

Street Railway Journal

VOL. XXIV.

NEW YORK, SATURDAY, OCTOBER 22, 1904.

No. 17.

PUBLISHED EVERY SATURDAY BY THE
McGRAW PUBLISHING COMPANY

MAIN OFFICE:

NEW YORK, ENGINEERING BUILDING, 114 LIBERTY STREET.

BRANCH OFFICES:

Chicago: Monadnock Block.

Philadelphia: 929 Chestnut Street.

Cleveland: Cuyahoga Building.

London: Hastings House, Norfolk Street, Strand.

Cable Address, "Stryjourn, New York"; "Stryjourn, London"—Lieber's Code used.

ST. LOUIS HEADQUARTERS:

Section 1, Electricity Building, Louisiana Purchase Exposition.

TERMS OF SUBSCRIPTION

In the United States, Hawaii, Puerto Rico, Philippines, Cuba, Canada and Mexico.

Street Railway Journal (52 issues)..... \$3.00 per annum

Combination Rate, with Electric Railway Directory and Buyer's Manual (3 issues—February, August and November) \$4.00 per annum

Both of the above, in connection with American Street Railway Investments (The "Red Book"—Published annually in May; regular price, \$5.00 per copy).....\$6.50 per annum

Single copies, Street Railway Journal, first issue of each month, 20 cents; other issues, 10 cents.

To All Countries Other Than Those Mentioned Above:

Street Railway Journal (52 issues), postage prepaid..... \$6.00
25 shillings. 25 marks. 31 francs.

Single copies, first issue of each month, 40 cents; other issues, 15 cents.

Subscriptions payable in advance, by check or money order. Remittances for foreign subscriptions may be made through our European office.

Copyright, 1904, McGraw Publishing Co.

Entered as second-class matter at the New York Post Office.

EDITORIAL NOTICE

Street railway news, and all information regarding changes of officers, new equipments, extensions, financial changes and new enterprises will be greatly appreciated for use in these columns.

All matter intended for publication must be received at our office not later than Tuesday morning of each week, in order to secure insertion in the current issue.

Address all communications to

STREET RAILWAY JOURNAL,
114 Liberty Street, New York.

The St. Louis Convention

In the last issue of this paper we published the papers presented at the three conventions in St. Louis, together with a report of the meetings of the American Railway Mechanical and Electrical Association and a digest of the meetings received by telegraph of the American Street Railway Association. In this issue we are enabled to present a full report of the latter meeting, together with an abstract of the proceedings of the Street Railway Accountants' Association of America and some particulars in the form of convention notes as to the features outside of the conventions proper which were of interest to the delegates.

The close of the twenty-third annual convention of the American Street Railway Association makes it possible to review the results of the meeting at St. Louis, which is also probably

the final meeting to be held under existing conditions. The most obvious feature of the St. Louis convention—in fact, the keynote of the meeting—was the unanimity with which all the members of the different associations accepted the idea suggested by Mr. Ely for a reorganization of the several bodies. This sentiment is in no way indicative of any decline, either gradual or recent, in the condition of the parent association. On the contrary, the meeting at St. Louis, in quality of papers presented, their discussion, and in attendance, compares favorably with any recent convention. It was the general feeling, however, that the association has latent possibilities of accomplishing much more for its members than it has in the past; that the immense opportunity for mutual benefit afforded by concerted action on the part of the interests represented can be directed into more fruitful channels, and that the work of the association need not be confined to the two days on which the meetings are held, but can profitably be extended throughout the year.

The proper form for reorganization is one which requires careful thought. On the one hand, there is no doubt that some of the most important subjects to be considered by the association are those which under a logical arrangement of the proposed programme would fall to the mechanical section or sections. These subjects would include power station design and management, the relative advantages and disadvantages of different forms of prime movers, new forms of track construction, etc. In fact, there is a host of similar and allied subjects relating to the mechanical department which are of vital interest to the companies, and many of which have been considered by the parent association in past years. The continual growth of the industry will simply accentuate the need for their further discussion. They certainly cannot be divorced from the consideration of the executive officers of the companies which send delegates to the convention, in spite of the fact that the subjects are purely mechanical or electrical in character.

On the other hand, all will admit that under the present arrangement the subsidiary associations have done remarkably good work. This has been due largely to the fact that in their small meetings, attended only by others engaged in exactly the same work, the delegates, whether they have been master mechanics or accountants, have felt free to discuss matters and describe their practice in their own ways and methods. Many of them are not practiced speakers, and it is doubtful whether if their meetings were attended in large numbers by the managers, they would feel as untrammelled in their discussions. As one master mechanic who has attended a great many conventions expressed himself, "In any managers' meeting the boys have always kept silent and always will." We mention this phase of the subject only to indicate the necessity of considering this natural tendency in any plan which may be adopted.

We have no doubt that the plan finally selected will satisfactorily safeguard every encouragement for debate, and at the

same time secure a much more efficient organization. The composition of the executive committee this year, representing as it does members who have been prominent in the councils of the various associations for a long time, insures the careful consideration of all possible plans of reorganization. We shall not at this time attempt to offer any suggestions to this end, but most cordially commend the suggestion made by President Ely that members use the columns of this paper during the coming year to discuss this question. In this way a solution will undoubtedly be reached which will satisfactorily conserve the interests of all.

The Officers for the Coming Year

We have already referred to the good fortune of the association in securing the retention in office of President Ely for another year, and while the re-election of the president of the association is an entirely new event in the history of that body, we believe that no one is better fitted for the task than the gentleman who now occupies the presidential chair.

The re-election of Mr. Penington as secretary and treasurer of the association was a popular one. The able administration of the finances of the association by the present secretary, his knowledge of the history of the association and his personal acquaintance with practically all of the members made him the association, as laid down by the recommendations of the nominating committee, contemplate the selection of a secretary who will be able to devote all of his time to the needs of the association. If this plan is followed, we imagine that the present secretary would hardly care to make the sacrifice which would be required of him from a pecuniary standpoint to administer the office of secretary of the association, but the association will be fortunate if it can retain his services as treasurer, and thereby secure the administrative ability which he has shown for this position.

The Proposed New Office

If the plan recommended by the nominating committee of appointing as secretary some one who shall give his entire time to the needs of the association be carried out, such an officer could be of immense benefit to the association at large. His duties would in no sense be confined to preparations for the annual conventions, although in that capacity he would be of immense advantage. Having his whole time at his disposal, he could arrange, in connection with the chairmen or secretaries of the different sections or divisions, the programmes and see that the papers to be presented shall cover all of the important as well as the latest developments in the art. One fault with conventions in past years has been that the papers have been prepared only a short time in advance of the meetings, and there has been little or no opportunity for members to study them carefully before going to the conventions. A secretary whose entire time is devoted to the duties of the association could take up the different topics with the authors a sufficiently long time in advance of the meeting to insure the completion of the papers and their printing and distribution to the members in season. He could also arrange with outside engineers when necessary to present papers or discuss topics of interest to the industry. The success of this plan in other bodies is ample proof both of its feasibility and desirability.

The activities of such an officer, however, would by no means be confined to the preparation for convention week or the actual days of meeting. As outlined by President Ely, he could be made the repository of a vast amount of technical, legal and

other data relating to the industry, and probably by following up this matter during the year could secure information which would be of great benefit to the association at large, and which could be available by them on demand; for instance, data in regard to wages paid, franchise conditions, accident laws and insurance rates, as well as on more technical subjects, such as power-house records, electrolysis conditions, etc., could be compiled, classified and made available. Such an officer should preferably be a railroad man, or at least one fully conversant with operating conditions, having a knowledge of what is wanted, combined with the ability to secure it. While he need not necessarily be an expert in all branches of railroad work, he should be sufficiently conversant with all departments to be acquainted with the questions which vitally interest each section. Such a person, we realize, cannot be selected in a moment, but we fully believe that when secured he will be of inestimable value to the association, and will certainly earn any salary which the association is able to pay him.

The Coming Year

The coming year promises to be a critical one in the history of the association, because during the next twelve months the plan which will determine the extent of the future usefulness of the association to the industry must be determined upon. The action taken at St. Louis was most satisfactory, in that it demonstrated the popularity of the reforms proposed by President Ely. It must be recognized, however, that it was a beginning only, and that the details of the proposed change will have to be settled by the executive committee during the year.

It must not be forgotten that in street railway work there are a large number of small companies in which one or two men have charge of several departments. In any national organization provision must be made for these smaller companies. If any considerable number of department organizations are to be conducted, their conventions should be arranged with a view to the convenience of the officers of the smaller companies who are likely to wish to attend the conventions of several departments. Further than this, the financial arrangements, such as the dues, should be such as not to preclude the participation of the smaller companies. As long as department associations are conducted independently, requiring a separate payment of annual dues for each association, it is practically certain that some of the smaller companies will not join some of the department associations; whereas, if a company could join the whole work by affiliation with the American Street Railway Association, it would strengthen both the parent association and the sections devoted to the various departments.

The expense of maintaining these various sections under the proposed plan will probably be nearly the same as before, when the departments were independent. As far as the operating expenses of the associations are concerned, therefore, there will be little economy to be gained by a consolidation. We think that the advantages from a financial standpoint come rather in the shape of increased gross receipts. Most small companies would more quickly pay \$100 to join an association covering every branch of electric railway work than to pay \$25 each for joining four different organizations. In the latter case, the chances are they would cut off one or more organizations, or fail to join any one, because of the multiplicity of associations. When electric railway companies have reached the number and size of steam railroad companies, the situation might easily be different, but as matters are at present, these considerations are entitled to a great deal of weight.

The Papers on Turbines and Other Prime Movers

The relative status of steam engines, steam turbines and internal combustion engines is a topic which we have so often considered in its various phases that we would not bring it up here save for the important papers read at the convention upon it. Three of them there were, dealing, respectively, with Curtis turbines in the smaller sizes, with Westinghouse-Parsons turbines and with Diesel oil engines. The first mentioned contained something of real novelty, in the consideration of direct-current turbo-generators. We have often pointed out the necessity of direct-current generation from turbines arising from the difficulty of taking full advantage of the underload efficiency of the turbine when handicapped by the necessity of producing alternating current. If the scores of small railway generating plants scattered over the country could feed their lines directly from turbo-generators, the average station efficiency would be very much improved. It is idle to talk of getting direct current from a rotary installed in the station as some engineers have, but if direct current can be generated as such, there is often something to be gained. Mr. Rice's description of the new machines was therefore much to the point, but we must confess to a certain feeling of disappointment at learning that in the small sizes at least the light load efficiency is not materially better than in the case of ordinary engines. In fact, working non-condensing, the steam consumption was very high, and even condensing it was somewhat abnormal. The generators were reported to give pretty successful commutation, in spite of the very high rotative speed, and the machines seem eminently convenient and workable. There are many cases in which they should prove valuable, although we regret that no economy data were given for the 300-kw size, the smallest listed as a 500-volt machine. Its speed was 1800, which is certainly not prohibitively high, and its economy ought to be far better than in the smaller machines described.

Mr. Bibbins, however, gave some most interesting details on a 400-kw turbine, unfortunately for alternating currents. The economy of this was pushed by superheating 182 degs. and using 28-in. vacuum, to 11.17 lbs. steam per brake-hp-hour at full load, which is quite the best figure we have yet seen for a turbine of anything near this size, and practically as good as anything obtained from turbines. If the d. c. turbine just mentioned can approach this figure it will prove a very valuable adjunct in railway service.

In the subsequent discussion some interesting facts were evoked. In particular, Mr. Mailloux bore witness to the successful operation of d. c. turbo-generators abroad, which leads us, in view of Mr. Rice's reports, to take a hopeful view of the situation here. One speaker gave a most interesting report of a competitive test between two 500-kw turbo-generators and two 500-kw generators coupled to Greene-Wheelock compound engines. Rather to his surprise, the latter gave better efficiency per unit at the switchboard and more advantage from superheating, although they experienced some trouble from lubrication in the cylinders, and on the whole, he approved of the turbines. This bit of experience brought out the fact which we have more than once impressed upon our readers: that the economic advantages of turbo-generators must be sought outside of their steam economy at normal load. From all the data at hand, it is clear that the compound, and particularly the triple-expansion engine, easily takes the first place in efficiency, even at the switchboard, as compared with the turbines in their present state of development. The latter, however, make a very strong showing in total cost of the power produced, particularly under varying load. The struggle is now one for im-

provements in both types of prime movers, and the issue is still uncertain. The turbine has so considerable an advantage in actual cost of construction that it is sure of an important field in any event.

Mr. Meier's paper on the Diesel oil engine was lucid and interesting, but from the total lack of exact quantitative data, scarcely convincing. There is no doubt whatever that this engine will run on wonderfully little fuel—say upon the equivalent of $\frac{3}{4}$ lb. of coal per brake-hp-hour. It seems to be reliable and to have avoided lubrication troubles, so far as the sizes already constructed are concerned. The largest output per cylinder thus far tried seems to be about 100 hp, and the 225-hp three-cylinder machines shown at St. Louis are so massive as to have a species of architectural effect. From an operative standpoint, however, the engine seems to be thoroughly good, and while apparently complicated and high in price, can compare favorably with an ordinary engine plant, including boiler and accessories. Looking at the subject in its larger aspects, one must admit that the desideratum in prime movers is one that can show high fuel economy in using ordinary grades of coal. This specification points rather to the gas engine with producer gas than to an engine using a special fuel like petroleum. Big gas engines are already in use with capital results, and while American engineers are disposed to look askance at them, they are working their way into practice in spite of objections. So far as electric generation is concerned, gas engines are already in successful use in units of moderate size. Their adaptability to heavy work, particularly with the nice regulation of instantaneous speeds that is requisite in the parallel running of alternators, is yet to be proved. So important is improvement in fuel economy that there will be a powerful incentive to keep at work on the gas engine until the problem of its larger use is solved. At present it has not reached as high a state of evolution as the steam engine—it gives a larger field for improvement in economy, even at its actual high efficiency. It must therefore be taken seriously, and engineers would do well to realize its possibilities instead of ignoring them.

The Exposition Railway Exhibits

It is needless to say that one of the chief advantages derived from the selection of St. Louis as a meeting place this year was the opportunity afforded for studying the street railway exhibits in the different Exposition buildings. No such collection of street railway apparatus has ever been made before in the history of the industry, and the departments of Electricity, Transportation and Machinery proved of the greatest interest to all in attendance at the convention. With the technical press replete as it is with descriptions of all new apparatus and improvements, it can hardly be said that the Exposition contained, in the transportation line certainly, any important new appliances with which the delegates were not at least partially acquainted. At the same time, the opportunity of personally examining a new appliance with which one had become familiar only through the press, was most helpful, and in the majority of cases the printed description served only to increase the interest in the exhibit shown. Many of the exhibitors arranged special demonstrations of their appliances for the benefit of those in attendance during the convention week. Unfortunately, it is not always, or even often, possible to hold a convention in a World's Fair city, but to many of the delegates the opportunity afforded of inspecting the collections in the palaces of Machinery, Electricity and Transportation was alone sufficient to repay them for the trip to St. Louis.

THE TERRITORY, CONSTRUCTION, POWER TRANSMISSION, SYSTEM AND ROLLING STOCK OF THE OREGON WATER POWER & RAILWAY COMPANY—I

The Oregon Water Power & Railway Company, of Portland, Ore., operates an electric railway system which has many interesting features, several of them being unique in traction development. Besides doing a large and profitable passenger business, it has worked up a freight traffic that has surprised

of power for the operation of the railway system. Since it was placed in operation in 1892 that part of the road from Milwaukee south to Oregon City has been operated directly from this power plant, and it undoubtedly was one of the first electric railways in the West to be run by water-generated power.

The northern end was operated for some time from a steam plant, but in 1894, on the completion of a 10,000-volt transmission line to Portland, a rotary converter was installed to feed the road, making the first instance of electric railway oper-

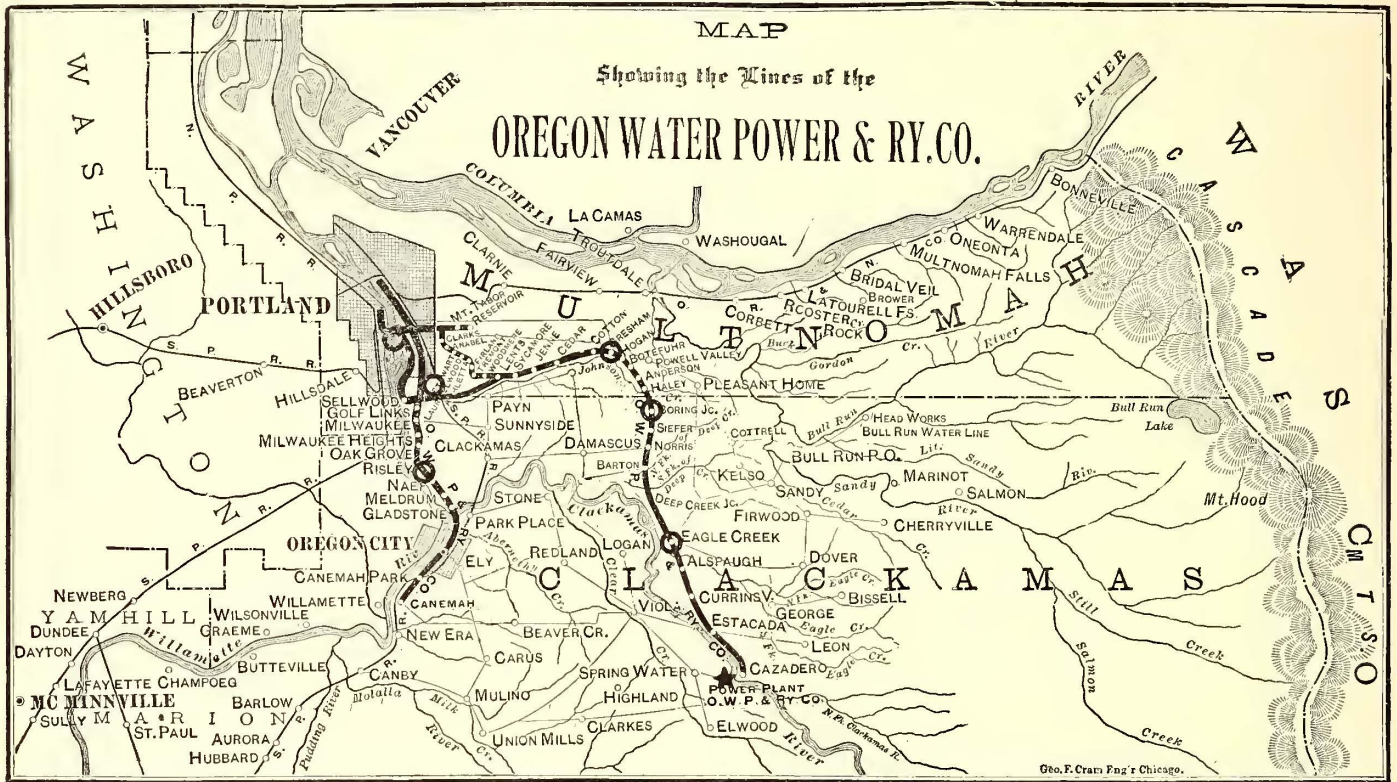


FIG. 1.—MAP SHOWING THE LINES OF THE OREGON POWER & RAILWAY COMPANY

even the owners of the property, while, with its terminal facilities and the excellent resources of the territory adjacent to the railway, this development may be said to have only begun. The company has a passenger terminal at First and Alder Streets, in the business center of Portland, and freight terminals in East Portland, and operates an interurban line through Oregon City to Canemah, suburban branches to Mount Scott and Mount Tabor Reservoir and an inter-line to Cazadero, on the Clackamas River. The map, Fig. 1, gives a general idea of the extent of the system.

