association, Atlantic City, N. J., Oct. 13-17, 1913.

CLOSING SESSION OF THE CLAIMS ASSOCIATION

On *Aera's* mailing list are nearly 1200 papers, located in cities in which member companies operate. The clipping sheets are sent to all of these and are quite generally used. In addition, the help of member companies has been enlisted to secure publication, and it is through company members that any extensive campaign of publicity must be waged.

Although it is impossible at this time to report upon the final results of the effort made to secure publicity for the present convention, enough is known to prove that it is not difficult to secure extensive publication of matter having news value. The clippings shown in a frame in this convention hall were those received within ten days before the convention and were cut from seventy-five papers, in forty-five cities in twenty-four states, these papers having a combined circulation of nearly 3,600,000. Because of the necessarily early arrangement of these clippings, they consist of the most part of clippings of matter sent directly from the office to the newspapers. Clippings of articles inserted through the aid of company members will form an even larger collection.

A large number of such clippings have since been received and probably have had more extensive publication than those sent directly to the papers. They indicate what may be done if the member companies will co-operate.

It is, of course, impossible to indicate in detail to member companies methods of establishing close relations with the press of their territory. In many cases such relations already exist, and it but remains to take advantage of them. In the preparation of *Aera* clipping sheets, a careful selection is made of such matters as are of general interest and that are of a character that will recommend them to an editor as proper for publication.

Very often it is possible for the officers of companies receiving the sheets to add something that will give them local interest and thus make them additionally attractive.

Your committee feels that a satisfactory start has been made toward securing a hearing for the electric railway industry. The machinery for giving proper publicity to matters in which the industry is interested is being assembled and put in working order.

The machinery is at the service of the officers and committees of the association. From them must come the material for any effective movement for publicity.

In conclusion, your committee desires to state that in its opinion *Aera* is already admirably fulfilling its functions and that its effectiveness and usefulness is a cumulative growth, increasing with each number issued.

It has accomplished and is accomplishing a great work for the association in stimulating interest in association work by constantly keeping members in touch with association affairs.

The commendatory letters received, the demands made for prompt delivery, the complaints made when the magazine is delayed and the favorable comment of *Aera* readers encourage your committee to believe that the magazine is appreciated.

Aera needs a larger subscription list; it needs contributions, and it needs the support of association members.

Your committee believes that all of these will be forthcoming. *Aera*, it is convinced, has achieved an assured place in the activities of the association and will continue to be one of the strongest agencies for promoting the good of the organization and of the industry.

The Metropolitan Street Railway, Kansas City, is utilizing the reverse side of its transfers for educational purposes. All sorts of reading matter are being used. "Save yourself" is one heading. "It is safe and easy to get off with face to front of car. It is dangerous to get off the car backward." This warning is illustrated with views of the correct and incorrect method of alighting from a car. The text is changed several times weekly.

The closing session of the Claims Association was held yesterday morning with President Avant in the chair. The attention which the claim agent is giving to new developments in the transportation field as they affect the accident question was indicated by the first paper. The subject was "Motor Vehicles," presented in a paper by M. B. Bracken, claims department United Railways of St. Louis, with written discussion by C. G. Rice, superintendent claim department Pittsburgh Railways; W. F. Weh, claim agent Cleveland Railway, and James R. Pratt, assistant general manager United Railways & Electric Company of Baltimore. The next and final paper was that on "Adjustment of Accident Claims," by F. D. Edmunds, assistant to general attorney Interborough Rapid Transit Company, New York. After a general discussion on both papers and after a report on the index bureau, by B. P. Holmes, of the Hooper-Holmes Information Bureau, the report of the nominating committee was received and adopted unanimously. The officers of the association for the ensuing year are the following: President, W. F. Weh, claim agent Cleveland Railway; first vice-president, W. Tichenor, claim agent Terre Haute, Indianapolis & Eastern Traction Company; second vice-president, George Carson, claim agent Puget Sound Traction, Light & Power Company; third vice-president, R. E. MacDougall, claim agent New York State Railways, Rochester, N. Y.; secretary-treasurer, B. B. Davis, claim adjuster Columbus Railway & Light Company. Speeches of thanks were made by the new officers.

The executive committee, in addition to the officers, is composed of the following: P. C. Nickel, claim agent New York Railways; F. J. Whitehead, claim agent Washington Railways & Electric Company; S. B. Hare, claims attorney Altoona & Logan Valley Electric Railway, and C. B. Proctor, claim agent Memphis Street Railway. The subject committee for the next convention comprises L. S. Hoffman, general counsel Public Service Railway; M. P. Spillane, claim agent Boston Elevated Railway; J. H. Handlon, claim agent United Railroads of San Francisco, and Wallace Muir, claims attorney Kentucky Traction & Terminal Company. The committee on ways and means is composed of J. S. Kubu, claim agent New York State Railways; P. B. Dixon, claim agent Jackson Light & Traction Company, and J. S. Harrison, claim agent Jacksonville Traction Company. The employment committee is composed of A. D. Brown, claim agent Syracuse Rapid Transit Company, and C. J. McAleer, claim agent Schenectady Railway.

The meeting adopted a resolution offered by Mr. Nickel that the past-presidents and present officers and executive committee be appointed a committee to prepare data on ways and means for accident prevention. C. A. Avant, retiring president, was presented with a badge similar to that which has been presented to other past-presidents of the Claims Association. Mr. Avant acknowledged this gift in a happy speech in which he thanked the members for the assistance they had given him to secure a successful administration. Remarks were made by E. C. Carpenter and H. K. Bennett, expressing their sorrow at the sudden death of R. H. Schoenen, late claim agent Lehigh Valley Transit Company and a former vice-president of the association. The memorial prepared on Mr. Schoenen by the ex-presidents of the association had been left inadvertently at the office of Secretary Donecker of the American Association and consequently could not be read. It will, however, be made a part of the minutes. Remarks were also made on the death of L. L. Austin, claim agent Metropolitan Elevated Railroad, Chicago, Ill., and on the death of S. W. Gonsalus, claim agent Southwest Missouri Railway. The meeting was then adjourned after the most successful gathering the association has had for years.

REPORT OF COMMITTEE ON PUBLIC RELATIONS*

THOMAS N. McCARTER, CHAIRMAN; PATRICK CALHOUN, O. T. CROSBY, JAMES H. MCGRAW, W. H. HEULINGS, JR.

An important development in the work of this committee was a conference held on Feb. 18 between the public policy committee of the National Electric Light Association and the members of this committee. The interests of the two associations as affected by public relations are so nearly identical that your committee was more than pleased to avail itself of the opportunity offered by an invitation received from Arthur Williams, chairman of the N. E. L. A. public policy committee, to meet and to discuss matters which both of these bodies were authorized to consider.

The representative character of those present at the meeting gave assurance of the interest taken in the matters upon which they deliberated. President Harries of this organization and President Tait of the National Electric Light Association were both in attendance, and from the N. E. L. A. were Arthur Williams, E. W. Burdett, H. L. Doherty, C. L. Edgar, W. W. Freeman, T. E. Murray, S. Scovil and C. A. Stone; from the association, Chairman Thomas N. McCarter, Patrick Calhoun, O. T. Crosby, J. H. McGraw and W. H. Heulings, and representing important public utility systems or groups were Frank Hedley, J. H. Pardee, H. G. Bradley, E. A. Maher, C. C. Peirce, John W. Lieb, Jr., and C. Loomis Allen. Judge E. P. Matthews was also a guest, and the two associations were represented by their secretaries, T. C. Martin and H. C. Donecker.

A discussion replete with valuable suggestions and of great importance as developing the ideas of men prominent in both the electric railway and the electric light industry as to ways and means for bringing about what all are striving for—a better condition of affairs as between the companies and the public—lasted from 8 o'clock in the evening until 1:30 a. m.

As a concrete example of what joint action by the two bodies represented can accomplish may be cited the appointment at this meeting of a committee to act with and advise the National Civic Federation in the preparation of a model utility law. Previous to this meeting much publicity had been given to a draft of such proposed law. It was felt by both committees that the advice and counsel of men thoroughly in touch with the practical side of street railway management and operation were needed before such a model statute was placed before the public sealed with the approval of such an organization as the National Civic Federation, and the co-operation offered by the two committees was gladly accepted by the National Civic Federation. The committee's representatives have had a voice in the preparation of such a law, as will be explained to you later in the week by William D. Kerr.

Thanks of the association are due to Judge Armstrong, who represented this association and its committee on public relations in the preparation of the draft.

As a further result of this conference, it was resolved to establish a joint committee representing the two associations to handle such matters or to devise means of effective publicity to deal with questions of public relations and to consider the molding of public opinion by the presentation of real facts regarding public utility interests and the controverting of the mass of misinformation being spread by propagandists of socialistic and semi-socialistic ideas relative to the control of public utilities. The National Electric Light Association has already appointed its members of this committee. The names of our own representatives will shortly be announced. Our members, together with the National Electric Light Association members, will choose a member at large, and it may be expected that effective and ener-

getic work will shortly be undertaken, and that results will be obtained which cannot but prove pleasing to the association.

Your committee has kept in mind the importance of publicity for the industry. Many plans suggested by it have been put into effect and are now being carried out. We are seeing the results in editorials in the public press and in the news columns. We are still impressed with the importance of an energetic effective campaign along these lines. The apostles of change, both those operating under a misunderstanding of the real conditions as affecting public utilities and those who are wilfully spreading false doctrines and false information, are not resting. It is necessary that our side of the controversy be placed before the public and we believe that every effort should be made to interest the member companies of this association in the work of refuting the arguments presented everywhere by our opponents. This can be done if proper assistance and co-operation is given to your committee in its efforts, and we feel sure that such assistance and co-operation will be forthcoming.

ANNUAL ELECTION OF MANUFACTURERS' ASSOCIATION

The annual meeting of the American Electric Railway Manufacturers' Association was held in Engineers' Hall at 4 o'clock yesterday afternoon, with President W. H. Heulings, Jr., in the chair. The meeting was well attended, and there was a lively rivalry among the friends of several candidates for the five positions on the executive committee that had to be filled.