The Oregon City Road is 15½ miles long and is the original line of the system, it having been constructed in 1892 by the Oregon City & Southern Railway Company. This company was afterward consolidated with the East Side Railway Company and the Mount Scott Railway to form the Portland City & Oregon Railway Company, which about two years ago was succeeded by the present corporation, the Oregon Water Power & Railway Company. The line to Oregon City parallels the Willamette River and passes through several prosperous towns and a rich agricultural section. Oregon City is one of the oldest cities in the State, as it is the site of several large mills and factories, and also of the water-power plant of the Portland General Electric Company, which controls the lighting and power business in Portland, as well as furnishing a large amount

of power for the operation of the railway system. Since it was placed in operation in 1892 that part of the road from Milwaukee south to Oregon City has been operated directly from this power plant, and it undoubtedly was one of the first electric railways in the West to be run by water-generated power.

The Cazadero line, or what is known as the Spring Water Division, which was opened for regular traffic in October, 1903,

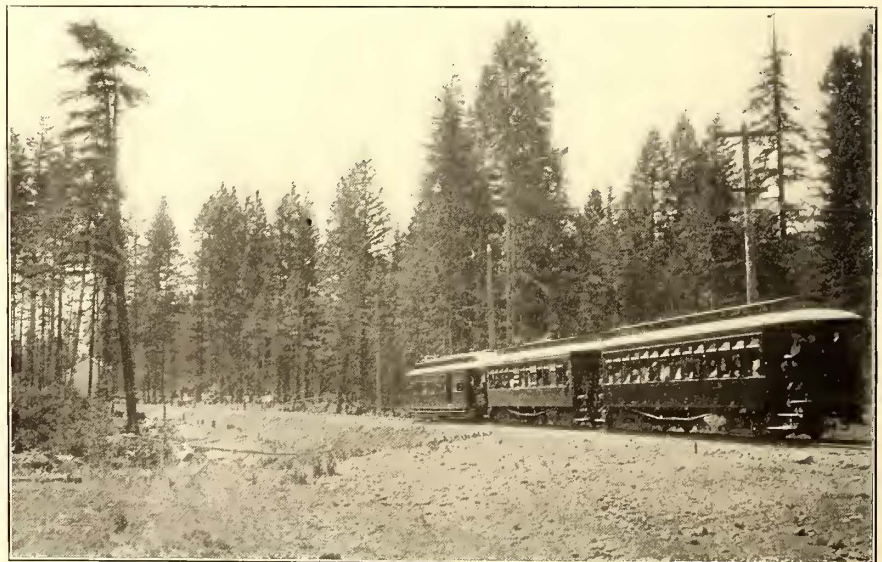


FIG. 2.—VIEW ON CAZADERO LINE OF OREGON WATER POWER & RAILWAY COMPANY

is now the most important part of the system. It is 38 miles long and passes through the valley of Johnson Creek, Eagle Creek and the Clackamas River, tapping a rich foothill region

west of the Cascade Mountains which had been only partially developed because of its lack of transportation facilities. Figs. 2 and 3 are views along this line. A large timber section has been opened up by the road and the freight traffic has been systematically developed until it now forms the major portion of the business of the company, and probably exceeds in amount that of any steam railroad of equal length in the West. Excellent and valuable water-front terminal properties are owned

As the Spring Water Division embodies the latest standards of construction of the company, its physical features will be described in detail. Fig. 4 illustrates the standard roadbed both for single and double track and for embankments and excavations. A 60-lb. 4½-in. T-rail, A. S. C. E. section, is laid in 30-ft. length with four-bolt angle-iron joints. Sawed fir ties 6 ins. x 8 ins. x 8 ft., spaced seventeen to a rail length, are laid over the greater part of the line, but where possible, on

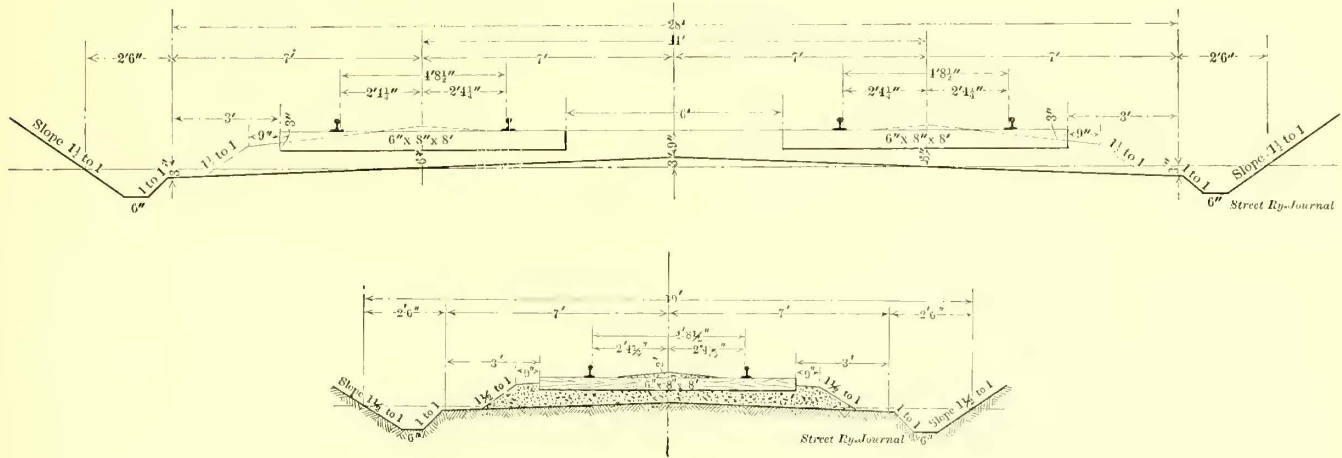


FIG. 4.—PLAN OF STANDARD ROADBEDS ADOPTED BY THE OREGON WATER POWER & RAILWAY COMPANY

by the company on the east bank of the Willamette River, in East Portland, and by means of a new branch line through Sellwood involving heavy and expensive construction, these terminal yards are placed in direct connection with all parts of the city. The development of the company's freight business is of especial interest, and will be treated in detail in what follows, as will also all of the principal engineering and operating features.

TRACK CONSTRUCTION

Outside the limits of the cities of Portland and Oregon City the company operates over a private right of way. On the new

the southern end, hewn fir ties were employed, they being obtained from the adjoining timber lands. The rail-joints are suspended and are laid even on tangent track, with nuts on the outside of the rail. On curves the joints are broken. The rails are bonded with Edison-Brown bonds and also with a home-made type consisting of solid copper wire. Open cattle-pits 8 ft. long have been adopted.

The track is well ballasted with a good grade of gravel, which was taken from the company's own pits along the right of way by means of a 3½-yd. Vulcan steam shovel, Fig. 5, and Roger ballast cars. The track was first laid on the sand sub-grade;

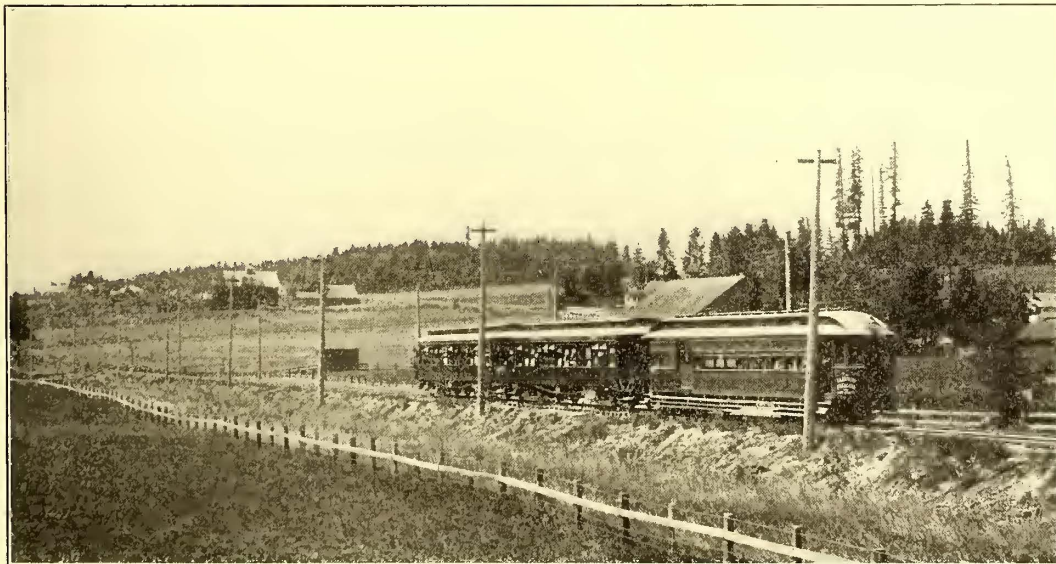


FIG. 3.—VIEW ON CAZADERO LINE NEAR GRESHAM, SHOWING MAIL CAR AND STANDARD TRAIN

line to Cazadero this is 100 ft. wide practically the entire distance, and is fenced in with a barbed-wire fence consisting of one board and four wires (three below and one above the board) with posts set 8 ft. apart. A single track is used to Cazadero with frequent sidings, but ample room is provided for a double track. About half of the Oregon City line is double tracked. There are 67 miles of single track operated by the company and it is all standard gage.

gravel was then dumped on and the track worked up 6 ins. A final surfacing coat 4 ins. thick was used to raise the track the required 10 ins. above sub-grade. On the finished roadbed the gravel is raised 2 ins. above the ties in the center and sloped off to the middle of the ties at the ends. In the fills, the roadbed is 14 ft. wide, and in cuts 22 ft., the slopes being 1½ to 1 in both cases. For double track a 28-ft. roadbed is used with 14 ft. between track centers. Wherever necessary, the track is cross-drained with vitrified sewer tiling in sizes from 8 ins. to 18 ins., placed at least 2½ ft. below sub-grade. Less than two tiles are never

laid at one point, and each is of sufficient capacity to take care of all the drainage. The section of Oregon through which the railway runs has a continuous rainfall during the winter season, and the fact that the track was not damaged during all last winter speaks well for its construction and drainage.

As the road was built primarily to handle heavy freight in carload lots, special precautions were taken with the alignment,

and at no point is there a curve greater than 3 degs., except at the dock terminal, where a 4-deg. curve is necessary. The maximum grade is 1.88 per cent compensated, 6000 ft. long, and is located on the divide between Deep Creek and Johnson Creek. The entire line was laid out so that the passenger cars could take all curves at a speed of 60 miles an hour. Figs. 6 and 7 give good views of the track and overhead construction.

SPECIAL TRACK FEATURES

As already pointed out, this railway was built to conform with the best standards of construction, and compares very

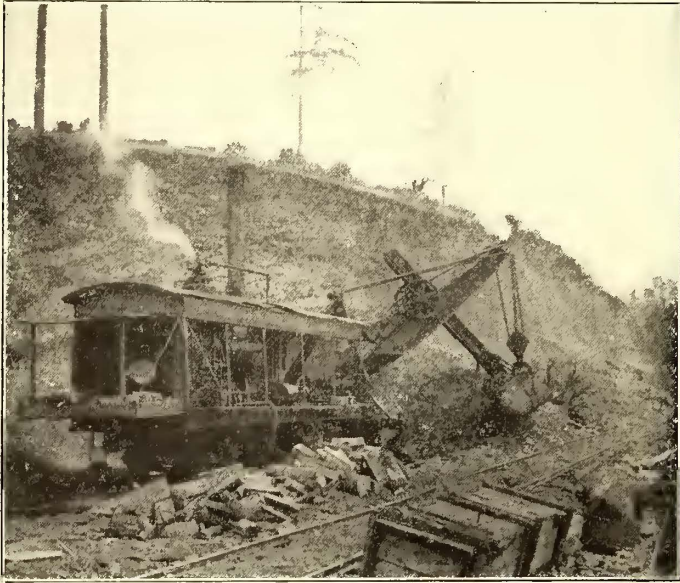


FIG. 5.—STEAM SHOVEL WORKING IN GRAVEL PIT DURING THE CONSTRUCTION OF THE RAILWAY

work could be finished or the track put in shape. The excavated material from the cut, amounting to 188,000 cu. yds., was



FIG. 7.—VIEW ON CAZADERO LINE, SHOWING STANDARD TRACK

favorably with the steam roads in that part of the country. The heaviest cut on the system is east of Sellwood, at Willsburg, Fig. 8, where an excavation about 50 ft. deep was made for a

hailed about a quarter of a mile and used to make a heavy fill across the valley of Johnson Creek. This fill, a portion of which is shown in Fig. 9, is about 35 ft. to 40 ft. high and 3200

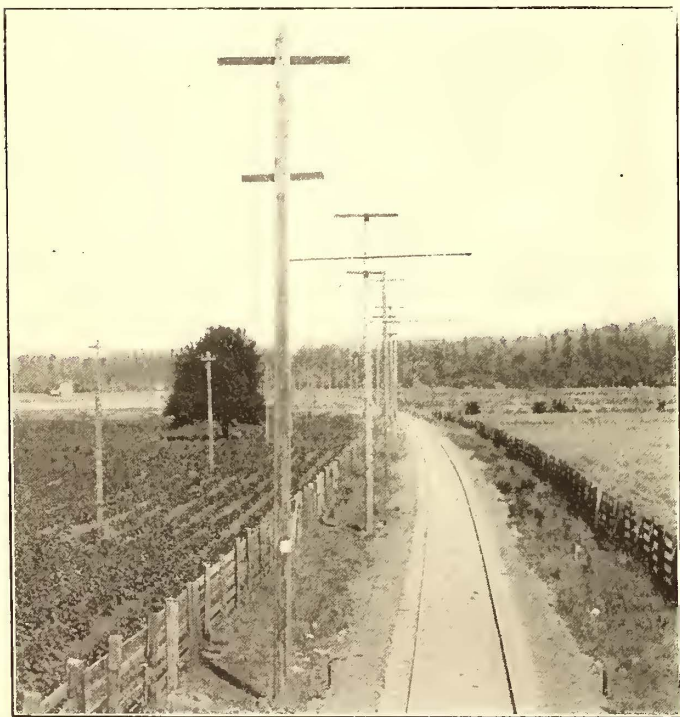


FIG. 6.—CAZADERO LINE IN EAGLE CREEK VALLEY, SHOWING STANDARD TRACK AND OVERHEAD CONSTRUCTION

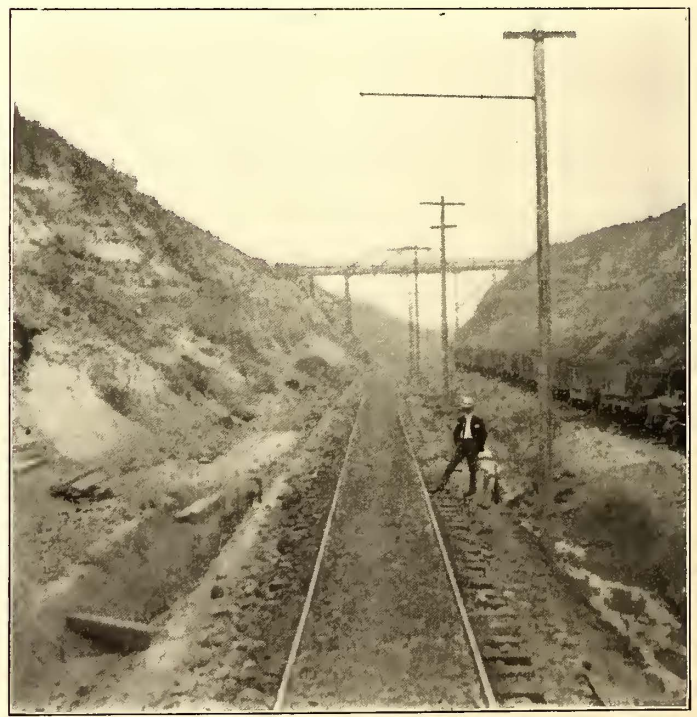


FIG. 8.—WILLSBURG CUT ON CAZADERO LINE 50 FT. DEEP FOR A DISTANCE OF 1800 FT.

distance of 1800 ft. Considerable difficulty was encountered in making this cut, as several good sized springs were uncovered, the water from which had to be taken care of before the

ft. long. Besides giving this branch a very easy grade, the fill serves to carry the track over the main line of the Southern Pacific Railroad. In fact, the Cazadero line has no grade

crossings except one with the company's Oregon City road, near Sellwood.

Probably the most expensive work on the system was the construction of the new line along the 4 miles of river front, from Sellwood to the company's freight terminal yards at the Madison Street Bridge. For 7900 ft. of the distance along the river bottoms a heavy trestle 20 ft. high has been built, and this is being filled in, except at one point where a creek channel has

were sawed off and toe-nailed 2 ft. below the new sub-grade, as indicated. New ties were distributed along the fill under the west side of the trestle. Then at 7 a. m. one morning about 120 men were put to work (this force being reduced at night to 82 men). The old rails were taken up and rolled over on the west side of the trestle, the caps were sawed off close to the third pile and the sway-braces on the east side were cut off



FIG. 9.—HEAVY FILL ACROSS JOHNSON CREEK VALLEY 35 FT. TO 50 FT. HIGH AND 3200 FT. LONG

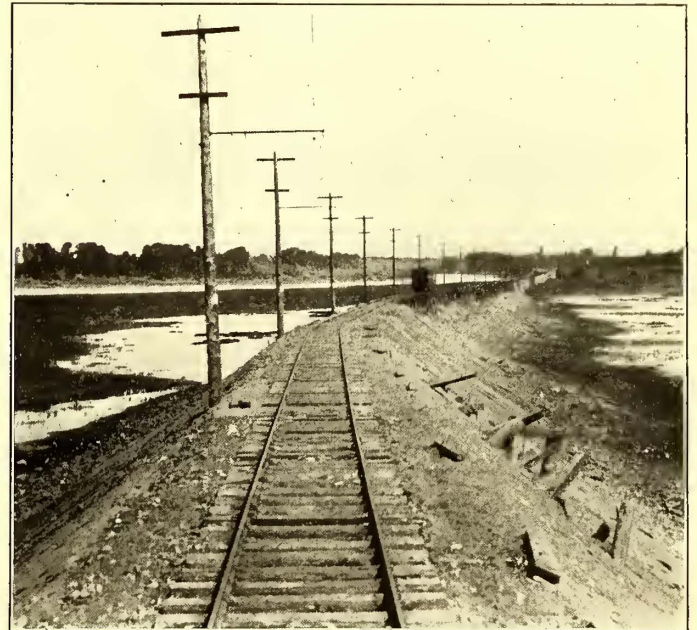


FIG. 10.—FILL AND TRESTLE ALONG WILLAMETTE RIVER BOTTOMS

to be maintained. Partial views of this trestle and fill are given in Figs. 10 and 11.