President Heulings delivered a brief address reviewing the general business conditions that have prevailed during the year. He stated that in spite of somewhat unfavorable business conditions the association had added forty-seven new members to its roll. He stated that the committee had been doing its utmost, and it was the expectation and endeavor that it would continue in work designed to raise the fund of \$12,000 for the support of *Aera*, the official publication of the parent association. Of this fund \$4,200 had already been collected and upward of \$700 additional had been pledged.

The nominating committee, consisting of B. A. Hegeman, Jr., D. W. Smith, George Stanton, R. H. Herzog and Edwin C. Folsom, was appointed to report nominations of candidates to succeed Messrs W. H. Heulings, Jr., E. H. Baker, Scott H. Blewett, E. M. Williams and J. L. Repogle.

After the nominating committee had withdrawn for consultation Gen. George H. Harries, president of the American Association, delivered a short address in which he expressed his personal and official appreciation of the work which the manufacturers had done on behalf of the American Association and for the industry as a whole.

The report of the nominating committee recommended the election of W. H. Heulings, Jr., E. H. Baker and Scott H. Blewett to succeed themselves, and of E. F. Wickwire, of the Ohio Brass Company, and Thomas Finigan, of Pierson, Roeding & Company, to succeed Messrs. Repogle and Williams. The report of the nominating committee was received, and then Edwin B. Meissner, of the St. Louis Car Company, seconded by A. H. Sisson, of the Southern Car Company, placed in nomination a second ticket as follows: Thomas Farmer, of the Consolidated Car Heating Company; Bertram Berry, of Heywood Brothers & Wakefield; F. A. Elmquist, of the Sherwin-Williams Company; E. H. Baker, of the Galena Signal Oil Company, and Thomas Finigan, of Pierson, Roeding & Company.

As the names of Mr. Baker and Mr. Finigan were on both tickets they were unanimously elected by one ballot cast by the secretary. On the formal ballot on the other six candidates Messrs. Farmer, Berry and Elmquist received the highest number of votes, and were declared elected.

*Abstract of report read before the American Electric Railway Association, at Atlantic City, N. J., Oct. 13-17, 1913.

It was announced by the chair that the new committee would meet at the office of the association in the pier entrance at 12.30 to-day for the purpose of organization.

On motion the meeting adjourned.

RAILWAY SIGNAL ASSOCIATION CONVENTION

Among the various committee reports presented to the Railway Signal Association yesterday at its convention in Nashville, Tenn., that of the committee on electric railways and alternating-current signals perhaps aroused most interest. The committee brought up to date previous specifications for alternating-current automatic block signal systems for railroads using either alternating current, direct current or steam for propulsion. It also gave historical data on thirty-three installations for alternating-current signaling on both electric and steam railways. W. Morrison, of the New York Central Railroad, presented the report in the absence of Chairman H. S. Balliet. Mr. Howard, of the Union Switch & Signal Company, gave useful suggestions and will co-operate with the committee further. There was no discussion on the historical section.

The association delegates visited the Hermitage, the old home of Andrew Jackson, yesterday evening as the guests of the Manufacturers' Association. The concluding session will be held to-day.

The annual meeting of the Signal Appliance Association was held yesterday forenoon. The officers elected are: Chairman, W. P. Hawley, New York, United States Light & Heating Company; vice-chairman, L. T. Thomas, Chicago, General Railway Signal Company; secretary and treasurer, F. W. Edmunds, New York, Dressed Railway Lamp Works. Executive committee—W. T. Gillingham, Chicago, Hall Switch & Signal Company; George H. Porter, Chicago, Western Electric Company; W. T. Kyle, New York, Duplex Metals Company, and Fred Cameron, Corning, N. Y., Corning Glass Works. Committee on arrangements for next year's convention—E. E. Hudson, Orange, N. J., Thomas A. Edison, Inc.; Mr. Cameron and George Blackmore, New York, Union Switch & Signal Company. Committee to confer on place of convention—Mr. Gillingham.

It is probable that next year's convention will be held at Bluff Point, Lake Champlain, N. Y., during the last week of September. The appliance association is carrying out a fine entertainment program at Nashville.

A SUGGESTION IN REGARD TO CONVENTION LOCATIONS

A representative of one of the manufacturers present at the convention has made a suggestion with reference to the annual meeting of the American Electric Railway Association which appears to be thought worthy of consideration by a number of those members and manufacturers to whom he has presented it. He argues that the scope of the annual meetings has grown so greatly that it is increasingly difficult to find facilities properly to take care of the attendance and at the same time afford the space adapted for the exhibition of manufactured apparatus and supplies. When the exhibition can be made in proximity to the convention halls and to the hotels so that those attending the convention are close together and can reach the exhibition and convention halls quickly and without inconvenience, the advantages of attendance, both for representatives of member companies and manufacturers' representatives, are fully obtained. On the other hand, when the convention and exhibition halls and the hotel accommodations are widely separated, it is difficult, if not impossible, for delegates to get the full benefit of the meetings.