A very interesting and rapid piece of work has recently been executed by the company on its Oregon City line. Along the bottom land of the Clackamas River there was an old trestle which had been constructed when the road was first opened. It was 4700 ft. long and averaged about 40 ft. in height, the track being 15 ft. above high-water mark. The trestle was expensive to maintain, so it was decided to fill it in the entire

close to the top of the fill. Then every 1000 ft. the stringers and girts were cut, ropes were fastened to the cut-off sections and the whole tumbled down the embankment. This left the fill clear for the new track, which was rapidly laid with the new ties that were already at hand and the old rails, which were rolled off the standing part of the trestle. The five short bridges were cut off the required height, the trolley wire was lowered the necessary 12 ft., and twenty-two hours after the work was begun a car was run over the entire fill. Traffic was

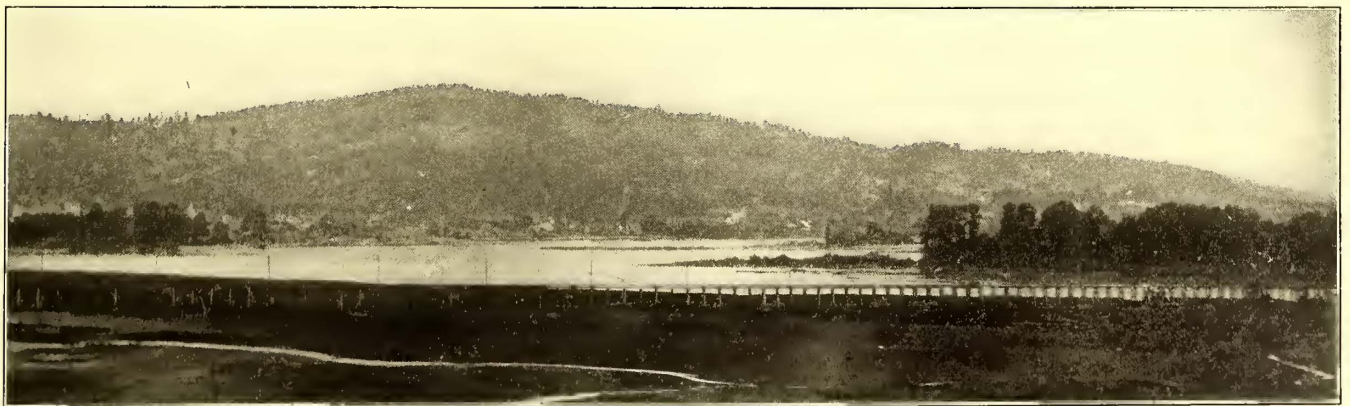


FIG. 11.—TRESTLE ALONG WILLAMETTE RIVER BOTTOMS

length, with the exception of five small bridges, and also to lower the track 12 ft., still leaving it 3 ft. above high-water mark. Accordingly the material was hauled on to the structure and the fill was made to the required height. Then the problem arose of cutting off the trestle, removing it and laying the new track with the least possible delay to traffic. This was successfully accomplished in the following manner: The trestle had been built for a double track, but only the east track had been laid, as shown in the sketch, Fig. 12. About a week before the final work the four piles of each bent under the track

thus delayed less than a day, certainly a remarkably short time for such a difficult piece of work. Fig. 13 shows the fill in its present condition. The rest of the trestle will be removed as opportunity offers.

On the Cazadero line the track crosses four good sized creeks, all of which flow through deep canyons. These streams are bridged by pile trestles which are remarkable for their height. That across Eagle Creek, illustrated in Figs. 14 and 15, is probably the highest bridge ever built with single piles. The structure is 760 ft. long and crosses the stream 95 ft. above

the water. The longest pile is 115 ft. in length, and all are set from 12 ft. to 15 ft. in the ground. Fig. 16 illustrates the construction and shows the design of the four-pile bents used on the banks and the six-pile and seven-pile bents in the deep portion of the bridge. The bents are spaced 16-ft. centers. Where it was deemed necessary, a seventh pile was driven in

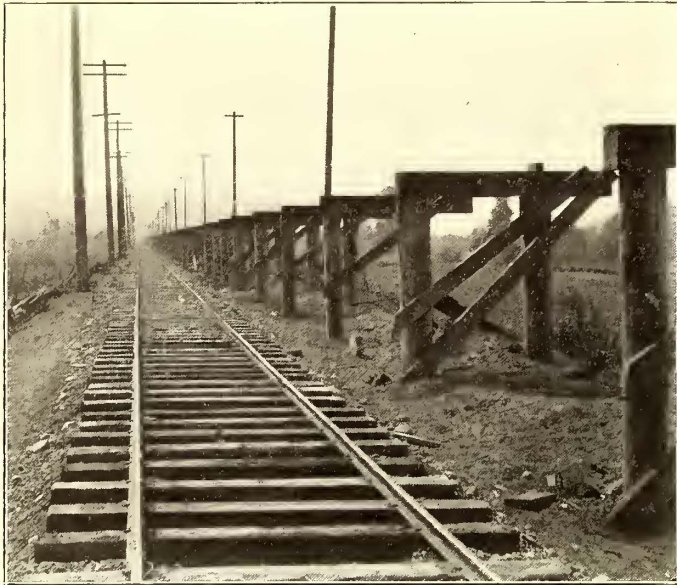


FIG. 13.—OREGON CITY FILL AND OLD TRESTLE AS CUT OFF

the center of the deepest bents. Some difficulty was experienced in driving the piles, as the material on the banks was a cement gravel, while that in the bed of the stream was a blue clay that cracked easily. No shoes were used, all the piles being driven with square ends by means of a 3800-lb. hammer. The piles are of excellent quality, and were cut on land adjacent to the track. It took but twenty-six days to drive the 216 piles, cut them off, put on the caps and sway-brace about half of them. The trestles across the North and South Forks of Deep Creek are, respectively, 60 ft. and 70 ft. high, and were constructed in a similar manner.

An interesting piece of special work is the crossing placed at the intersection of the Spring Water line with the double-track Oregon City line. The single track is on a 3-deg. curve and the double track has a curvature of 5 degs. Joints with spaces between the fillers and the webs of the rail are used, they being preferred to tight joints. Another special crossing is installed at Canemah, where the line crosses the Southern Pacific 10-deg. track at an acute angle.

OVERHEAD LINE CONSTRUCTION

For the single-track lines, a single-pole bracket construction is used for the overhead work, but on all double-track and at all sidings and stations side poles with span wire are employed. The poles are of extra fine cedar, some of them being 15 ins. to 18 ins. through at the butts, while all tops are 8 ins. or over. They are 41 ft. long and are set 6 ft. in the ground. Practically all the poles were cut on the timber lands along the line, while a few were even taken from the company's right of way. They are set on 100-ft. centers and are numbered consecutively, so that distances may be easily measured and locations readily reported by the train crews in case of damage to the track or overhead work. The poles were set by means of

a jib crane mounted on a flat car and operated by a donkey engine (Fig. 17), 140 poles being set in the holes by this means one day in ninety minutes, the derrick car being pushed by a steam locomotive. The No. 0000 grooved trolley wire is hung by cap and cone insulators from 10-ft. brackets of the Ohio Brass Company's manufacture, the wire being 22 ft. above the

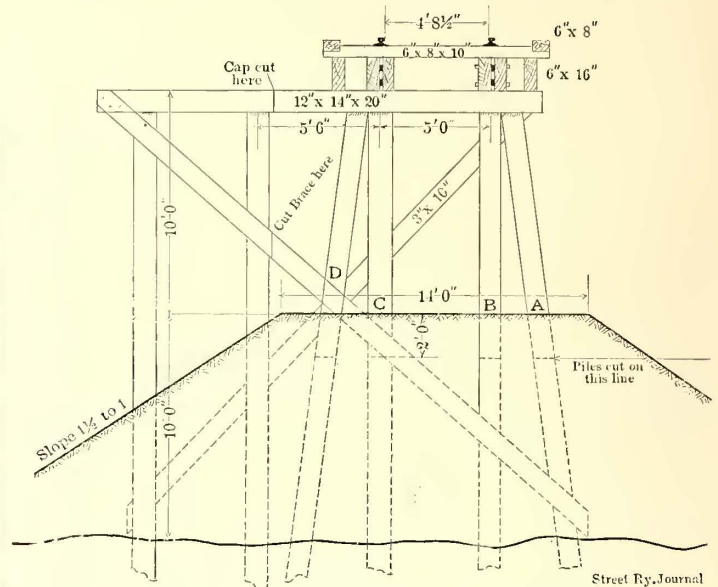


FIG. 12.—DETAILS OF TIMBER TRESTLE ON THE OREGON CITY LINE

top of the rails. Seven-strand $\frac{3}{8}$ -in. galvanized wire is used for spans. The feeder cables are carried on a cross-arm just above the bracket. At the top of the poles, 10 ft. above the trolley, an 11,000-volt three-phase transmission line is run from the power house at Boring in each direction to the sub-stations



FIG. 15.—EAGLE CREEK 95-FT. PILE TRESTLE

at Gresham and Eagle Creek. The wires are of No. 6 soft-drawn copper, two wires being mounted on a 6-ft. cross-arm and the third on the top of the pole. Cross-arms and pole-tops are treated with Carbolineum wood-preserving compound. Triple-petticoat glass Locke insulators of the Redland type are employed with eucalyptus pins. There is very little light-

ning in this section, so no arresters are used, except in the power houses.

PRESENT POWER SUPPLY

As already mentioned, the Oregon City line is operated with rented power, while the Spring Water Division is run from a steam plant at Boring, which feeds rotary converter sub-stations at Eagle Creek and Gresham. Another steam plant on the company's terminal property in East Portland feeds into the city lines of the system. This entire power supply is but a temporary one, with the exception of the two sub-stations, as the company is building a large water-power plant on the

sists merely of the extra steam and help necessary to run two small engines for driving the "hog" and the conveying system, as the fuel is given to the company by the operators of the

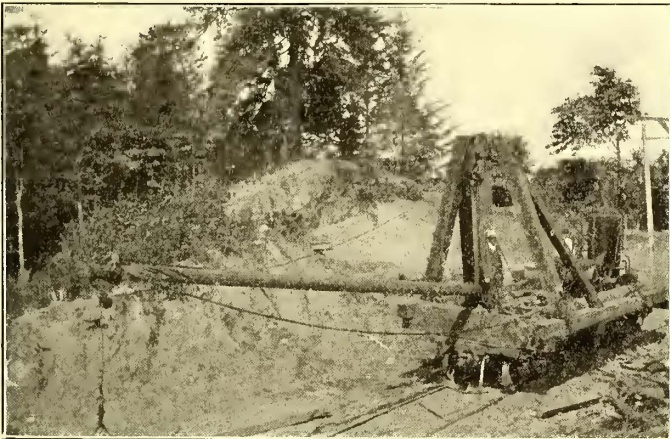


FIG. 17.—DERRICK CAR USED IN PLACING POLES AND FOR BRIDGE WORK



FIG. 14.—EAGLE CREEK PILE TRESTLE, 95 FT. HIGH (OLD COUNTRY ROAD BRIDGE AT LEFT)

Clackamas River near the Cazadero terminal, which will be more than sufficient to operate the entire road. Mention will be made of this water-power development later.

The steam plant at Boring is located adjacent to a saw-mill,

saw-mill, provided it is carried away. The hog is a rotary chopper which chews the slabs, edgings and other waste pieces from a mill into small bits, that, together with the sawdust, can be easily handled by the conveyor. This latter consists of an

endless chain with cross-bars every 4 ft. sliding in a 9-ft. trough. It carries the chewings to the top of the large storage bin shown in the center of Fig. 18, where they are dropped through trap-doors in the bottom of the trough at any required point, or are delivered into another conveyor which empties into the boiler room, and directly into the furnaces if desired. Enough chewings are usually obtained from the mill to supply the steam station in East Portland. These are carried by a cross-conveyor and emptied into a car on the track outside the plant, which is then hauled directly to the other station.

The boiler equipment at the Boring plant consists of four 60-in. x 16-ft. Erie City tubular boilers. They are equipped with Dutch oven furnaces, so that they can be fed from the top with the sawdust and hog-chewings. Slabs and cord-wood can also be fed from below by hand. The hog-chewings make a fairly good fuel, except that they sometimes clinker badly on account of the stone and dirt in the slabs.

In the engine room, Fig. 19, is a 22-in. x 44-in. double Corliss engine with 20-ft. fly-wheel, which drives by means of a compounded rope drive a 600-kw revolving-field Stanley alternator. This generator is excited by a 10-kw Northern belt-driven machine and delivers 11,000-volt 33-cycle three-phase cur-

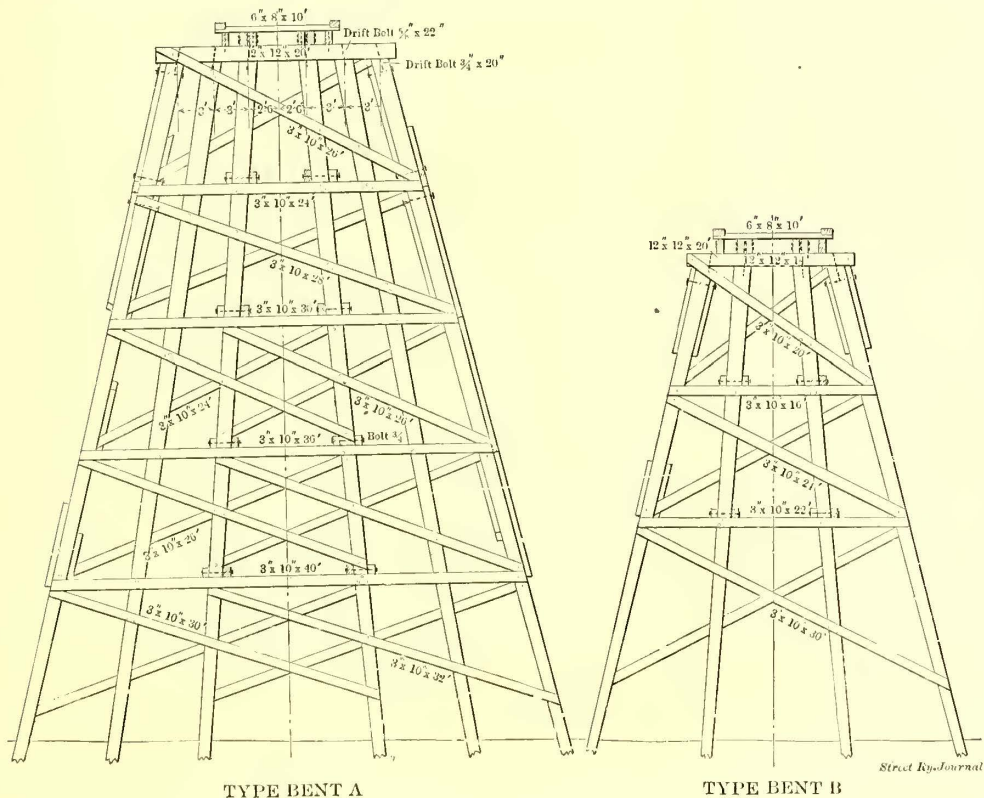


FIG. 16.—DETAIL OF BENTS OF BRIDGE NO. 21 AT EAGLE CREEK

from which it gets all its fuel in the shape of sawdust and "hog-chewings." Wood is practically the only fuel used in Oregon, because it is comparatively very cheap. There are probably few, if any, power plants in the country which can show as low a cost for fuel as this one at Boring. The entire cost con-

rent directly to the transmission line, feeding the sub-stations. The current is handled by a gray marble switchboard, Fig. 20, equipped with Stanley instruments and switches. A 400-kw Bullock 650-volt direct-current generator is now being installed on the extended shaft of the alternator to feed into the line at Boring. When the water-power plant is completed the alternator will be operated as a synchronous motor to drive the direct-current generator, making the plant a sub-station.

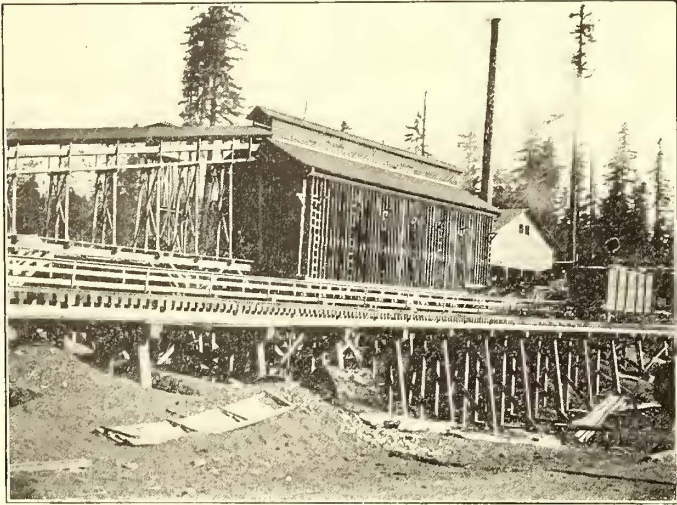


FIG. 18.—BORING TEMPORARY STEAM PLANT, SHOWING SAWDUST CONVEYOR AND STORAGE BIN

The steam equipment will probably be maintained as a reserve.

The East Portland station, which is also temporary, is equipped with five Babcock & Wilcox water-tube boilers provided with Dutch oven furnaces in which the sawdust and hogchewings from the Boring mill are burned. A stock bin and set of conveyors similar to those at the other station are installed. Water of excellent quality for the boilers is pumped



FIG. 23.—SITE OF DAM ON CLACKAMAS RIVER AT CAZADERO WHERE 25,000 HP IS TO BE DEVELOPED

from the Willamette River into a tank, from which it flows by gravity to the heaters and boilers. The generator equipment of 550-kw units consists of three Edison bipolar machines driven by a Wright-Corliss 24-in. x 48-in. engine, with a 20-ft. fly-wheel.