After the experience of many years, this manufacturer

says, it has become obvious that there are few places available which meet the conditions first outlined above. Of these places, Atlantic City is clearly the best. He suggests, therefore, that following a meeting one year at Atlantic City, the convention of the following year should be held at some other point to be chosen by the association, and at that meeting there should be no exhibits of manufactured apparatus. That meeting would then be primarily devoted to the special business of the association—the representation of the manufacturers being, perhaps, smaller, and in any case made up more of the commercial and less of the technical men. At such a meeting, obviously, the sessions of the member companies would receive greater attention than is possible at a full meeting with the diversions of the exhibition and its attendant attractions and large list of visiting delegates.

In the third year, according to this plan, a full meeting would again be held at Atlantic City, and the fourth year there would be a limited meeting without manufacturers' exhibits, at another selected point in the West or Middle West as the case may be; and so on, alternating between Atlantic City with full exhibition and various other points without exhibition. It has been argued that this plan would insure the holding of the full meeting with exhibitions at a point perfectly adapted for this purpose, where facilities for the holding of the formal meetings of the convention, for the showing of apparatus and the housing of delegates are ample and convenient. It would insure in every second year a meeting for the transaction of strictly association business under possibly more favorable conditions than are now possible when the convention is accompanied by manufacturers' exhibits. It is further suggested in support of this plan that it is practically impossible for manufacturers to make exhibits at such short intervals as one year without considerable monotony in the nature of products shown.

The man whose suggestion is quoted admits that there are many pros and cons that may be put forth in connection with this proposal, but believes that the former outweigh the latter.

LETTER BOXES ON CARS IN HUDDERSFIELD

Some years ago the Huddersfield (Eng.) Corporation entered into a contract with the Government Post Office Department for gathering letters in boxes on electric railway cars. Regular cars to the number of sixty carry an iron letter box hung on a rail at the rear of the car, easily removed and attached. The slot in these boxes is large enough to receive any letter or single paper. As often as once an hour, from 6 a.m., until 10 p.m., the conductor on the car removes the box and takes it into a special office devoted to that purpose by the railway department, at a central point which is passed by all cars during their regular runs. The conductor there places the box on a shelf designated for that purpose, takes from another shelf an empty box and attaches it to his car, and then proceeds on his way. As this is done at a regular waiting point, no time is lost by this additional work of the conductor. Every hour special collectors gather all the letters from boxes thus left and carry them to the post office. A person may signal the car to stop, as if he were intending to board the car, and then mail his letter, giving the conductor the usual single fare, the conductor punching a ticket the same as for a ride. The outlying districts, to which the cars on some of the lines run, make much use of the system. The corporation owns and furnishes the boxes, and the Post Office Department pays 1,500 a year for the service and free transportation on cars of collectors who have to travel some of their routes by car.

DIXON-LUBRICATED NORTHAMPTON GEAR STILL DOING GOOD SERVICE

W. O. Hay, general manager of the Northampton (Pa.), Easton & Washington Traction Company, has the following interesting remarks to make concerning the half gear and pinion on show at the exhibit of the Joseph Dixon Crucible Company: "Both of these came with the original equipment furnished us by the General Electric Company and were put in service in the early summer of 1906; they have been in service since that time, continuously. They have made more than 275,000 miles, and we expect to use them again when returned to us. During all this period the only lubricant we have used has been Dixon's graphite wood gear grease. When we first put this equipment into service, we filled the gear case full of Dixon grease and after that it was our custom each week to add about a double handful in each gear case."

J-M SAND SPOUTS AND STOVEPIPE INSULATORS

Among the items of unusual interest shown by the Johns-Manville Company this year is a sand spout for cars and electrobestos stovepipe insulators. The sand spout is made of strong metal ribbon, wound spirally, the edges being crimped in during the winding to form a continuous interlocking metal hose which can be bent to the desired curve without fear of fracture.

This spout will stand a crushing strain of 300 lb. to each four turns of its spirals and under ordinary conditions will last as long as the car on which it is used. It is said to give much better service and for a longer time than coiled wire spouts as the latter usually kink and have an opening which gradually enlarges, thus permitting the sand to leak out. There is also no danger that this spout will pull out.

The J-M electrobestos stovepipe insulator is a molded fire-proof insulator for use in car heater stovepipes to insulate that portion of the pipe extending above the car roof from the heater proper. It offers absolute insurance against damage to the heater equipment or personal injury in the event of a broken trolley or other live conductor coming in contact with the upper portion of pipe.

THE PETER SMITH HEATER COMPANY'S NEW HOME

The Peter Smith Heater Company, Detroit, Mich., has recently purchased the buildings and grounds formerly occupied by the Grabowsky Power Wagon Company on Mount Elliott Avenue, adjoining the right-of-way of the inner belt line used by steam roads for interchange of cars. This new site comprises $8\frac{1}{2}$ acres, five buildings and side tracks to accommodate sixty cars. The main building, four stories in height, is of the Kahn system of reinforced concrete construction and contains about 75,000 sq. ft. of floor area. It is fully equipped with a sprinkler system, model heating plant and electric elevators. A portion of the second floor is devoted to suites of offices. The main office building, near the entrance to the property on Mount Elliott Avenue, is a one-story brick structure with oak interior finish. The other buildings on the property include a modern power plant and a one-story building containing 15,000 sq. ft.

The Peter Smith Heater Company plans to park the property surrounding the main office building, erect an ornamental fence as well as beautify the entire grounds in various other ways. The rapidly increasing heater business of this company has caused it to outgrow its old quarters, and the new plant will give it ample room to expand. It is said that the Peter Smith Heater Company now is the largest manufacturer of forced hot-air and hot-water coal heaters for electric railway cars in the world.

NEW TONGUE SWITCH AND FROG AT WHARTON'S

William Wharton, Jr., & Company, Inc., Philadelphia, Pa., have departed this year from the usual order of things, and instead of exhibiting a miscellaneous lot of track pieces with which railway men are more or less familiar, they have devoted spaces 626-634 to showing a few pieces, which, however, are entirely new. First among these is a tongue switch built on the principle of the Wharton heel-less switch, but with a larger bearing for the pivot portion of the tongue. The entire switch is of manganese steel, and the tongue pivot fits into a complete cylindrical bearing which is set back underneath a projecting portion and is therefore protected from the direct blow of the car wheel, a feature of this heel-less switch which has recommended itself to many. The tongue of this switch is reinforced throughout its entire length. The holding device consists merely of a piece of spring steel and a bolt and nut. This switch has been in actual service only a few months, but it has already been favorably commented upon by authorities on street railway track work.

Another new type of work is a solid manganese steel frog with a separate manganese steel center. The under surface of this center is ground true and rests directly on the larger manganese steel casting, which is also ground in the same way. The center is held in place by bolts and can be renewed without difficulty, as there is no spelter to melt out except that which surrounds the bolt heads, and to remove that is a small matter. Work of this type has been in satisfactory use for the past three years. Other new articles are Type "N" and "O" spring controlling devices which have been used for some months with satisfactory results. With these articles is exhibited one of the heel-less manganese steel center switches, as well as a complicated solid manganese three-way frog piece. All the manganese steel in this exhibit is of the noted "Tisco" brand, made by the allied Taylor Iron & Steel Company, High Bridge, N. J., which is the only American company making manganese steel under the original patents of the inventor, R. A. Hadfield.

The Forged Steel Wheel Company at space 538 has a novel demonstration of the uniformity of the steel used in the construction of its wheels. Two samples were made up from the top and the bottom of an ingot respectively and samples were taken from the webs at a number of points. Chemical tests on these showed great uniformity in carbon, the percentages being marked on the samples, the maximum variation being but 0.03 per cent. The company has on exhibition a variety of standard wheels designed for all classes of service, including a sample from a lot furnished the Interborough Rapid Transit Company and designed for three turnings. There is also a pair of wheels which were in service in Washington with a record of 197,000 miles. They are good for some service yet.

To eliminate the breakage of tungsten lamps and obtain a perfect control of light distribution, the George Cutter Company, South Bend, Ind., has developed the "Idealite" lighting equipment which it displays at the booth of the Western Electric Company. It is of interest to learn that this development had its origin in the tungsten lamp troubles of the Oliver Plow Works at South Bend. In the Cutter mechanism, crystallization of the tungsten filament is prevented by suspending the socket between six springs, three above and three below. Three bolts extending through the socket hold the springs in place and assure uniform tension regardless of the vertical adjustment of the socket or the weight of the shade. The shades and reflectors are of various materials and shapes as may be best suited for indoor or outdoor purposes. F. X. Cleary is on hand to demonstrate the economy of modern lighting.

Among the Exhibits

The Curtain Supply Company has an attractive exhibit of curtains and curtain fixtures in space 638.

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The Gulick-Henderson Company, inspecting engineer, Pittsburgh, Pa., is represented as usual by Henry Gulick.

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Edward H. Chapin, vice-president of the National Car Wheel Company, is looking after its interests at the convention.

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Although without an exhibit the E. W. Bliss Company, Brooklyn, N. Y., is represented at the convention by B. W. Stone.

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Representatives of the Railway Materials Company are entertaining their friends in their reception booth at space 535.

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Wylie Brown, general sales agent of the Bridgeport Brass Company, is present at the convention, looking after the interests of Phono-electric wire.

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The Vacuum Car Ventilating Company has a reception room showing blueprinted and printed matter on the Cooke system of car ventilation in space 539.

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The Protective Signal Manufacturing Company, Denver, Col., is exhibiting in space 133 its highway crossing protector. In addition to two fully equipped crossing standards, the company is showing the separate oscillator bell and signal light mechanisms.

* * *

J. W. Griffin, of the Wheel Truing Brake Shoe Company, says he has been attending every convention since the Boston meeting in 1898. He says that on his first offense, at Boston, he took forty-five bona fide orders from electric railway men, and that he still has nearly everyone of them as a regular customer.

* * *

The American Steel & Wire Company, Chicago, Ill., has on exhibit, at spaces 558, 559, 560 and 561, a machine for applying to a rail its well-known type of twin terminal bond, and also a vibration machine for testing the mechanical life of its bonds. The company is also showing its special galvanized woven wire fence for right-of-way fencing.

* * *

The Woods fare box is one of the interesting devices shown in the exhibit of the Holland Trolley Supply Company, space 357. This type of box has been in service in Illinois for several years and has proved very efficient. It has four compartments which automatically lock when withdrawn from the box. This box takes either coins or tickets. Other devices shown are the Holland ball-bearing trolley boxes, harps, wheels, etc.