SUB-STATIONS

The two sub-stations at Gresham and Eagle Creek which feed the Spring Water line from Lents to Cazadero have been designed as permanent stations, and are built substantially of

brick and concrete. Fig. 21 illustrates the Eagle Creek sub-station and also the freight and passenger depot, while the drawing, Fig. 22, gives the design of the sub-station. The building is divided into a transformer room 12 ft. x 22 ft., and a room for the rotary converter and switchboard, 22 ft. square. An 8-in. wall separates the two rooms. The equipment of each station consists of a 400-kw 600-volt d. c. rotary, a two-panel switchboard and three 150-kw water-cooled, oil-insulated

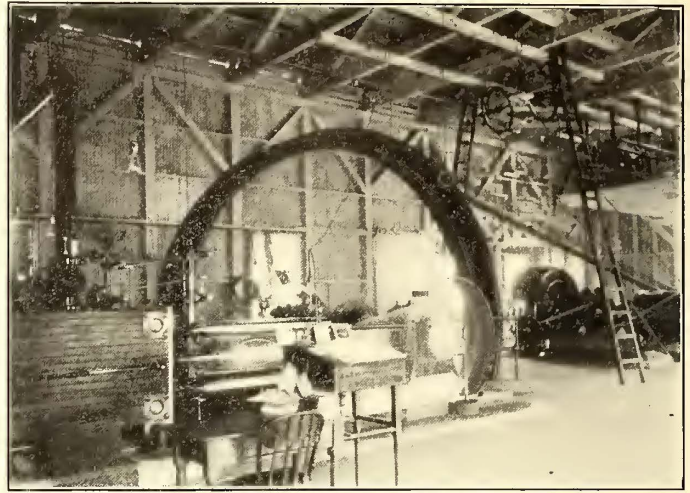


FIG. 19.—INTERIOR VIEW OF BORING STATION, SHOWING DOUBLE CORLISS ENGINE WITH 20-FT. BELTED FLY-WHEEL

transformers, all of the Stanley manufacture. At the Eagle Creek station water is scarce, so the transformers have been set in concrete pots, from which the water is drained into a well and used over again. The attendant at each of the sub-stations, besides doing the operating, attends to the depot and handles tickets and freight.

After the power is available from the Cazadero plant the

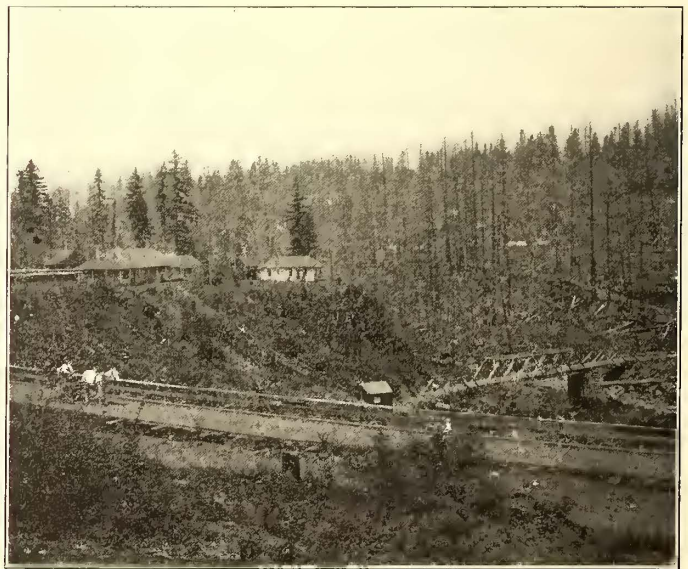


FIG. 25.—THE COMPANY'S "LODGE" ON THE CLACKAMAS RIVER AT CAZADERO

system will be operated entirely from six sub-stations. Two of these will be the present stations at Gresham and Eagle Creek, the third will be the Boring plant, while new stations will be erected at the terminal yard in East Portland, at Sellwood and at a point on the Oregon City line near Oak Grove, as indicated in Fig. 1. The standard equipment for these sub-stations will be rotary-converter units of 400 kw each, and as many such units will be installed at the different points as needed. They will all be fed from a 11,000-volt transmission line carried

along the right of way on the trolley poles. A portable sub-station consisting of a rotary mounted on a car will also be equipped for use whenever and wherever necessary.

CLACKAMAS RIVER POWER PLANT

The water-power development on the Clackamas River, which is now being energetically prosecuted, will have an ultimate capacity of 25,000 hp, although but 10,000 hp is to be de-

veloped at the outset. Some of the features of the plant are of unusual interest. The water will be raised by a dam at a narrow point in the river, Fig. 23, to a height of 60 ft., and then diverted into a canal about 1 mile long, which will empty into a large reservoir just above the power house, and from which an effective head of 125 ft. will be obtained. The permanent dam will be 60 ft. high, 240 ft. long on the crest, 92 ft. wide at the river bed, and will be built of concrete

and masonry. As an expensive coffer dam would have been required to permit work being carried on during the flood season, it was decided instead to build a temporary log-crib dam 1000 ft. above the site for the permanent structure. This log dam is being constructed of heavy timbers, will be filled in with rock and will serve as an excellent coffer dam, diverting all the water into the canal during nine months or more of the

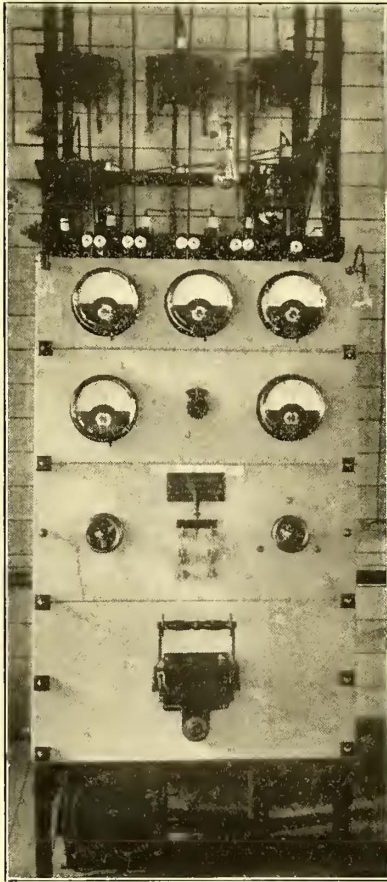


FIG. 20.—SWITCHBOARD AT BORING STATION

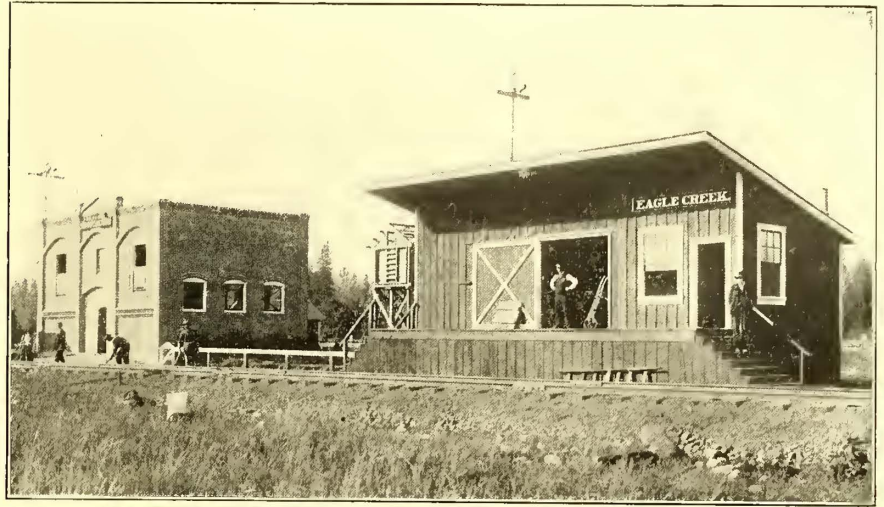
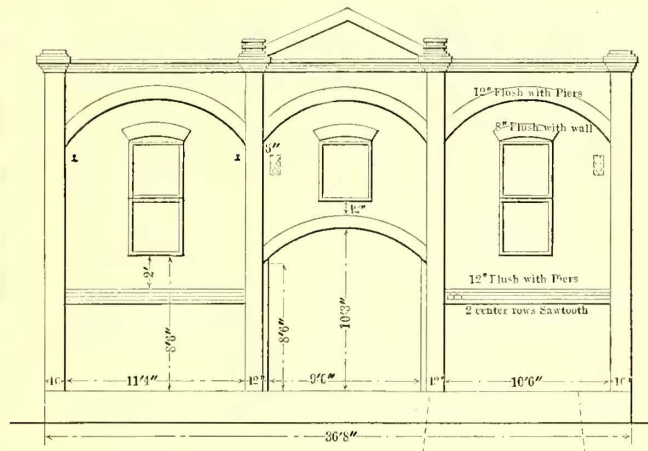


FIG. 21.—EAGLE CREEK SUB-STATION AND DEPOT



Foundation for Stanley 400 K. W. Rotary.

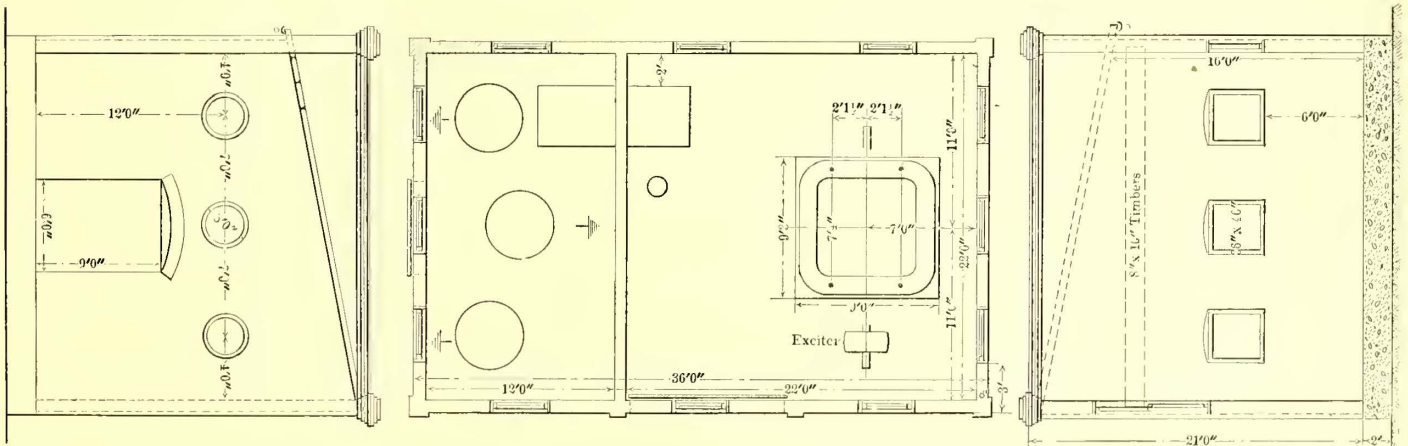
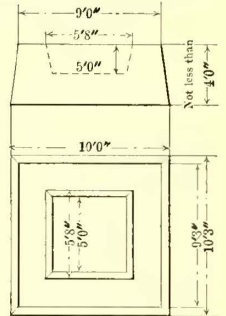


FIG. 22.—SUB-STATION OF THE OREGON WATER POWER & RAILWAY COMPANY AT EAGLE CREEK

veloped at the outset. Some of the features of the plant are of unusual interest. The water will be raised by a dam at a narrow point in the river, Fig. 23, to a height of 60 ft., and then diverted into a canal about 1 mile long, which will empty into a large reservoir just above the power house, and from which an effective head of 125 ft. will be obtained.

The permanent dam will be 60 ft. high, 240 ft. long on the crest, 92 ft. wide at the river bed, and will be built of concrete

year, so that a dry river bed will be available for carrying on the permanent work below. The temporary dam will be 140 ft. long at the base and 250 ft. at the crest, 50 ft. high and 160 ft. in width at the base, thus giving it a factor of safety of over 3. The slope of the up-stream side will be 3 to 1. It will be divided into seven cribs in the direction of the stream, and the foundation logs used for starting the cribs are remarkable for their size, being 140 ft. in length, thus reaching

from bank to bank. The logs are all cut on the company's own property within half a mile of the site of the dam, and were hauled to the river and into the stream by wire cables and donkey engines. The cribs of the dam will be filled with rock from the adjacent banks, most of which can literally be rolled down hill directly into the cribs, thus making the cost a minimum. The contents of the dam will be about 35,000 cu. yds. The life of the log structure is estimated at twenty years, but after it is completed the work will be begun on the permanent

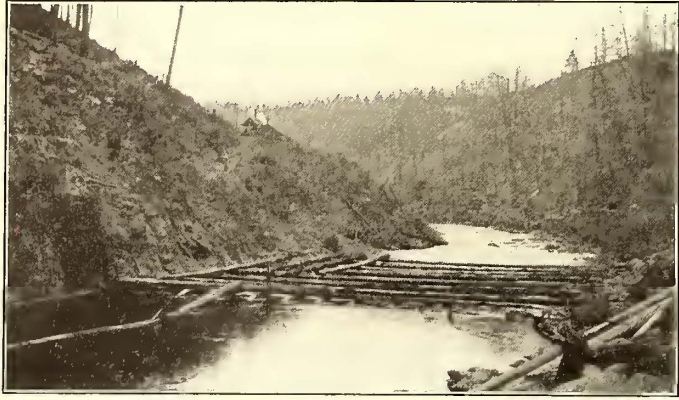


FIG. 24.—FOUNDATION CRIBS OF CAZADERO LOG DAM

masonry dam. Fig. 24 shows the foundation crib of the log dam.

A lake or reservoir about 7 miles long will be created by the dam, and the water will be diverted at the south bank into the ditch or open canal leading to the fore-bay reservoir. This canal will be 28 ft. wide on the bottom and 12 ft. deep, and will be built on a grade sufficient to give a velocity of about 6 ft. per second. Its construction will be permanent, and no

mentioned later. Fig. 25 illustrates the company's "Lodge," which has been erected on one corner of the plateau for the use of the officers and engineers. Across the river through the trees may be seen the station buildings at Cazadero.

The power house will be located on the edge of the Clackamas River below the lower end of the reservoir, where a sheer bank 125 ft. in height will be utilized for the development of water by means of turbines. The initial installation will consist of three 2500-kw direct-connected units and room will be left for two additional units of the same capacity. These machines will generate a 2200-volt 33-cycle three-phase current. An interesting feature will be the transmitting of the entire product of the station at machine voltage across the river, a distance of 350 ft., where will be located the step-up transformer house. Here all the power that is needed for the operation of the company's electric railway system, probably from 1500 hp to 2000 hp, will be raised to 11,000 volts and fed into the transmission system, supplying the six sub-stations already mentioned. The remaining power the company is already under contract to sell to the Portland General Electric Company, whose water-power development at Oregon City has now reached its maximum capacity. It will be raised to 33,000 volts and carried by a double-pole line directly across country a distance of 22 miles to a new distributing station at Sellwood, which the two companies will operate jointly. This station will also embody the new Sellwood sub-station for the railway company. Thus, instead of being a purchaser of power from the Portland General Electric Company and also having to depend on temporary steam plants, the Oregon Water Power & Railway Company will operate its system with its own water-generated power and will sell its surplus current for lighting and power uses in Portland. It will take about a year to complete the Clackamas River plant and its cost will involve an expenditure of about \$1,000,000. The entire plant has been designed by

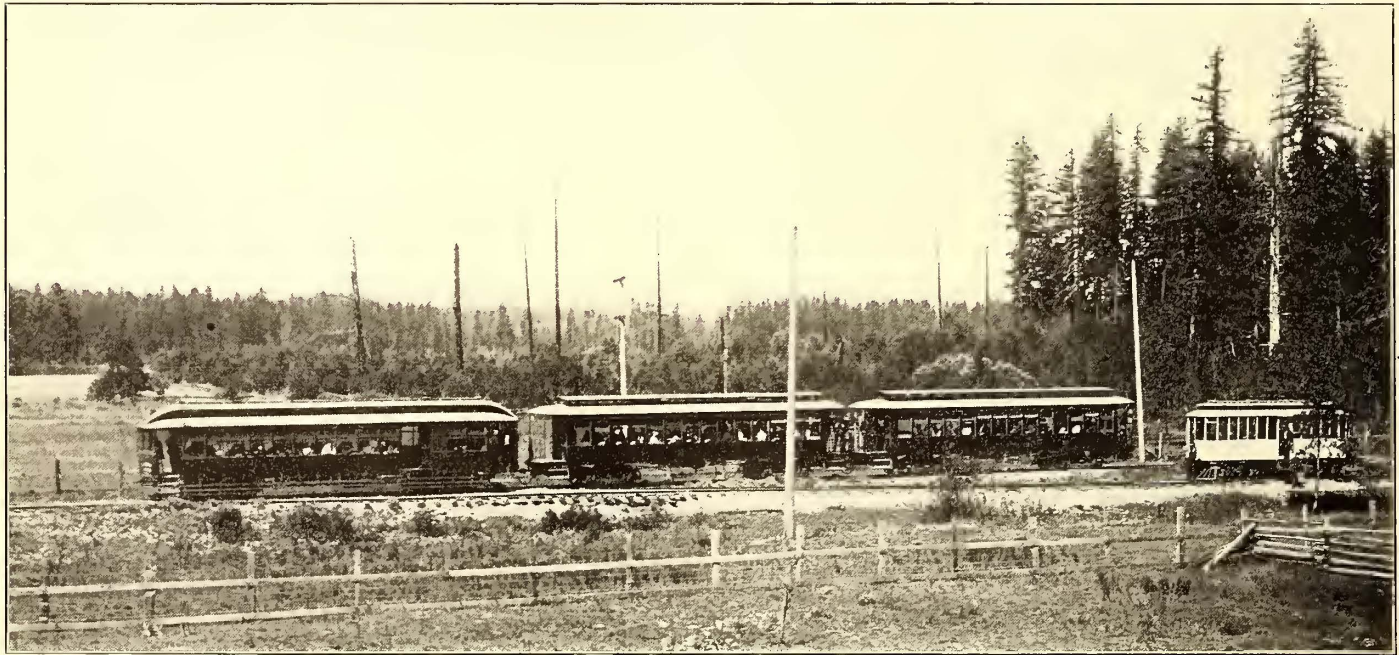


FIG. 26.—STANDARD PASSENGER TRAIN AND PRIVATE CAR "PORTLAND," ON CAZADERO LINE IN EAGLE CREEK VALLEY

difficulties are anticipated, as it will follow an easy slope along the river bank, which at its lower end broadens out into a level plateau. At a few points concrete retaining walls and sections of flumes will be necessary. The plateau at the end of the ditch covers 90 acres and is to be utilized as a large open reservoir. It will be excavated down to hard-pan, an average depth of 12 ft., and will thus hold enough water to help out on the daily peak loads and also to operate the entire plant at its maximum capacity for ten hours in case of accident to the ditch. A novel use of this reservoir for logging operations will be

the company's chief engineer, G. I. Brown, and the work is being carried on under his immediate supervision.

ROLLING STOCK

For its passenger equipment, the Oregon Water Power & Railway Company uses twenty-nine standard passenger motor cars with seating capacity ranging from forty-four to fifty-six, and nineteen standard trailers, whose seating capacity varies from thirty-six to seventy-five and ninety. The motor cars will average 20 tons in weight. All are mounted on double trucks, and six of the motors and six of the trailers are of the Brill

semi-convertible type, the others being closed cars. A recent shipment of the Brill cars was illustrated and described in the *STREET RAILWAY JOURNAL* of July 9, 1904. Four of the motor cars are equipped with baggage compartments, and on one this compartment has been changed over for a standard railway mail-car service. The trucks employed are of the Brill 27-G and the company's own types, the latter being of simple construction with I-beam frame and wooden swing-bolster. The four cars, which are equipped with baggage compartments, are provided with combination automatic and straight air-brakes, the automatic system being used when the cars are employed to haul one or more trailers. A customary train on the Cazadero line comprises one motor and two trailer cars, as indicated in Fig. 26. The other motor cars are equipped with straight air-brakes, all the straight-brake equipments being of the Christensen type as manufactured by the National Electric Company, of Milwaukee. Brill type of brake-shoes are used throughout. All motors on the passenger cars are either of the GE 57 or Stanley 401 type. Six of the cars have four-motor equipments and the others two motors.