* * *

The Herr Fender Company, New Orleans, La., is one of the new exhibitors at the convention. It has an exhibit of its motorman-controlled fender in space 530. The features of greatest importance are the light-weight, only 90 lb., and the lever which controls the drop device that is placed in line with the controller handle. The fender is carried 9 in. above the rail. The Herr fender is now in use in New Orleans, Shreveport and Baton Rouge, La., and in Laurel, Miss.

* * *

A new device, the automatic change maker, is exhibited in space 312 by the Rooke Automatic Register Company, of Providence, R. I. It consists of four tubes for quarters, nickels and dimes. With one stroke of the locking device

five coins are released, so that in the case of nickels change for a quarter can be obtained at one time. It was especially designed to accelerate change-making for the Rooke register and for fare boxes on prepayment cars.

* * *

In space 127 the Scientific Railway Appliance Company is showing the various safety appliances for cars. These include the motorman's valve which automatically drains the accumulation of moisture in the pipe line and prevents freezing and clogging of the air. This valve is of the piston type, which reduces the amount of packing otherwise necessary. Other devices shown include the conductors' control device, which places the control of the car in the hands of the conductor, and the Scientific automatic sander, which has attracted a great deal of attention.

* * *

"A fare collecting and accounting device for every service on city cars" is the slogan of the International Register Company in spaces 300-306. The company is giving demonstrations of the International coin register and the International money-counting fare box. The coin register combines in one machine a fare box, a coin-counting machine and a car register. The money-counting fare box is similar to the coin register except that the car register is omitted and the totalizer, showing the amount of money deposited, is located just above the money-counting mechanism.

* * *

A. C. Terwilliger, representing M. Welte & Sons, Inc., New York, is in charge of that company's automatic brass band orchestrion. Railway park managers who desire to furnish any variety of dance, popular or classical music at lowest cost and in a most agreeable manner should ask Mr. Terwilliger to give a demonstration on this instrument in Aquarium Court. That severe climatic conditions do not affect this orchestrion is shown by its performance under the severe conditions which obtain at a seaside resort like Atlantic City. The Charlottesville (Va.) & Albemarle Street Railway is one of the recent purchasers of these instruments.

* * *

A general line of apparatus for railway air-brake and industrial service is being shown by the National Brake & Electric Company in space 15. Special attention is being directed to this company's latest development in light-weight air-brake compressors known as type A-5B 18 ft. It retains all the excellent features of the standard A-5 type introduced two years ago and has proved satisfactory in every respect under service conditions. A new type of governor for controlling all classes of air compressors in both railway and general use and an improved type of motorman's brake valve and handle are also receiving unusual attention.

* * *

At the exhibit of the National Tube Company of Pittsburgh, located at spaces 554 to 557, there is a large array of devices and supplies of interest to street railway men, of which not the least important is the Kewanee union testing machine, used for testing unions to 125 lb. compressed air pressure under water. This is used in the Kewanee works, where specialties are manufactured under the trade name "Kewaunee." A piece of crushed National casing, concerning which considerable space has been used in the trade papers recently, is shown. This piece of casing withstood the tremendous shock due to the explosion of 120 quarts of nitro-glycerine, at the bottom of a 3000-ft. well, without showing the slightest fracture. Among the other exhibits are tubular steel poles, pole joints and an important trolley-pole testing machine. Several trolley poles are shown machined to show construction. One exhibit is a table top made from a number of pieces of Shelby seamless steel tubing. These items are mentioned simply to indicate the general nature of the exhibit, which contains samples of the standard products of the company.

The Lobbell Car Wheel Company, Wilmington, Del., is represented by F. A. Lex.

* * *

Edward J. Hunt, of Newark, N. J., is here furthering the interests of his transformers and transformer-oil purifiers.

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Mr. Richard F. Kruse is attending the convention in the interest of the C.-A.-Wood-Preserver Company, St. Louis, Mo.

* * *

The P. Edward Wisch Service, of New York and Electric-Railwaydom, is represented at the convention by its founder, P. Edward himself.

* * *

The J. W. Paxson Company, Philadelphia, manufacturer of Paxson's steel wire frog and switch brooms, is represented by John S. Gilbert.

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George H. Sanford, of Bridgeport, Conn., is present at the convention in the interest of his own business. George says that when "Bill" Dugan gets here there will be something doing.

* * *

In yesterday's announcement of the new herringbone gear recently perfected by the R. D. Nuttall Company and shown at spaces 142 and 144 the word "not" was inadvertently omitted. The advantages of the new gear are, of course, simplicity and the absence of pockets for the accumulation of dirt.

* * *

The Ackley Brake & Supply Company, spaces 117-119, is carrying on some interesting demonstrations of Monarch refillable fuses. Various sizes and types of refillable fuses are blown, refilled and blown again to illustrate their current-carrying capacity. Three types of fuses are exhibited, namely ferrule contact, screw clamp contact, and knife blade contact.