Standard 33-in. solid-web wheels with $1\frac{1}{8}$ -in. flange and 4-in. tread are used on all of the equipment. The cars are provided with Wagenhals arc headlights, and when the city streets are reached a circular cloth screen is dropped over the light, in order to diminish its brilliancy. Around the edge of the disc is printed in black letters the destination of the car, and this can be easily read at a considerable distance. Standard tail lights are used on all interurban cars at night. Portland does not have the severe cold winters of the East, but it is frequently quite cold, and heaters are necessary in the cars. At present a home-made type of heater is used consisting of a cast-iron grid

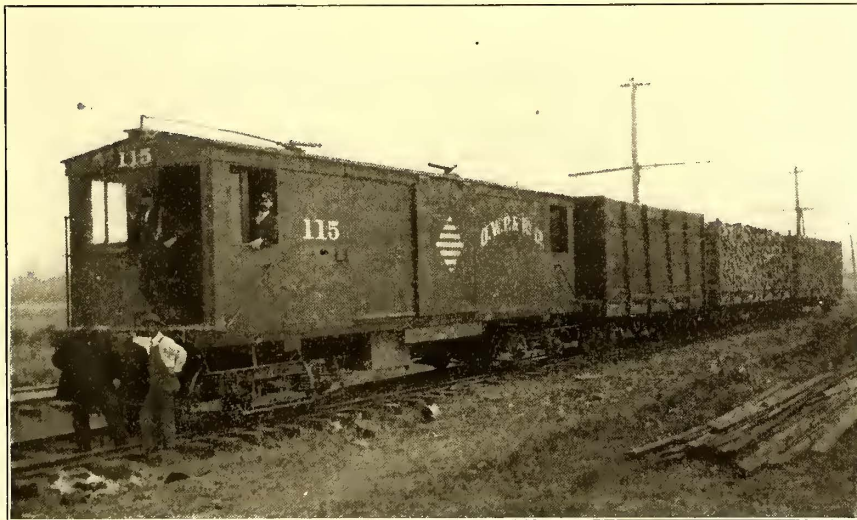


FIG. 27.—STANDARD FREIGHT MOTOR CAR WITH LOAD OF SAWDUST AND CORD WOOD

covered with asbestos paper and wound with broom wire. The company has a parlor car called the "Portland," shown in Fig. 27, which has been fitted over from an old car that was thought to be worthless. It is used by officials in inspecting the road and for private parties.

The freight equipment of the road at present comprises twenty box-cars and 137 flats, all M. C. B. standard, with patent couplers and air-brakes and having capacities ranging from 30,000 lbs. to 50,000 lbs. These cars are built by the company at its own shops, and the experience has been that the cars could hardly be built fast enough to meet the demand for the increasing freight traffic. For handling the freight equipment four electric freight motor cars have been built, they being of the type illustrated in Fig. 27. A 40-ft. box-car is used with motorman's cabs enclosed at each end. These cars are equipped with four GE 73 motors, and can haul a heavily

loaded freight train of several cars over any part of the line. The company has three steam locomotives, which were purchased for constructing the new lines and also in switching and hauling freight before the electrical equipment was completed. One or two of these locomotives will be kept by the company

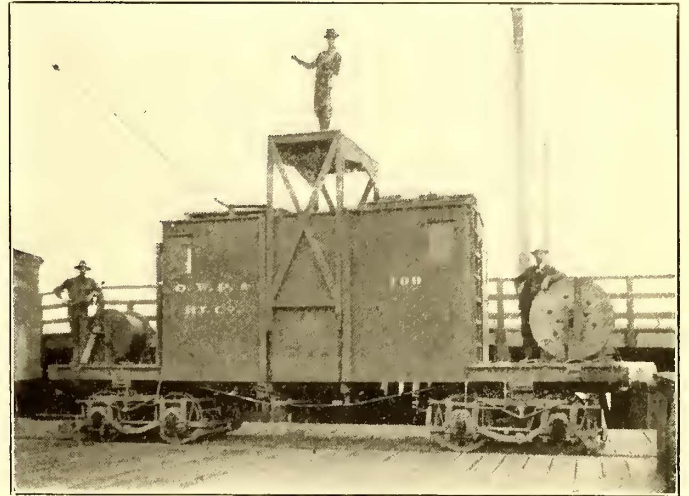


FIG. 28.—LINE CAR USED BY THE OREGON WATER POWER & RAILWAY COMPANY

to carry on future construction work and also to serve as a reserve in case of serious accident to the electric railway.

In the way of special equipment, the company owns seventeen Rogers ballast cars, which were found of great service in ballasting the line; the $3\frac{1}{2}$ -yd. Vulcan steam shovel already mentioned; a pile-driver with 2800-lb. hammer, operated by a $12\frac{1}{2}$ -hp donkey engine; a tool or "Jerry" car, and three bunk cars used for the construction gangs. There is also a McGuire rotary snow-plow, which, by the way, has only been needed once during the last three years. The street sprinkler, which the company built in its own shops, is used on all the streets over which the company operates. It consists of a large tank mounted on a flat car, and has swinging arms 10 ft. long, by means of which the entire street can be sprinkled at once. A car which has been found to be very useful in the company's construction and repair work is the line car, illustrated in Fig. 28. It has a closed portion about 15 ft. long, with a tower which can be raised above the center. Reels of trolley wire may be mounted at each end, and when necessary arranged for stringing the wire alive. The car is equipped with two WP 30 motors. Another piece of equipment which has done good service for the company is the derrick car, Fig. 17, used in setting poles and for bridge work, etc.

The Lake Shore Electric Railway Company has arranged a winter schedule which it is claimed will reduce the present car-mileage by about 2000 miles per day without affecting the efficiency of the service. Instead of giving hourly headway over the entire line with three limiteds each way in addition, the new schedule provides for two-hourly headway from Cleveland to Toledo and from Cleveland to Sandusky, giving hourly headway from Cleveland to Lorain and to the junction at Ceylon. Extra cars will be put on to give hourly headway between Fremont and Toledo. The limiteds will continue as at present. The scheme gives the parts nearest the large cities better than hourly headway and reduces only the service where traffic is lightest.

PROCEEDINGS OF THE AMERICAN STREET RAILWAY ASSOCIATION

The twenty-third annual convention of the American Street Railway Association was held in the Transportation Building on Wednesday and Thursday, Oct. 12 and 13, 1904. A brief abstract of the proceedings, as reported by telegraph, was given in the last issue of this paper, but a more extended account is presented below:

WEDNESDAY'S SESSION

President W. Caryl Ely, of Buffalo, called the meeting to order at 10:15 a. m., and said:

Gentlemen, the convention will please be in order. We will proceed directly to business, as we have with us the president of the Louisiana Purchase Exposition, who has taken enough of his valuable time to come here and say something to us. We will not detain him by proceeding at the present time with any roll call or any regular order of business, and I will therefore introduce him to you at once. He is chargeable probably with the getting of this great Exposition here more than any one person—in fact, all St. Louis unites in saying that not only more than any other one person, but that he is the only person, almost, who has builded this great Exposition. Certainly one who has the ability to bring together such a great collection of buildings and such a great installation of exhibits therein, is a man who is worthy of filling any position, not only by his ability, but by the tried qualities that are exhibited in the doing of a thing of that sort. I take pleasure in introducing to you the Honorable David R. Francis, president of the Louisiana Purchase Exposition. (Applause.)

President Francis—Mr. Chairman and Gentlemen: If I did not know that the American Street Railway Association is composed of such genial men, such progressive men, your flattering introduction would have embarrassed me. I am glad of this opportunity to rise before you and entertain you for a few moments only. I am here, not only as the president of this Exposition, but as a street railway man myself. (Applause.) I have long desired to get into the transportation business. I made several efforts to get into the steam railroad business, and was partially successful, until others came along and insisted on taking the property away from me. (Laughter.) About ten years ago I made my first venture as the constructor of an electric railway on the east side of the river. From a small beginning it has gradually extended until now it runs to the city of Alton. We have great hopes of branching out this road until it may reach the Atlantic Coast, and possibly the Pacific Coast. (Laughter.) At any rate, the street railroads of this country are developing to-day, and I think very few of you gentlemen even anticipate what their work will be in the future.

Through such an Exposition as we have here, where are assembled all kinds of machinery, and where you are making tests in your respective lines of work, where the exhibits are not dead exhibits, but exhibits of processes, every line of human endeavor is given a new impetus. I think there is no line that will feel this impetus more sensibly than that of the street railways. We have a model street railway of our own here, as a live exhibit within these grounds. We suggested to the street railway organizations of this city that they extend their lines into these grounds—that they operate a line, rather, within the limits of the Exposition, that would be the joint property of the two companies, and upon the tracks of which line they could run the cars from their systems throughout the city. When I went to Europe in the interests of this Fair, early in 1903, it was my understanding that we had about perfected an arrangement whereby an intramural road could be constructed and would be the joint property of the city's street railway systems, the St. Louis Transit Company and the Suburban system. Upon my return—and I was not gone over six

weeks—I found the entire project had been abandoned. I found that the Suburban Company had become discouraged because of a fire which destroyed about fifty or sixty of its cars, and that the Transit Company had found that it was making such extraordinary preparations for the Fair that it had incurred a larger debt than it had planned, and consequently it was compelled to make a temporary loan of some millions of dollars. I do not remember whether it was five millions or twenty-five millions, but I know it very seriously affected the value of the stocks I was holding in that company. I found, furthermore, that the Exposition management had about decided that the crowds within these walls could be handled by automobiles. I threw up my hands in despair and said that the idea of handling the crowds that would come within these gates by automobiles, without fixed routes, was, in my judgment, a very erroneous one. I said that it was necessary to have an intramural road, or the crowds which would come to the Exposition could not be handled with any satisfaction, if at all. They said, "You will have to build it yourselves." That meant the Exposition authorities. I have no personal interest in anything on these grounds, unless it is the entire grounds. I am staking more on this Exposition than I have staked on any enterprise in my life, and I do not know why, unless the exposition microbe got into my veins and I cannot get it out. It might get into the veins of any man who will associate himself with an exposition and who has a love for his fellow man and desires to make progress. (Applause.)

I immediately set about, therefore, to arrange for an intramural road that would be operated within the grounds as the property of the Exposition and be under the control of the Exposition authorities. In order to utilize the tracks already laid, it was necessary that the gage should be the same as upon the steam roads—that is, 4 ft. 8½ ins. instead of 4 ft. 10 ins.—as on the street railways in the city. Without going into further details, we ask you to look at the road. It is operated daily except Sunday. The Government does not permit us to open the Fair on Sundays. I do not know your ideas about Sunday observances, but I wish to say that that prohibition by the Government has cost this Exposition \$1,000,000. If we had been permitted to operate this Exposition on Sunday it would not only never have injured the morals of the people who patronized it, but it would have attracted them to pursuits less injurious than those in which many of them now indulge on Sundays in consequence of the Exposition being closed. (Applause.) However that may be, the Exposition is not open on Sunday, but on every other day the intramural road is in operation. The results to us have been more than satisfactory. Not a person has been killed, and not over three injured during the operation of this road. It carries an average of 55,000 persons a day. (Applause.) It carries nearly, or quite, 55 per cent of the paid admission to these grounds, and is one of the best sources of revenue that the Exposition management has. (Applause.)

Now, imagine, gentlemen, how we could have transported the crowds, if you can imagine—I cannot—without an intramural road. Think of having 150,000 people a day on these grounds depending on roller chairs, automobiles and jinrikishas. And think of the magnificent distances between these buildings! These grounds are 2 miles east and west, and 1 mile north and south. We have two sections of land partly within these grounds. You who live in the West know what a section of land is. You who followed the plow, as some of us have, know what 640 acres of land is, or a 10-acre field is. When I tell you who have not been on a farm, and do not compute areas by sections, that the area of this Fair is about twice

that of the Chicago Fair and equal to that of the Chicago, Buffalo and Paris Expositions combined, you will have some idea of the extent of the territory covered by this Fair. If you then attempt to walk through the grounds without going on the intramural road or taking some other means of transportation, you will have some idea of the area of the grounds.

Furthermore, gentlemen, we would not only have been unable to transport the crowds within the grounds, but we never would have been able to bring the hundreds of thousands of people from the city to the grounds without electric street railways. If we had not had electric street railways, and depended upon horses and mules, we never could have operated an Exposition of this magnitude. I mean by all this to demonstrate to the public—I do not think you need any such evidence to convince you of the truth of this statement—what a great factor this application of electricity to street railways is in the progress of a community, of a State, or of a nation. It has marked the beginning of a new epoch in the history of the United States, at least. There is hardly a town in the country, certainly not any city of any magnitude, that cannot attribute the greater part of its progress, its increase in wealth and in population, to the advent of the electric street railway. (Applause.) The management, therefore, gentlemen, is very proud to welcome the representatives of this great interest within the gates of this Exposition.

This is a Universal Exposition in which all sections of our country co-operate and in which all civilized governments on the earth have participated. There is no distinction here, as you know, of race or creed or nationality. We have here not only the most cultured people on the globe, but the most primitive as well, and you gentlemen know what a task it is to get together within an area as small as this the best products of every country on the globe, and what it means to make this Exposition, as we had promised to make it, and as we think we have made it, a marker in the progress of civilization. It could not have been here if the street railways of this country were not performing the very great functions which they are performing from hour to hour and from day to day.

There is no doubt that the interest which you represent has not reached the peak of its development. We flatter ourselves that in our Palace of Machinery and in our Palace of Electricity are installed exhibits which have been inspected by you with interest, and which will be taken advantage of by you to promote the already admirable facilities which you employ. As to the results to follow from the installation of this machinery I will not attempt to make a prophecy, but in general terms, I think I am justified in making the statement that there is no line of human endeavor that will not from this Exposition gain a new impetus. When you think that within the short period of seven months—and I believe any intelligent man could with benefit devote the full period of seven months to the inspection of the exhibits in this Exposition—but if not seven months, we will say within a period of two months or sixty days, an intelligent, careful observer can see what has been accomplished by every country on the globe, by every race on the earth, you will get a clearer conception of the great work which has been done here. You should also bear in mind that, in addition to the material exhibits, we are holding, in connection with this Exposition, International Congresses, which show the advance in every line of human thought. Perhaps the cap sheaf of these congresses was the International Congress of Arts and Sciences, which has been an ambitious effort to unify all human knowledge and to show the relations to each other of all branches of science. That congress was participated in by savants from all over the world, who were selected for their fitness to write upon the subjects assigned to them, and all of the papers and addresses at this congress will be published in book form.

We welcome you for what you represent, and we will wel-

come you for what we think you can gain from this Exposition; but in addition to that, we welcome you for your own personalities. We know you; we have the pleasure and privilege of a personal acquaintance with many of you. But if we did not know of you, and were not acquainted with you, and were disposed to measure your merits by the men in our midst who are engaged in the same pursuits, we would know that you are all good fellows together, and we would welcome you heartily. (Applause.)

I did not come here to touch on the local situation, but I am sure I will be pardoned for doing so in this presence. One of the great problems which this Exposition management had was how to convey the people from different parts of the city to these grounds. The two great railroad systems of this city made very liberal preparations and expended a great deal of money in consequence thereof. There seemed to be, however, a great dissatisfaction, or, if not that, a want of confidence on the part of the public as to the ability of these street railway systems to comply with their promises, or to meet the requirements of the Exposition. I was too much engaged myself to investigate the cause of this want of confidence—I only knew that it existed. Some time before the Fair opened there was a change in the management of both of these lines, especially was there a very radical change in the management in the Transit Company. I do not know that the present management is any more competent than the previous management; I do not know that the man who at present controls this immense railroad system is any more capable in his line than the men who preceded him, but I do know this, that the present management of the Transit Company has behind it the good will of the community, and that that means more than I can express in the management of any public utility such as a street railway line. (Applause.) I have known street car management that were not excused for accidents which they were unable to prevent, and were not pardoned for situations which they could not remedy, because they did not have the good will of the community in which these roads were operated. I do know that it is different in St. Louis to-day. I do know that this is the most trying time that the street railway system of St. Louis ever experienced, and I believe it will not have an experience again as trying as this. At the same time it is a source of great pleasure to me, and ought to be the cause of ineffable gratification on the part of the management of the street railway systems, that they have the good will of the people of this town and the good will of the hundreds of thousands of strangers that have come here and patronized the street railways. In other words, if there should be an accident or delay, my observation and information is to the effect that the public is willing to excuse, to make allowances. That is the first thing to gain, gentlemen, in the successful operation of a street railroad system or in the operation of any public utility—the good will of the patrons of that public utility. (Applause.) Without it, it is impossible to succeed, and with it if a man does not succeed, it is because the elements of success are not in him. If we did not have the good will of the people of this country in this Exposition we never could have advanced it to its present stage.

We do not measure the success of this Exposition by the same criterions by which you measure the success of a street railway system, and that is by its revenue. We never expected to make any money on this Exposition, we never expected to get back the \$15,000,000 put up for its inauguration, and we will not be disappointed. (Applause.) Whether we get back any of it or not—and I might say in passing, we are paying back to the Government what we borrowed, \$4,600,000, and it is interesting to see the expression of amusement on the faces of some senators when they say they never expected the Government to get back any of this loan—we are satisfied with the result of our effort. As a matter of fact, we have paid \$3,500,000 to the Government on account of the loan, and we will pay

another \$500,000 on Saturday. Outside of that, this city has put up \$10,000,000, the Federal Government advanced \$5,000,000 at the time of the inauguration of the Exposition, in addition to what exhibitors and our own and foreign States have contributed toward the fund. The total installation represents an expenditure of over \$45,000,000. Of course, we will not get the money back. But that is not the measure of our success; that is not the standard. We wish to ask the people who come to this Exposition and the people of the world whether we have fulfilled our promise to make this Exposition truly representative of the industrial and intellectual progress of the world. If we have done so, then this Exposition is a success. It will go down in history long remembered as a Universal Exposition, the equal, if not the superior, of any ever held up to its time. (Applause.)

I believe it will be a long time before another Universal Exposition is held in this country. There will be exhibitions, international in character, but a Universal Exposition that takes in every line of human endeavor and every subject upon which the human mind has labored is a great undertaking. The only criticism that we have heard of this Exposition is that it is too big. What would you think of it if we did not have the intramural electric railroad in operation inside? Gentlemen, I did not mean to detain you so long—you want to get to your business. I only want to state that we are glad to have you here. We are proud that you are holding this meeting on the grounds, and to this association the Exposition management extends the most cordial welcome. (Applause.)