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C. H. Florandin, sales manager of the C. & C. Electric Manufacturing Company, Garwood, N. J., is crowding a week's work in two days among the electric railway men at the convention. Mr. Florandin expected to have one of the C. & C. electric arc-welding outfits on exhibit, but contract work kept this company's shops too busy to get out an extra set on time for this show.

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E. E. Daglisch is at the convention, having made a special trip from England in order to demonstrate the application of the "Limit Stop" brake staff, which is being exhibited by the Ackley Brake & Supply Company, spaces 117-119. George H. Anger has also come over from England for the purpose of demonstrating the application of the Anger improved automatic brake adjuster, which is being exhibited by the same company.

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W. Frank Carr, manager of the railway department of Parrott & Company, San Francisco, Cal., is attending this convention. Incidentally Mr. Carr is seeking additional agencies whereby his company will handle the Pacific Coast sales for reliable Eastern manufacturers. He was formerly the chief engineer of the Falk Company and before becoming associated with the latter company had a broad experience in the construction and operation of street railway properties.

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The National Tube Company has distributed paper drinking cups to the various booths bearing a photograph of a piece of the company's pipe, exhibited in its booth, which was crushed and twisted, but not fractured, by 170 quarts of nitroglycerine while in an oil well 3000 ft. below the surface. Moving pictures illustrating the complete process of manufacturing National pipe, from the mixing of the ore through the blast furnaces and up to the loading and

shipping of the pipe, are being shown on the screen in the ballroom at 11 a. m. and 4 p. m.

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The Pittsburgh Insulating Company, at space 529, has an interesting line of oiled fabrics, the basis of the coatings being refined linseed oil. By the process used in preparing the oil it is obtained in such condition that it does not injure the fabrics. The novelty of the exhibit is oil-treated canvas used in armature construction. The sample shown is 37 mills thick. This canvas has received favorable attention from the master mechanics who have called at the exhibit, as it is something for which they have felt the need. The company is distributing rolls of oiled bias-fabric tape such as is used in insulating armature coils.

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The great interest exhibited at this time in the use of anti-friction bearings and of improved rail joints makes a visit to the headquarters of Marburg Brothers, Inc., New York, one of exceptional interest. L. C. Marburg and John Bell are representing the company and are showing the S. R. O. ball bearings, the product of one of the oldest and largest ball-bearing factories of Europe. An important feature of this bearing is the design of the cage, which insures the guidance of the balls at the axis of rotation, while the openings near the outer edge assure free lubrication. These bearings are made in all standard sizes of annular and thrust types and special bearings will be furnished on request. Another product shown by the company is a novel rail joint with splice bar and wedges.

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The Duff Manufacturing Company at space 637 has examples of several effective designs in lifting jacks. The Bay State emergency jack, which during the past two years has been put upon a large proportion of the electric cars in Massachusetts, has been recently adopted in other states on a large scale. It is claimed that with this jack, which is provided with a drop-forged steel claw hanging near to the ground, a car can be raised to a height of several inches by two inexperienced operators in approximately a half minute. Another recent product is the high-speed ball-bearing jack equipped with the Cyclone lowering device. This is simply a worm gear attachment added to the standard bevel-gear connection between the ratchet and the nut. When a crank is inserted in the worm-wheel axle the load can be quickly lowered.

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More than usual interest attaches to the exhibit of the Railway & Industrial Engineering Company, with which is combined that of the Transmission Engineering Company. In view of the increasing attention being given to the outdoor, high-tension substation, the complete substation set up on the pier has great educational value as showing a self-contained equipment, which can be put together in a few hours by persons without previous experience. The station consists of a structural steel tower with three 50-kw outdoor transformers mounted on I-beams about half way up. Three high-tension switches are located on the top of the structure and arranged for operation from one lever on the ground level. In the indoor exhibit of the company, at space 609, samples of the switches for 30,000 volts and 60,000 volts are shown. The important feature of these is the arrangement used for eliminating torsional stresses in the insulators. Each knife blade is mounted on two pin insulators on a swinging arm, and an auxiliary break is made by a horn gap, which interrupts the arc finally. An ingenious arrangement of triangular-shaped choke coil and horn-type static interrupter is well worthy of study, as it is evidence of a successful effort to apply the same substantial construction and good mechanical design to overhead, high-tension equipment as is found in the older and better standardized low-tension apparatus.

George A. Parmenter is at the convention in the interest of Parmenter Fender & Wheel Guard Company, Boston, Mass.

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The Hon. W. B. Hoggatt, C. H. MacDonald and W. R. Kerschner are present at the convention in the interest of Keys Products Company, New York.

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The T. H. Symington Company shows at space 575 samples of 3¼-in. by 7-in. and 5-in. by 9-in. journal boxes. These are mounted on iron standards for convenient examination. A complete ball-bearing center plate is also exhibited.

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An additional feature of the exhibit of the National Lamp Works of General Electric Company is a collection of interesting photographs of lighted cars. These show the results from using National Mazda lamps and Holophane reflectors in contrast with the undesirable effects produced by bare clusters.

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The forces of the General Railway Signal Company, Rochester, N. Y., are divided this year between Atlantic City and Nashville, Tenn., where the annual convention of the Railway Signal Association is held this week. H. M. Sperry and Salisbury M. Day are with us, looking after the interests of the company at the convention.