President Ely—We must not detain the Governor any longer. I merely wish to express our thanks to him for having come here and welcomed us, and also for the great amount of information he has given us concerning this Exposition and its buildings and what it represents. A statement made by him was of great interest to me. I had to do, as a member of the board of directors and of the executive committee, with the Pan-American Exposition at Buffalo. I worked long and hard to open the gates of that Exposition on Sunday. The president of that Exposition, a very able man, worked very hard to close the gates of the Exposition on Sunday. He was influenced in that wise by the tremendous amount of pressure brought to bear by the various Sabbatarian organizations throughout the land. I have no doubt but that it was due to that influence that the unfortunate provision concerning Sunday closing contained in the original governmental act in relation to the St. Louis Exposition was introduced there. I was much interested in the statement of Governor Francis that he believed that this Sunday closing had cost the Exposition \$1,000,000, because there were those in Buffalo who attributed a large portion of the misfortunes of the Buffalo Exposition in a financial way to the fact that we had opened it on Sunday. It never seemed that way to me. It was true that we little more than paid our operating expenses on Sunday, but the fact that there was a hiatus there in point of time, when the Exposition buildings were closed, which cut out a day, had a tremendous effect upon the people in their going and coming. Another thought that underlied the efforts of those who worked for Sunday opening was that without Sunday opening the benefits of the Exposition would largely be held from a very large class of citizens, of laboring men and the poorer classes generally, who would find it difficult, after the summer holidays were over, to go to the Exposition unless they could go on Sunday. Even if only a part had been open and the amusements in the Pike closed, as they could have been, it does seem to me that this Fair at St. Louis would have been a great deal more of benefit to mankind, and especially that part of it in this neighborhood, if the gates could have been opened.

One more thought about this Exposition. Governor Francis said that he believed that we knew what it meant to have an Exposition like this. There is no man, who has not been

directly concerned in it, who can realize, or begin to realize, the enormous amount of labor that is required in the holding of an Exposition like this. This Exposition is one of the most tremendous achievements of men. The building of it requires an enormous amount of effort, and that effort must be exercised along the best and most intelligent known lines. Then all these exhibits must be arranged in a proper way, so that they may be submitted in an intelligent manner to the grand and petit jurors who are to pass on the excellence of the things shown, so that the prizes and premiums may be fairly awarded. All of these things have to be looked after. Then the diplomatic side of the matter is a tremendous affair; and if it had not been for the heroic work of David R. Francis, that has characterized every step of this thing from its very inception, it is difficult to imagine what the result would have been. I remember well having had the pleasure of meeting Mr. Francis in Buffalo when he was about entering upon his task, and it seemed to a good many of us that he had but slight idea of the gigantic work that lay before him. But we were entirely mistaken, and I wish to congratulate the people of the State of Missouri, of the city of St. Louis and of the whole country upon having had at the head of this Exposition a man who realized from the outset that if it was to be successful, somebody had to devote his life to it; somebody had to give up his business; somebody had to sacrifice his social relations and family ties, and everything of that kind, and devote his life and soul to the object. And from all that is known of this work, Governor Francis has entered upon it in the most soul-stirring and self-sacrificing manner; and I congratulate him and congratulate the people of all countries upon the magnificent success of this grandest of all Expositions. (Applause.) I wish to say to Governor Francis before we leave him and he leaves us, that in this Exposition there has been most fittingly celebrated the grand accession of territory that the Fair is designed to celebrate and perpetuate, and in the part he has played in it I am sure it will be the acclaim of all his fellow citizens that he has made a name and fame that will be perpetuated so long as the English tongue is spoken. We expected that the Mayor of the city of St. Louis, the Honorable Rolla Wells, would be present this morning to make an address. He has not arrived, and I have now the pleasure of calling upon Prof. W. E. Goldsborough, chief of the Department of Electricity of this Exposition, who has kindly consented to talk to us concerning the matters of interest to us in the Exposition. (Applause.)

Prof. Goldsborough made a most interesting address in regard to the electrical and transportation exhibits in general, but as they have been described extensively in these columns the address will not be reproduced.

President Ely then introduced Hon. Rolla Wells, Mayor of St. Louis.

Mayor Wells—Mr. President and Gentlemen of the American Street Railway Association: First I desire to apologize for the lateness of my appearance, but, as some of you in this room are aware, our speed limit in the city of St. Louis is rather low, and consequently I could not hasten; otherwise I fear I would have been under the painful necessity of placing myself under arrest. If I ever experienced any regret in having assumed the responsibilities devolving upon the Executive in the management of a large city, that regret is now dispelled, for the reason that my position gives me this pleasant opportunity of appearing before my old colleagues, those engaged in the management of street railways. (Applause.) In explanation, it may possibly be of interest to you to know that I am a child of the street railways. My father constructed and operated the first street railway west of the Mississippi—the old Missouri Street Railroad Company, in the city of St. Louis. (Applause.) The first car started on July 4, 1859. This reminiscence affords me great satisfaction, from the fact that it is the brightest thing in my life to recall that my father placed sufficient confidence in

me, his son, to appoint me the general manager of that railway at the age of 22 years. Although I was not in the city of St. Louis at the time of the Louisiana Purchase, I have been here a sufficient length of time to see the rapid and enormous growth of this, what we consider a typical, splendid American city, and I know from my own observation that that growth should be in a large measure credited to the street railway systems. This city is not as old as the cities of the East. One hundred years ago it was simply a trading post. Since that time it has experienced a peaceful transition of its occupancy from Spanish to French, and from French to American people. Our people come from every section of the United States, and when I hear that this Exposition is a success I realize the reason. That success I largely attribute to the intelligent, and I might say patriotic interest that has been taken in it by the owners and managers of the street railway systems in the city of St. Louis for the purpose of bringing the people to these grounds in comfort and ease. Now, gentlemen, I am expected to receive the Italian flag presented to the city of St. Louis by the Italian Government; as I am now a little late in getting there, I will close by thanking you for the courtesy of this invitation to appear before you and extend to you the greetings of St. Louis and the courtesy of our city. (Applause.)

President Ely—Mr. Mayor, I present to you the thanks of this association for coming here and honoring us by welcoming us to the city, and also for the remarks that you have made. I fancy, Mr. Mayor, that this body of intelligent and progressive men will carry away from St. Louis an adequate conception of your city and the splendid Exposition which you have here. I congratulate you upon the success of the Exposition, and I congratulate the city of St. Louis upon it. I hazard the prediction that, notwithstanding the forebodings of the croakers, and there are croakers everywhere, the time will come when the business men and those who have charge of the best interests of the city will unite in a unanimous expression that the Exposition has not only been beneficial to the country but beneficial to the city. I had to do with the Buffalo Exposition, and I was an earnest worker in its behalf from the inception of the idea; and I remember well the difficulties we met with from certain conservative elements in the community who were opposed to the Fair, and I suppose you have had your fair share in St. Louis. I therefore am pleased to state to you that our experience in Buffalo with the Exposition was of great importance to the city and of lasting benefit to it, and that the croakers are all silenced and now unite in the general expression that it was a good thing. I thank you very much indeed for coming to speak to us.

President Ely then presented the following address:

PRESIDENT'S ADDRESS

One of the most difficult tasks that fell to the lot of your executive committee during the last year was that of making the choice of location for the holding of this year's convention. After several meetings of the executive committee, at which the question received the most careful consideration, it was finally determined to hold the convention at St. Louis during the exposition. As we are assembled here in the midst of the glorious creations of this greatest and grandest of all world's fairs, I cannot but feel that the executive committee and the members of this association are to be congratulated that the choice was so wisely determined. This splendid exposition typifies and presents the best and most glorious of all the achievements of men. By assembling here we are enabled to view not only the highest results of the inventive genius and the progressive labor of man in our special line of transportation, but also the best examples of all that has been attained in allied branches of transportation, and in the arts and sciences, trades and manufactures, brought here and assembled together from the different parts of the world. These exhibits are so arranged that we may view side by side with examples of the first and weakest attempts in all the various lines of work the most finished productions of human endeavor, illustrating in the most forcible and striking manner possible the progression of useful improvements and inventions from the most primitive times to the glorious realities of the present moment. By the kindness of Prof.

Goldsborough we have had presented to us a statement concerning the things that will be found to be of greatest interest to us in our respective lines of work, so that during the limited time at the disposal of the most of us we will be enabled to reap the greatest possible benefit. That most unique of modern philosophers, Mr. Martin Dooley, has said "that fr wan man that goes to a wuruld's fair to see how boots is made they'se twinty goes to see th' hootchy-kootchy an' that's where th' wan lands fin'ly." Far be it from me to lay upon you an injunction that would prohibit the enjoyment of the alluring attractions of the "Pike," but I know that you will pardon me if I earnestly request and suggest that the seductive tones of the "spieler" on this most enticing of all modern Midways shall not be permitted to interfere unduly with the proper contemplation of the vast collection of useful exhibits here assembled together, which constitutes one of the greatest monuments of civilization, a tremendous milestone marking the endless highway of the world's progress.

The Street Railway Association year now growing to its close has witnessed many things of supreme interest to the electric railroad world. During the present year the New York Central & Hudson River Railroad Company has matured its plans for the electrification of its great trunk lines entering the city of New York and the lines radiating therefrom for a distance of 35 miles; the Pennsylvania Railroad has determined upon the electrification of that section of its line which will enter the city of New York in two great subterranean tunnels underneath the waters of the Hudson River; the Schenectady Railway Company has begun the operation of cars propelled by means of single-phase alternating-current motors in regular service carrying passengers, and the General Electric Company at the recent meeting of the New York State Street Railway Association at Utica has exhibited in practical operation a car propelled in part over the tracks of a city system by direct current, and in part over connecting interurban lines with the single-phase alternating current. Purchases of street and interurban electric railway systems of considerable magnitude have been made by the New York Central & Hudson River Railroad Company in the central portion of the State of New York and this great corporation has announced its intention of electrifying a portion of its West Shore Railroad tracks in connection with the street and interurban railway systems thus acquired.

The electrification of the Manhattan Elevated Railway system, which was finally completed in June, 1903, in which month the last steam train was taken off, has, during the last year, enabled a direct comparison to be made between the operation of the system by electricity and steam. It has been determined that the substitution of electricity has increased the carrying capacity of the road 33 per cent, as indicated by the actual increase in car mileage; the passenger traffic has been increased 30 per cent. The operating expenses have decreased from 55 per cent of the gross receipts in 1901, to 45 per cent in 1903, and all obnoxious vapors, smoke, steam and cinders incidental to steam locomotive operation have been eliminated from the streets traversed by the railways of the system. The wisdom of the enormous expenditure of money necessary to make the change has been fully demonstrated by the benefits which have moved not only to the people of the city, but to the intelligent management which at such great cost made the change. This great system, which carries nearly a million of passengers each day has been leased to the Interborough Rapid Transit Company, which, during the past four years, has been engaged in constructing underneath the city of New York a vast system of subways, which are now completed and a portion of which will be put in operation during this present month. This system comprises 15 miles of subway and 5 miles of elevated structure, providing for 63 miles of single track to be electrically operated by the protected third-rail system and trains operated by the multiple system of train control. But little over four years have been occupied in the construction of this great work, and when the difficulties encountered beneath the streets and the buildings of the great metropolis are taken into consideration in connection with the magnitude of the work itself it is to be doubted if the record made in this construction has ever been equalled in the history of engineering or construction achievements. On Wednesday last it was my privilege, upon the invitation of the general manager and general superintendent of the Interborough Company, to join a large party of railway men in the inspection of that portion of the subway upon which trains are now being operated preparatory to the formal opening to the public during the latter part of this month. The ventilation of the subway is well-nigh perfect, and all parts of the work, including the railroad and its equipment, leave nothing to be desired. Being practically familiar to some extent with the underground railways of London and Paris, I was enabled to make direct comparison between them and this latest of modern subways. It is gratifying to be able to state that the points of superiority in this newest work are many and so self-evident that they may be at once detected not only by the skilled railway manager or engi-

neer, but by the everyday traveler. The benefits that are to flow from this great system of underground railways to the varied interests of the inhabitants of the great metropolitan city and those who do business within its boundaries are difficult of adequate conception. Our train left the City Hall station at the Brooklyn Bridge, and in less than seventeen minutes we were at 146th Street, a distance of about 9 miles, and impossible of accomplishment in any other way in less than an hour or an hour and a half. The speed of the train at some points was nearly a mile a minute, but so smooth was the track, and so perfect its grades and alignment that the great speed was practically unnoticed and almost before one had realized that were were off on the journey the arrival at its end was announced.

It is almost impossible to realize what the works alluded to above mean to the city and State of New York and that portion of New Jersey bounding the great metropolitan city. It is estimated that the city and its neighboring cities that ought to be considered as within the metropolitan area contain about 4,500,000 people. The growth of the city and the metropolitan district has been very much hampered in the past by the inadequate facilities of transportation between the homes of the people and their places of work, business and recreation, and the discomforts of life owing to the insufficiency and inefficiency of transportation facilities have been so great as to constitute a real hardship to those who were forced to dwell within the area described. But great as will be the addition to the comfort and convenience of the people caused by the additional railroad trackage included in these works, after all the most inestimable benefits flow from the utilization of the subtle element, electricity, in connection with the works. By means of it ventilation is secured in the subterranean tunnels and the foul air is made sweet; the cars and the subway are lighted and heated by it, and the dark places wherein danger lurked when the operation was by steam are made light and safe; cleanliness is made possible everywhere and the highest degree of comfort and convenience that could be dreamed of seems to have at last been attained. It is by the mastery and the utilization of this same agent that you in the operation of surface street and interurban railways have in these later days wrought a grand transformation. You are so familiar with all these things that I fear lest I be guilty of over-description in what I have said concerning them, but I am bound to congratulate you upon having given so good an account of your stewardship of this great modern agency of motive power, heat and light in its application to your business, that those who have been contending with the great problems of steam railroad transportation have found it both advantageous and necessary to take it up and still further exploit and use it for the benefit of mankind. In a paper recently presented at the International Electrical Congress held at this exposition, Mr. Frank J. Sprague, writing of the history and development of electric railways, in which he has played such an important part, says:

What the electric railway has done may only briefly be referred to here, but the writer may be permitted to repeat the substance of remarks written some nine years ago, for it has become a most potent factor in our modern life and left its imprint in the indelible stamp of commercial supremacy. It has given us better paved streets, greater cleanliness, more perfect tracks, and luxurious, well-lighted and well-ventilated cars; and with the higher speeds it has made possible the extension of the taxable and habitable areas of towns and cities in a much greater ratio than is represented by the increase of speed.

It has released from drudgery tens of thousands of animals and increased the morale of transportation employees. It has given employment to an army of men and hundreds of millions of capital. It has improved and extended the telephone service by forcing the abandonment of ground circuits. It has built up communities, shortened the time between home and business, made neighbors of rural communities, and welded together cities and their suburbs.

Will it replace the steam locomotive?

Perhaps the best answer is that its future is not in the wholesale destruction of existing great systems. It is in the development of a field of its own, with recognized limitations but vast possibilities. It will fill that field to the practical exclusion of all other methods of transmitting energy; it will operate all street railway systems, and elevated and underground roads; it will prove a valuable auxiliary to trunk systems; but it has not yet sounded the death-knell of the locomotive any more than the dynamo has that of the stationary steam engine. Each has its own legitimate field which will play its proper part in the needs of all civilization.

But its work within the sphere to which it is at present confined has brought about social and economical results which are being constantly more and more forcibly impressed upon the minds of the observers of conditions of growth and settlement in this country. A writer in the "Yale Review" recently pointed out the results attendant upon the electrification of the street railways and the construction of the interurban railways, which have been connecting up and binding together the cities and populous places throughout the country, and the New York "Sun," in an able editorial, reviewing the article mentioned, remarked that the whole country was becoming urban, and humorously stated that the

"hayseed" was disappearing from the land. Present results are really wonderful. It is difficult to correctly divine the future, or to make any prognostication concerning the ultimate social and economic results that may flow from the elimination of the line between the city and the country. We can only judge of the future by the past. It is safe to say that this latest and most beneficent of servants given by nature to man will continue to be utilized for his betterment in a ratio that will constantly increase with the passing of time. With the ever-growing intelligence of the people concerning this great modern agency, and the increased recognition of the beneficial results to accrue to the public from an intelligent co-operation by it with your efforts, you will find your burdens lighten as time goes on, until finally there will come a period when with mutual recognition of the duties and obligations which each owe to the other you will secure the widest radius of beneficial action and the maximum both of pecuniary results and public recognition.

I am now about to touch briefly upon a matter of great importance to this association. For a number of years past there has existed a feeling and an opinion that the growth of the interests which had come to be represented by this association required a remodeling of the form and scope of our organization and its work. The first visible effect of this growing feeling was the formation about eight years ago of the Street Railway Accountants' Association of America, an auxiliary association with a membership comprised of the accountants of the different companies, members of this organization. Within the last three years the feeling has been further evidenced by the organization of another auxiliary association, namely, the American Railway Mechanical and Electrical Association, with a membership composed of the mechanical and electrical engineers of our companies.

During the past year the project of still another subsidiary organization, with a suggested membership of electric railroad "way" engineers and superintendents has been actively agitated through the medium of correspondence between various officials of different companies and to a limited extent in the columns of the technical press. The discussion of the advisability of the formation of this third auxiliary association, or of rendering the same unnecessary by enlarging the scope of the American Railway Mechanical and Electrical Association sufficiently to include not only the engineers and superintendents of way, but also several other important branches of the business wherein the need of investigation, comparison and discussion had come to be recognized, has finally involved the discussion of the main question, namely, that of a reorganization of the parent body. A very ingenious and well considered suggestion in this regard emanated from the superintendent of construction and maintenance of way of the Milwaukee Electric Railway & Light Company. An outline of that plan was printed in the STREET RAILWAY JOURNAL several months ago, and has been quite extensively commented upon.

At Saratoga last fall there was an open and avowed expression of desire for a change in the method of conduct of association affairs, and the scope of association work, and a discussion of nearly two hours' duration in the session of the executive committee brought out warm expressions of hope for work along new lines and not a single voice was raised in opposition. Later on debate upon the subject was precipitated during the discussion of one of the papers in the convention and reference to the minutes of the last convention reveals the fact that while several leading members of our profession spoke in favor of a change, not one person spoke against it. The discussion in the convention resulted in the matter being duly referred to the executive committee with broad power to act. The first branch of the case taken up by the executive was a proposition to relieve the association of the duty of preparing space and arranging the details of the installation of the exhibits of manufacturers of electric railway supplies held annually at our conventions and in connection therewith. This duty has of late been almost, if not quite, the most onerous and difficult devolving upon the secretary's office and has consumed the greater amount of that officer's time. The supplymen's exhibition has grown gradually from small beginnings and latterly has come to be one of considerable importance, occupying a large amount of room, and the preparation of space and making of arrangements for the accommodation of such exhibits. Allotting space to individual exhibitors and collecting the revenues therefrom has called upon the officers of the association for the performance of duties not within the scope of the work of the association, as the same is defined by the constitution and by-laws. The proposition to rid the association of all care in relation to this exhibit, and to leave it to the supply men themselves was informally discussed at Saratoga, and several energetic and intelligent gentlemen at once took great interest in the matter and effected an informal organization to take up the work in an orderly and effective way, and proceeded to sound the manufacturers as to their views. Upon investigation it was found that the manufacturers themselves for

the most part were perfectly willing to take the burden off our hands and to assume and perform the whole task without any cost of time or money to this association. In May last a formal organization was effected and a committee was organized representing the technical press and a number of prominent manufacturers. This committee formulated a circular explanatory of their plan and distributed the same extensively, with the result that a large number of manufacturers have already come forward and joined the association and others have expressed their intention so to do. It is proposed that the function of this Manufacturers' Association will be to take the entire charge of making the annual exhibit, and in addition to this the manufacturers' committee has suggested that it would be their desire to do something in the way of entertainment, subject in every way to the wishes of the officials and executive committee of this association, and with their complete sanction and co-operation. This matter has received the sanction of your executive committee, and a report will be made to this convention expressing the satisfaction of your executive committee with the change.

It would be quite proper to mention at this time the fact that this manufacturers' committee procured the beautiful badges for this convention and presented the same to our association, and also provided the attendance of Reeves' celebrated band of Providence throughout the entire convention week to supply music at our various meetings and entertainments. Furthermore, all of the entertainment which is noticed in the voluminous programme of the convention has been provided by this committee. All of this has been done with the knowledge and approval of your executive committee.

The desirability of this change, which is now suggested by your executive committee, seems so obvious as to require no argument or explanation from me. When this association in convention assembled shall have approved of this action of your executive committee, and the holding of this exhibit shall have been entirely divorced from the work of the association, then the association will be in much better condition for the performance of its legitimate work.

Reference has been made by me to the creation of certain subsidiary or auxiliary associations, and the desire for the creation of still others. This thing cannot go on indefinitely, or we will be confronted with a large number of organizations, each pursuing its solitary way unmindful of the others, until, finally, all will be chaos and we shall be involved in an intricate mass of technical work, the value of which, owing to its chaotic state, will largely be lost. We should, therefore, it would seem at this time, take up the matter of a reorganization of the entire work. I will not attempt to outline any plan for such reorganization or reformation of the lines of work. That should undoubtedly be left to the committees of the different organizations, working together with great care and deliberation, and taking all the time necessary to bring about a satisfactory result. Since assembling here for this convention, representatives of the auxiliary associations have met with your executive committee and important action has been taken in this regard, which will be duly reported for your approval.

A careful inspection of the proceedings of the conventions of the last few years reveals the fact that the most of the time of each convention has been occupied with the reading and discussion of papers embracing subjects which for the most part relate to the small technicalities of the business, nearly all of which might have been profitably committed to proper auxiliary and subsidiary organizations. Broad fields of co-operative effort in the most important lines of our work have remained almost untouched. It becomes immediately apparent upon investigation and discussion of the situation that we might profitably enter upon the discussion of the greater questions affecting our welfare. The confusion of laws throughout the country affecting our corporations is a matter to which we might well devote attention. There are also such great questions as taxation, municipal ownership of street railways, franchise rights and obligations, statutory laws affecting our class of companies, municipal laws and ordinances, and other questions of importance to which your minds will readily refer. The collection and preservation of data tending to throw light upon the problems of great importance that confront us is also a matter deserving of attention, and in this regard it would seem that through the medium of the secretary's office and of appropriate standing committees an invaluable collection of data could be made and permanently preserved in such form as to be conveniently accessible to any member of the association upon merely making request of the secretary. If the work of the secretary's office should be made continuous there would thus grow up in time a vast repository of valuable statistical and historical information, readily available as matter of right to every member. This branch of the work alone, if properly prosecuted, would render membership in this association so valuable that it is difficult to understand how any street railway corporation would feel justified in remaining

outside of this association. It is our duty to keep in step with the changes in conditions that confront and surround us; we must be in synchronism with the spirit of things; we must not hesitate to make necessary and beneficial changes, nor should we be deterred by our consideration of the past.

Upon the stepping-stones of our dead selves
We rise to better things.

It is undeniable that notwithstanding the fact that the intelligent and broad-minded policies that to-day characterize the operation of the great properties represented in this association, and notwithstanding the fact that inestimable advantages have been and are being thereby conferred upon the entire public within your individual spheres of action, there exists to-day a tremendous amount of misunderstanding of your labors and the effect thereof upon individuals and communities. Intelligence must replace ignorance; darkness must give way to the light. There are to-day no matters or things really in difference between yourselves on the one hand and the public on the other. With right understanding there will come about perfect accord. The remnants of old suspicions founded upon misconception and misunderstanding must be swept away. It is only by a general diffusion of information concerning our properties and our work that public appreciation may be obtained. Let us bury all questions of prerogative, precedence and personal advantage, and unite in a vigorous and persistent effort to bring out of present conditions such a state of organization and work as will not only meet with the intelligent and hearty approval of all those comprised in our different organizations, but will also put us in closer touch with the public whom we serve, and tend to the creation of such a condition of things as will enable us best to work out legitimate ends and purposes.

Congratulating you upon the things that you have attained, and extending to you my sincerest wishes for still higher attainments, I await the pleasure of this convention.

President Ely—The next order of business is the report of the executive committee on the management of the association during the past year. Before we enter upon that, I wish to extend to our friend, Capt. McCulloch, our united felicitations upon the things that have been said of the street railways of St. Louis. (Applause.)

(Vice-President Shaw in the chair.)

The secretary read the report of the executive committee, which consisted of the minutes of the various meetings of the executive committee held on Feb. 29, March 26, Sept. 10 and Oct. 11, 1904, at which meetings the various arrangements were made for the St. Louis convention.

At the meeting held Oct. 11, 1904, the following resolution was passed:

Whereas, during the past year many suggestions have emanated from different sources concerning the desirability of rearranging the lines and methods of work of the American Street Railway Association and its existing auxiliary organizations, the Street Railway Accountants' Association of America and the American Railway Mechanical and Electrical Association, to the end that through the medium either of these existing organizations or such other and additional organizations as may be deemed desirable, the work which was originally embraced within the scope of the objects of the parent organization, the American Street Railway Association, may be so enlarged and so prosecuted as to bring about results of greatest value to the street railway corporations of America, and at the same time whatever organizations may be deemed most desirable to conduct such work shall be brought more closely together along systematic and correlated lines of work and procedure; and

Whereas, at this convention the matters above mentioned have taken such form that representatives of the different organizations have met in an official way and have made some progress in the consideration of the matter,

Now, therefore, be it resolved that it is the sense of the executive committee of the American Street Railway Association in a formal meeting assembled, that it is desirable that a closer working arrangement should be effected between the different organizations conducting street railway work, and to that end be it further

Resolved, that the executive committee of the American Street Railway Association hereby recommends to its convention about to be assembled such amendments to its by-laws as may be necessary to provide for increase in the size of its executive committee sufficient to accommodate as members thereof, by virtue of their office, the presidents of such auxiliary organizations engaged in street railway work as may be approved and fostered by the American Street Railway Association; and be it further

Resolved, that the American Street Railway Association be re-

quested to commit all matters and things concerned in bringing about the above-named objects to its executive committee the power to act.

On motion, the report of the executive committee was received, and because of the consideration necessary to be given to the resolution above referred to, its consideration was postponed until Thursday.

J. C. Hutchins, of Detroit, offered the following resolution:

Whereas, we consider it is an advantage to the association that the widest publicity shall be given to all its proceedings that are not of a confidential or privileged nature.

Be it resolved, that so much of the resolution regarding the publication of proceedings, and the censorship referred to on pages 237 and 238, of the proceedings of the Saratoga convention, as requests the technical press to refrain from the daily publication of proceedings be, and hereby is, rescinded.

There was a protracted discussion on the resolution, in which Messrs. C. O. Mailloux, John I. Beggs, C. H. Spencer, W. Worth Bean, D. Royse, J. C. Hutchins and L. E. Myers participated, and action on the resolution was postponed until Thursday.

The president then announced as the censorship committee the following-named gentlemen: J. C. Hutchins, C. O. Mailloux and John I. Beggs.

Mr. Vreeland offered the following resolution:

Resolved, that the thanks of this association be extended to Captain McCulloch, of the St. Louis Transit Company, for his courtesy in furnishing special tickets for the transportation of the members.

The resolution was unanimously adopted.

The president appointed the following-named gentlemen as the nominating committee to nominate officers for the ensuing year: J. C. Hutchins, of Detroit; C. S. Sergeant, of Boston; Robert McCulloch, of St. Louis; H. M. Littell, of Chattanooga, and John I. Beggs, of Milwaukee.

The secretary announced that the service of the local and long-distance companies would be open to the free use of the delegates; that of the long-distance service only between the hours of 6 p. m. and 10 a. m., at the telephone booth in the Southern Hotel, upon presentation of delegates' badges.

The secretary announced that Messrs. Cagney, operating the miniature railroad on the Fair Grounds, would honor the badges of the attendants at the convention for transportation.

The meeting then adjourned.

THURSDAY'S SESSION

President Ely called the meeting to order at 10:20 o'clock.

The president announced that the first order of business would be the report of the secretary and treasurer.

Secretary Penington presented the report, which showed 196 members.

On motion of Mr. Mailloux, the report was accepted and ordered to be published in the minutes.

An invitation from the Railway Signaling Club, inviting the members to attend its session, was read; also an invitation from the Street Railway Accountants' Association of America, inviting the delegates to inspect the blanks and records which were displayed in the hall, being the collection of exhibits which the Accountants' Association had compiled.

The St. Louis & Suburban Railway Company, of East St. Louis, invited the members of the association to use their lines on the bridge and their lines in Illinois, the badge being sufficient identification.

The various invitations above named were accepted, with thanks.

Mr. Bean said that in connection with the postponement of the resolution yesterday, referring to the publication of the proceedings by the press, he wished to offer the following resolution:

Resolved, that the last paragraph of the resolution in relation to the censorship of the proceedings as recorded on pages 237 and

238 of the proceedings of the twenty-second annual meeting of the American Street Railway Association be amended by substituting for the word "proceedings" the words "verbatim report of discussions."

L. E. Myers said that he had discussed the matter with the editor of the "Street Railway Review," and had read a copy of the "Review" published on Thursday morning, and noticed the change in the report of yesterday's proceedings, under the new plan of censorship, and he believed the resolution offered would give the meeting what was desired.

Mr. Bean's resolution was unanimously carried.

The president stated that the next order of business was the further consideration of the report of the executive committee, which had been presented on Wednesday. The president stated that the most important portion of the minutes that were presented yesterday was the action relating to the bringing closer together of the various organizations engaged in the work. (The resolution was then read.)

Mr. Bean moved the adoption of the recommendation of the committee.

C. O. Mailloux, of New York, thought it would be wise to have some discussion of the matter, so that some idea might be had from the members of their views regarding the manner in which the affiliation of what might be called the subsidiary departments of the organization might be arranged. He thought it wise to give the matter some thought, because he looked with a certain feeling of apprehension at the increasing number of sections or auxiliary associations, as eventually there might be but little work left for the parent association to perform. He felt that the framing of the provisions which are to govern the relations between these sections should be done with a great deal of care. His own view of the matter was that he would like to see some system of control by the central body, the American Street Railway Association, perhaps similar to the relations of the Federal to the State Governments. If we look closer into the organization of many other societies we will find in many cases that they are organized with a central body and having different sections. It occurred to him that some such arrangement might be made in this case. There might be a sort of holding corporation—the term was no doubt sufficiently familiar to the members—which would have the general control. Then there could be sections a, b, c, or 1, 2, 3, having as its sub-title the name which is now selected, like the Accountants' Association, or the Master Mechanics' Association, and that the American Street Railway Association should have a closer relation to these sections than it seemed to him it was going to have, if things continued as they were at present. He could see, he thought, that if the relation between the parent association and the subsidiary associations was not a closer one, and subject to a closer supervision of the central body, the formation of the auxiliary bodies might increase in number to such an extent as to seriously hamper the effectiveness of the parent association. Hence, he thought that a system of a central body, in which the other associations should become a section of the central body, should be carefully considered by the executive committee. He thought there should be, for instance, some sort of an arrangement whereby a company belonging to the American Street Railway Association should be able to partake, to some extent, even without paying the entire amount of dues which would have to be paid to become a member of all of them, of the benefits of the others. The very fact that it is proposed to bring as members of the executive committee the officers of the other associations indicates that some privileges are being given them for which some corresponding advantage should be given to the American Association. He believed the matter should be so arranged that it would not appear so much as it does now that there are three or four, and perhaps will be five or six, different organizations. They should all really be a part of a central organization.

Mr. Bean believed the executive committee when it came to

consider the matter would view it in all its bearings and make the best possible arrangement for the good of all.

The resolution was adopted.

The president stated the next business of the meeting would be the reception of the report of the committee on rules. The chairman of the committee, E. G. Connette, not being present, the report was presented by W. E. Harrington, the next member of the committee.

Mr. Harrington said that the committee had made its report in the book of rules which had been presented, and that the formal report of the committee was contained in the front of the book, and read as follows:

REPORT OF COMMITTEE ON RULES FOR THE GOVERNMENT OF CONDUCTORS AND MOTORMEN

The arrangement and numbering of the rules in the standard code does not permit of inserting such special rules, as might be required by the various companies, in their proper places under the different headings. In order to overcome this difficulty, a rearrangement of the standard code has been made and the rules numbered under three separate heads, viz.:

General Rules, 1 to 100, inclusive,

Rules for Conductors, 101 to 200, inclusive,

Rules for Motormen, 201 to 300, inclusive.

Rules, additional to those contained in standard code, can now be numbered and given their place, following the standard rules, under their proper headings. Where local conditions will not permit of the use of certain of the rules in the standard code, they may be omitted, the number thus left vacant should not, however, be used for any other rule but be left blank, thus preserving the integrity of each standard rule under its own number. Such additions to any of the standard rules as may be necessary, can be made by adding sections to the rule, using an affix letter, as, for example: "2 a," "2 b," etc.

It is intended that the interurban rules shall be used in connection with those contained in the standard code. The numerous accidents occurring of late, in connection with the operation of interurban railways, have suggested to the minds of the committee the necessity for many of the rules contained in this report.

The efforts of this committee were directed toward making the interurban rules conform, as nearly as conditions would permit, with the standards adopted by the American Railway Association, the diagrams, descriptive of hand, flag and lamp signals, being the same as those appearing in the standard code in use by steam railroads. The diagrams of the train signals necessarily vary from their standards to a degree, although the colors are used.

In the rearrangement of the standard code, certain rules were omitted to avoid repetition, and certain other rules, which seemed necessary, were added thereto.

This committee held one meeting jointly with the standard rules committee of the New York State Railway Association, at which meeting there was a representative of the Board of Railroad Commissioners of the State of New York, who ably assisted the committee by making suggestions. The rules, as they now appear, were adopted by the Street Railway Association of the State of New York at their annual convention in Utica, Sept. 13, and they are herewith submitted for your consideration, with the recommendation that the committee on rules be continued, and that members of the association be urged to communicate with the committee giving it the benefit of suggestions as to additional rules or changes in the Standard Code as herewith recommended.

E. G. CONNETTE,
W. E. HARRINGTON,
T. E. MITTEN,
ROBERT McCULLOCH,
JOHN J. STANLEY.

All employees whose duties are prescribed by these rules will be furnished with a copy, for which they will sign receipt, and will be required to have the same in their possession at all times while on duty.

On motion, the report of the committee was adopted.

The following resolution was offered by Mr. Vreeland:

Resolved, that the President of this association be, and he is hereby, authorized and empowered to appoint a special committee to be known as the membership committee of the American Street Railway Association, of which the president of the association shall be chairman, ex-officio. Such committee to consist of nine members, three of whom may be representatives of the technical press, and may or may not be members of this association. The duty of such committee shall be to endeavor to increase the membership of the association.

Mr. Mailloux moved the adoption of the resolution.

Mr. Vreeland stated there were at the present time something over 600 street railroad companies operating throughout the territory covered by the association, independent companies, of which number 196 are members of the association. The idea in the appointment of this committee was to have a representative committee of the leading railroad men of the country to prepare circulars and enter into general correspondence with railroads which were not members, and to use their personal influence with the managers of street railroads, with whom they were acquainted, to have them become members of the association. He thought this was particularly desirable at this time, as a certain percentage of increase in the membership of the association, based upon the present dues, would take care of the general running expenses of the organization and leave the reserve fund of the association intact, which probably could not be done if the membership stood stationary as at present. The idea of the resolution was to make a concerted and vigorous effort to increase the membership of the association.

The resolution was unanimously adopted.

The president announced the next business to be the reading of the papers.

The paper on "Steam Turbines," by Richard H. Rice, was presented by Mr. Rice, who said that the object of the paper was to describe the smaller size of steam turbines developed by the General Electric Company of the horizontal type. This paper was published in the last issue of the STREET RAILWAY JOURNAL.

In the discussion which followed, W. H. Abbott, of Cleveland, asked Mr. Rice to give a further description of the high-speed direct-current commutators, and whether they run in oil.

Mr. Rice replied that the commutators run dry, with lubricated brushes, and the commutator bars are well supported by nickel-steel rings shrunk on to the outside over the insulation. The commutator bars of the larger size are turned off in place after the shaft is put in the bearings.

Mr. Abbott inquired if they were carbon brushes, to which Mr. Rice replied they were.

C. O. Mailloux, of New York, said that he would be glad to give the delegates the results of some observations which he had made in an extended tour in Europe last summer, in which the investigation of steam turbines under various conditions was one of the principal objects he had in view. He was under the impression at the outset that steam turbines were not very suitable for use in driving direct-current generators, but he was pleased to say he had seen numerous instances of direct-current dynamos which are being driven at rather high speeds in Europe. The largest unit he had seen was 250 kw, running at 2500 turns. He had seen several small sizes running at 3000 turns and 4000 turns. There seemed to be no difficulty, at least no difficulty which is not likely to be overcome, in the operation of such machines. The brushes are generally carbon, although in some cases he had seen metal brushes of the Boudreaux type used with satisfaction. The tendency, however, is to prefer carbon brushes wherever they can be used, because the Boudreaux brush requires a much better electrical design than the carbon brush in order to get sparkless and suitable commutation. The general practice is to make the commutator very strong, using nickel-steel bands around it, or similar bands of very ample proportions. He had heard of but a few cases where sparking had given trouble, and it had been due in nearly every instance to unbalancing; where the armature is not properly balanced there is a slight chattering, which, though not visible to the eye, is yet sufficient to keep the brushes dancing on the commutator, and it soon becomes rough and gives trouble. He was glad to see a line of small turbines developed in this country, as they have already been developed in Europe. He had ordered two small turbines in Europe for direct-current work, of 15-kw each, because he was not then

satisfied he could get in this country direct-driven turbines that would answer the purpose. He was glad to see the General Electric Company developing a line of small turbines that can be driven direct. He meant by that turbines which do not require gears. He had had some experience with small turbines in which the speed is reduced through a gear, but found while they did the work, they are necessarily more delicate and not so satisfactory as one which does away with the gear. One of the uses to which small turbines are being put in Europe is that of driving pumps for boiler feed. He knew of several instances where direct-driven centrifugal pumps working under high pressures are being used very successfully indeed as boiler water-feed pumps. They have great advantages, because they have no reciprocating motion, the feed is absolutely steady. In cases where the exhaust steam is used for feed-water heating, it will be realized that the economy of the system is not of great importance, so that while it is in the abstract desirable to have a small turbine unit, which will give as high an economy as possible, yet for many applications, such as for auxiliaries in a power station, in many cases it would be rather desirable to have the auxiliaries consume a great deal of steam than the reverse, because in many modern power stations today it is becoming a problem to be able to get sufficient feed-water without using live steam and without using economizers, which many of us are not inclined to favor.