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The McKay steel form for contract work is being exhibited by the American Concrete Form Company at space 607 of the G. Drouvé Company. This form offers many economical advantages to the builder of concrete structures and eliminates many of the disadvantages of the wooden form system. The company is represented by its president and sales manager, W. R. McKay, who is attending his first electric railway convention.

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The Western Electric Company is showing the Brookfield Glass Company's line of high-tension glass insulators. The various types, ranging from 600 volts to 60,000 volts, have proved of intense interest by reason of their practicability and economy. This is the first time a comprehensive exhibit of glass high-tension insulators has been made in this country, notwithstanding the fact that glass is standard practice abroad for high-power lines. The sales engineer in charge of this department of the Western Electric Company exhibit is H. C. Law.

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The Corliss Carbon Company, Bradford, Pa., has in space 513 a complete plant for testing the friction coefficient of carbon brushes. A large commutator is mounted in bearings and is driven at high speed by an electric motor. One end of the commutator is surrounded by a gas heater so that the commutator can be brought to any desired temperature. Electrical instruments are provided for measuring the electrical input to the motor with the brushes on and off. As the motor is large compared with the load the difference may be considered the power loss in the brushes. The normal brush pressure is 3 lb. per square inch, and at a commutator speed of 4,500 ft. per minute 75 watts are consumed by brushes having an area of 12 square inch. The friction coefficient of the railway brush recommended by the company is 6 per cent. At one side of the entrance to the booth is a mammoth dummy brush with an enormous imitation copper "pigtail."

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The Standard Steel Works Company, space 635, has fitted up its booth as a reception room with no materials on exhibit. The popularity of this company's products is exemplified from the fact that numerous samples of its wheels are scattered throughout the various truck exhibits of other companies. Steel tired wheels of "Standard" manufacture are shown in the Baldwin Locomotive Works exhibit in spaces 540, 542 and 600. Particular attention is called to the 22 in. bolted-section, steel-tired wheels which will be

exported to the Imperial Government Railways of Japan. The Hess-Bright Manufacturing Company, spaces 143 and 145, is exhibiting "Standard" rolled steel wheels. Bolted-section tired wheels of "Standard" manufacture will be found in the Railway Roller Bearing Company's exhibit, space 140, and "Standard," rolled steel, single mileage wheels are shown in the "Halsey" radial truck being exhibited just off the board walk opposite the exhibition pier.

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Several aluminum models of standard trucks, showing the latest improvements, are in evidence at space 536, the headquarters of the Standard Motor Truck Company. One model represents the truck with 6½-ft. wheelbase equipped with single hanger, pressed-steel side frames, and bronze ring center plate arranged for oil lubrication. These features may be considered typical of recent progress in the design of the trucks of the company. There are also models of trucks with 7-ft. and 4½-ft. wheel base. The company has perfected the joint having a parabolic head pressed into its seat by a spring which has been successful in reducing chattering in the brake gear. The exhibit also contains actual samples of single-roller and double-roller side bearings and the adjustable, hooded journal wedge.

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The Railway Track-Work Company, Philadelphia, Pa., has in operation at spaces 161 and 163 one of its reciprocating track grinders. This type has been in successful operation for eight years. It consists of an apparatus for grinding the rails by means of corundum blocks rubbed backward and forward at high speed under heavy pressure. The stroke is about 18 in. and there are four bricks 2½ in. by 4 in., giving a rubbing area of 40 sq. in. The Crocker-Wheeler motor of special design requires 5 amp at 500 volts and is rated at 3¼ hp. The claim is made that the reciprocating grinding action permits an economical surfacing of the rail-head because the grinder is operated until the hollows disappear and no longer. The grinder is provided with wagon wheels and a lifting device so that it can be derailed promptly.

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The Hale & Kilburn Company is represented by a large corps from the sales department, under the general direction of V. Von Schlegell and A. F. Old. The company occupies spaces 576 to 579, which is filled with a complete exhibit of all kinds of Walkover and stationary seats finished in leather, imitation leather, plush and rattan. Special features of this part of the exhibit are the operating mechanism and all-steel construction recently perfected by this company. The other exhibits give an indication of the wide range of products turned out by this company. They include pressed steel doors, suitable for city and interurban steel cars, the samples being selected to show typical designs called for by railways which have recently adopted all-steel construction for their new rolling stock. Superintendents of rolling stock will be particularly interested in the pressed steel moldings, panels and trim for city and interurban electric cars. These illustrate the wonderful progress that has been made in approximating and even improving upon the appearance of wood interior finish. Samples of the steel integral window finish largely used on steam railroad systems are also shown. These are now being taken by leading Eastern and Western electric lines. A full line of samples of rattan seat covering is also exhibited both lined and not lined. This exhibit is intended to demonstrate the performance of a new waterproof cement by means of which the canvas lining adheres so tenaciously to the cane as to render it doubly durable. The cement is said to free rattan covering entirely from the effects of bleaching processes, heretofore so largely used. As a whole, the Hale & Kilburn exhibit is as complete a demonstration of the products and processes of the company as could well be given, even in as large a space as that occupied.