Mr. Abbott inquired if Mr. Mailloux had found that there was any great danger from water in the steam in using the turbine—water carried with the steam, even if the steam may be superheated.

Mr. Mailloux said he had heard of no cases of such trouble, although he had seen cases where turbines were operated at very low pressure. He visited one installation in a mine where a 250-kw turbine is operated from the exhaust steam of a hoisting engine, which steam was collected in a device called a steam accumulator, so that the working pressure of a few pounds is available for use at the turbine. The turbine is run condensing, and enough power can be obtained from the exhaust of a 1500-hp engine by the low-pressure turbine to drive a 250-kw turbine. The steam is naturally not very dry, and although the plant had been running for some two years, there was no record of any difficulty whatever. He had heard of no trouble being experienced with steam turbines from water. He could hardly understand how water would be present in superheated steam, because the idea of superheat itself would imply that there cannot be any water there, because any water would become saturated steam at the expense of the superheat.

S. M. Hopkins, of Columbus, said that in Columbus, Ohio, a 500-kw turbine was installed and had to be started up temporarily to take steam from a long line. They used superheat, and therefore no provision was made to drain the lines, depending upon superheat to take up such condensation as would occur in the line. The turbine was connected practically on the end of the line, with a General Electric exciter engine, the turbine spoken of being used principally for lighting work. They would find a large amount of water condensed in the pipe, due to its not being drained properly. Nevertheless, they never had any trouble after starting the turbine up with a large amount of water going through. They use high pressure, and for that reason feared the results on the air pump, which handles both air and water. In starting high pressure, the observer can see large gulps of water come out of the exhaust without any apparent injury to or jarring of the turbine in running. The speaker further said that in the last six months he had done some practical work on two 500-kw turbines, installed in a steam station and taking steam from the steam boilers, and under practically the same conditions were two Greene-Wheelock tandem engines, with a cylinder ratio of 6 to 1, connected to two 500-kw direct-connected generators. In order to get at the real comparative commercial value of an

engine unit of similar size, working under the same conditions of superheat as the turbine, they made quite exhaustive tests, and went so far, both machines operating under commercial load, to figure out the thermal efficiency and the B. T. U., per electrical horse-power, as that was what was really desired after all. He was much surprised to discover that the Greene-Wheelock engine showed a higher efficiency or used less B. T. U.'s per electrical horse-power on the board than did the turbine. These tests were made under one-third load, half load, full load and 50 per cent overload, and after comparing the tests, and taking the whole proposition into consideration, he considered that the turbine showed itself to be a superior generating unit. Recognizing that superheat costs money, the question arose as to applying that superheat to an engine and to the turbine, and whether it would not be of equal value to the engine as to the turbine. They found it even more so, if anything, although on the other hand, they found a great deal of trouble in lubricating the cylinders on the engine. It has been running for some months with an average of 75 degs. to 100 degs. on the engine, and they still have trouble as to lubricating the high-pressure cylinders, but the economy on the engine with superheat is quite as marked as with the steam turbine. Their conclusions were, in purchasing apparatus, they should not be misled by guarantees as to the additional superheat. The speaker thought that the superheat costs practically as much as can be got in economy in steam coming from the turbine. The tests were made in their own shops, under their own supervision, and they were pretty sure of them.

W. H. Abbott, of Cleveland, remarked, in reply to Mr. Mailloux in regard to water in superheated steam, that they are operating two 1500-kw turbines with from 50 degs. to 100 degs. of superheat, and in a number of cases they had water present in the steam; whether it is present always in a small degree, he did not know, yet there are times when the water comes there in more or less great quantities, and yet the thermometer will be registering superheat all the time. Of course, the thermometer has more or less lag in its readings, but the results of their experiments and experience would indicate that they could have and do frequently have water in fairly large quantities present in the steam pipe with a high degree of superheat.

Mr. Hopkins added that the plant he had referred to was originally designed not to have separators on the steam line of the engines, but having experienced the trouble which had been mentioned, they were compelled to add separators on all the engines, although they had 100 degs. of superheat. They find that they get water in the engines almost as badly as the saturated steam.

Mr. Mailloux remarked that explained the difficulty—simply water entrained mechanically, and that the cause of it was a defect in the design of the piping or boilers, or in the operation of both, and that it could be remedied by a receiver placed near the turbine, or by the use of separator, as the gentleman had stated. With reference to the matter of economy, he thought the gentlemen present would be interested in knowing what is not a secret, but a matter which has been very well ventilated elsewhere, namely, the turbine manufacturers themselves did not claim that the steam turbine has the highest economy under all conditions. In fact, the turbine manufacturers recognize that the steam turbine is more efficient in the lower stages of pressure than in the higher stages. This was so well known that a very prominent English engineer has proposed to use the reciprocating engine and steam turbine in series, so to speak, using the reciprocating engine for the higher pressure stages, say from 200 lbs., and expanding the steam down to 10 lbs. or 15 lbs. above the atmospheric pressure, and using the lower pressure turbine with condensation. Under these circumstances it would be found that a few pounds of pressure, plus the condensation, would enable the turbine to develop as much power as the steam engine with the higher form of pres-

sure. That is why things which are intelligible from a thermodynamic consideration are not a mystery. As the gentleman from Columbus had pointed out, there are other things which enter into the case. They were not concerned alone in the cost of fuel in the operation of a plant, as the cost of fuel is a small proportion, after all, of the total cost per kw-hour. What they wanted was the total cost reduced, and in that equation there entered many things, like space maintenance, repairs, etc., and the bulk of evidence up to the present time indicated that the turbine will make up in other things for a slight discrepancy against it in steam consumption. There is a steam engine in Berlin built by one of the most distinguished firms in Switzerland, a triple-expansion, four-cylinder compound engine, 5000-hp unit, which running at very nearly full load has developed a hp-hour for something less than 9 lbs. of water per ihp-hour with superheat up to 600 degs. F. or more. That was perhaps the world's record up to the present time, but that engine had sixteen valves, complicated mechanism, and a great deal of lubrication was required. It has been stated that doubtless the cost of maintenance and the cost of the extra lubrication of the cylinder, lubrication of the valve motion, etc., and all the expenses connected with the operation of that unit make it less economical when the total cost per annum of producing the kw-year is considered. So it was an important thing to bear in mind that one of the reasons why the steam turbine appeals to us is that it simplifies the operation of the maintenance of the plant in other respects in that of economy of coal. The steam turbine had only begun its development, and the more it was developed the more it would approximate the results obtained by the steam engine.

Robert McCulloch, of St. Louis, inquired where Mr. Mailloux procured his coal, since he thought it was an insignificant matter in the production of power, while with most roads it is bigger than all the other items put together.

Mr. Mailloux answered that it was a pertinent question. He referred the members to the transactions of last year, where that question was discussed and covered. In his capacity of consulting engineer, he had to deal with problems where fuel varied from \$1.50 per ton to \$15 per ton, and he had stated quite distinctly in the discussions referred to that there is a certain critical price for coal at which the steam turbine is not preferable to the reciprocating engine, and that there was a price slightly higher at which the steam engine fell down in comparison with the gas engine. At a still higher price, the selection lay between the gas engine and the Diesel engine, so that the question of cost of fuel was most pertinent. It was the first duty of a consulting engineer when called upon to advise his client to investigate the cost of fuel.

Thomas Hawken, of Dover, N. H., said that he believed that it is the duty of every man here who has a turbine working satisfactory to testify regarding it for the benefit of others. He has charge of a station of the United Gas & Electric Company, in which are installed two 500-kw machines, and since they had started up, about three months ago, they had been working very satisfactorily. They have had no trouble whatever with the lubrication of the turbines. They had conducted a twenty-one-hour test and got the results on light loads, quarter, half and full loads and 50 per cent overload, and he considered the results as good as any secured with a first-class reciprocating engine. The output for the day was 4400 kw-hours, and they run from the machine, motor circuits, railroad circuits and lighting circuits, and the regulation was very fine on the machine. The coal consumption was 4 lbs. per kw-hour. As to the lubrication, he wished to state that for the benefit of those present that he was told that it was necessary to have the oil cooled, but he found that after a couple of months that the water would get into the oil and the oil became saponified and looked very much like lard; but they found that it was possible to separate it by putting a steam pipe into the oil. The people

who sold the oil then said it was not necessary to cool the oil. They claimed the oil would give perfect results up to 400 degs. He was doubtful, but tested the matter and found there were no bad results whatever, and the temperature of the oil is 140 degs. to 160 degs. They have a perfect return-water system for their plant; they pay a price of 25 cents per 1000 gals. of water, but with this return system they find that it does not require over $5\frac{3}{4}$ lbs. per kw, so that their water bill is not very high.

W. H. Abbott, of Cleveland, said that the experience related by Mr. Hawken as to the deposits in the oil was interesting to him. In one of the plants for which his firm were consulting engineers, they had a similar experience. The deposit Mr. Hawken referred to was said to be like lard; the deposit which they had was more like vaseline, a dark yellowish, reddish deposit. They do not think it is due to water in the cooler, because as far as they knew, there was no leak in the pipe, no collection of water which would indicate a leak. Nevertheless, in using different kinds of engine oil, the best that the builders could recommend, they always had this deposit in rather large quantities, which was rather a serious matter, since they occasionally had to stop a turbine and clean out all the oil chambers.

Mr. Hopkins remarked that the turbines at Columbus are different from those at St. Joseph, Mo., with which he was familiar. There the pipe for the oil and the pipe for the steam leaving the step bearing are so arranged as practically to produce a balance between the oil and steam, and at that point they are having no trouble with water in the oil. He was not familiar with the detail of the method of piping, as it is a recent installation, but as he understood it is the method of piping which the General Electric Company expects to adopt. The installation at St. Joseph is a 1500-kw turbine, and they have no trouble with sediment in the oil, or with water in the oil. With the 500-kw turbine at Columbus they had the trouble the gentleman mentioned, and they found that they had to change the oil.

President Ely announced that the next business would be the paper "On Steam Turbine Power Plants," by J. R. Bibbins. Mr. Bibbins read the paper, which was published in the last issue.

A. S. Kibbe, of the American Railways Company, of Philadelphia, asked Mr. Bibbins whether the relative economy of the high vacua, as deduced in the paper, would not apply as well to reciprocating apparatus as to the turbines?

Mr. Bibbins answered that it depended entirely on what advantage the engine is built to derive from the higher vacua. He thought that he was not far from the truth in stating that an engine with a cylinder ratio of 1 to 4 did not usually expand below 5 lbs. condenser pressure. It would, of course, become more and more economical as the vacuum was increased, but the proportion of the rate of increase, as you might call it, is decidedly less than in the turbine, because the turbine does expand down to condenser pressure. That had been shown time and time again by taking the temperature of the exhaust end of the turbine. If a condenser can be built with 28 ins. vacua, the turbine can be designed so as to reach any condenser pressure. It was a fact that the turbine, without being made extra large or bulky, can take advantage of a high vacuum, where the engine cannot do so directly.

W. H. Abbott, of Cleveland, stated that he had noticed Mr. Bibbins call attention to the large amount of air which is brought into the water by small leaks, and he wished to ask whether, reasoning from that standpoint, Mr. Bibbins would say he should not use open feed-water heaters, but rather use closed feed-water heaters, so as to exclude the air.

Mr. Bibbins answered that he did not know that he could answer the question from his personal experience, but the fact was apparent that the more air can be excluded from the steam cycle the easier it will be to attain the higher vacuum.

He thought that fact was brought out in almost every turbine plant. Of course, the air pump is built to remove the air, but every cubic inch of air that gets into the circulating system has to be taken out by the air pump, and that means power consumption.

Mr. Mailloux inquired if Mr. Bibbins found any practical difference in the power required when the air pump pumps air that is cool, when there is a cooler for the dry vacuum pump.

Mr. Bibbins answered that he could not reply to that question definitely from the fact that he had never seen any tests made to determine that particular point.

R. H. Rice said that, in regard to the question of air, it seemed to him the open heater would contain less air than the closed heater, as the open heater would give an opportunity for the air to escape while the water was circulating, which the closed heater would not do.

Mr. Hopkins, of Columbus, remarked that he knew of two turbine installations, in one of which an open heater was used and in the other a closed heater was used, both using the same form of air pump, and there was practically no difference which could be observed as to the quantity of air which was in the water.

President Ely announced that the next business would be the reading of a paper on "The American Diesel Engine," by E. D. Meier.

Mr. Meier presented the paper which was printed last week.

Mr. Mailloux said that he thought he ought to open the discussion on the paper by returning to Mr. Meier a hearty vote of thanks for the extremely clear exposition he had given concerning the Diesel engine. He had been studying this engine for some years, because he considered it one of the most interesting things before the profession. He wanted to ask one or two questions—what is the largest size in horse-power of kilowatt capacity of the Diesel engines that are now made, and what are the prospects of larger sizes being made? He also desired, if possible, a statement as to what we may expect the cost to be per horse-power or per kilowatt. He considered the engine was more interesting on account of the promises it holds forth for the future than on account of the practical results realized at the present time for large power stations. As he understood, the large size machines have not been commercial and have not been used in practice. It would be possible, he imagined, to get a plant of 1000 kw in one unit; but, of course, it would be out of the question to have two units of 500 hp or 10,000 hp, but he thought the time would come when engineers would be as enthusiastic about engines of the Diesel type as they are at present in regard to the steam turbine, as steps forward in the general evolution of prime movers.

Mr. Meier replied that at present they are building nothing larger than 450 hp to 500 hp, the largest being 500-hp engines. They are now putting up one of that size at Elkhart Lake to drive a portion of Sheboygan & Elkhart Lake Railway. The engine will be running in about six weeks or two months.

Mr. Mailloux inquired how many cylinders the engine contained.

Mr. Meier replied that it contained six cylinders; it is composed of two engines coupled together, with a dynamo between. The German firms had already built four engines of 400 hp each, four cylinders each, 100 hp to a cylinder, which they have been erecting for the street railway and light plant in Kiev, Russia. They expected to get to larger sizes in the course of the next year; would probably get to a 1000-hp engine before long; no difficulty had been experienced so far. The difficulty in regard to large gas engines had been on account of the explosive action and the uncertainty of ignition, which has been largely overcome, and on account of the high temperature. The temperature in the Diesel engine is considerably less than in the gas engine, and they had experienced no difficulty in the larger sizes. They naturally began with the small ones, on ac-

count of experimental work, but they are now designing larger machines and expect to have engines as large as 1000 hp by next year. As to the cost, that was at present pretty high, but that will come down in the course of time. A person could not buy a Corliss engine fifteen years ago for the price for which it can be purchased now, and the cost of a Diesel engine varied from \$60 to \$70 per horse-power for the plant. Mr. Meier called the attention of the members to the fact that when they compare that price with a steam engine or a steam turbine plant, they must remember that they have no boilers to consider, no smokestack, no coal handling machinery and no ashes to get rid of. All the engine requires is an underground tank—run the oil into that and the engine would do the rest. There was no fuel to take care of. The exhaust was as clear as air. In some cases latterly they had admitted a little water into the exhaust chamber of each cylinder, and that water cooled the gases, and there was a small vapor of steam coming from that, which was especially designed to kill the noise, as the latter had been very objectionable.

Mr. Hopkins inquired upon what mean effective pressure the engine was rated on.

Mr. Meier could not tell that—it was so long since he had taken any indicator cards. They began by taking indicator card tests on every engine, and after they got started they found the brake test was all they required—as long as they got the economy and power by the brake test they were satisfied.

Mr. Hopkins inquired how the initial and indicated efficiency compared with the ordinary gas engine, using in both cases 10,000 heat units.

Mr. Meier answered they had about 520 lbs. pressure at the beginning and took the gas out at about 30 lbs. or 40 lbs.—the expansion was immense.

President Ely remarked that the very valuable papers which had just been read, whose preparation had evolved so much care and effort, were a source of congratulation to the meeting, and that some recognition would undoubtedly be taken of them by the convention.

President Ely announced that the last paper before the meeting was that on "Transfers; Their Uses and Abuses," by Leon Jewell, of the Chicago City Railway Company. This paper was also published last week.

A very lengthy and interesting discussion on the subject of transfers then ensued, in which President Ely, John I. Beggs, Robert McCulloch, L. E. Myers and H. H. Vreeland took part.

Mr. Vreeland offered the following resolution:

Resolved, that the executive committee be and hereby is authorized and empowered to employ such clerical or expert assistance as it may deem desirable and to fix the compensation therefor.

Mr. Vreeland said that his reason for offering the resolution was the fact that the practical work of the association largely devolved upon the executive committee. At the annual meetings of the association the time must be given to a consideration of the important questions for which the delegates assemble, the practical and technical questions connected with the business. It was therefore necessary for the executive committee to do the real work of the organization and have it ready for the members, to report to the open convention in annual session. An organization of which he was the president, the New York Railroad Club—a steam railroad club with over 1200 members—empowered its executive committee over two years ago to take similar action, so that it has been possible for the club to do a great amount of work in the sessions of the executive committee during the year which is invaluable to the work of the organization. There are many questions which come before the executive committee of the Street Railway Association which they can more intelligently handle than the open convention, and by giving them such technical and clerical assistance as they may require, and allowing them to be the judge of what it shall be, when to be used, and what the com-

compensation shall be, he thought that the members of the association would be well repaid for any expenditure involved.

The motion was seconded and duly carried.

G. Tracy Rogers, of Binghamton, offered the following resolution:

Resolved, that the thanks of the association be extended to the officers and members of the manufacturer's committee for the very excellent arrangements provided by the committee for the entertainment of the delegates at this convention, and the very satisfactory manner in which they are being carried out.

Resolved, further, that the members of the association take this opportunity of expressing their appreciation, particularly of the music furnished by the band engaged by the committee.

The resolution was adopted.

The president called for the report of the committee relative to prices on girder and standard T-rails, and John I. Beggs, chairman of the committee, stated that the committee had no report to make at that time.

John Grant, chairman of the committee on compensation for carrying United States mails, submitted the report for his committee. It was a report of progress, coupled with an expression on the part of the committee that they believed the conditions would soon be favorable for having the matter considered by the Government.

On motion of J. C. Hutchins, of Detroit, the present committee was continued.

The president called for the report of the committee on nominations, which was as follows:

Your committee, appointed to nominate officers and select a place and time of meeting for the next annual convention of the association, respectfully beg leave to submit the following report:

Recognizing the necessity for and looking to an administration of the work of the association along more comprehensive lines, a general plan of which was tentatively set forth in the admirable address of the president, and which we heartily endorse, and to enable him to elaborate and perfect the plan so well outlined, we recommend the retention in office for another year of the president and first vice-president.

We also recommend that during the ensuing year arrangements be made, and negotiations entered into to the end that at our next annual convention the duties of the secretary shall be enlarged so as to require him to give his entire time to the work of the association, and that he shall be qualified by training and experience to collect and preserve information on technical subjects and other matters of general interest to the members of the association, and that his office may constitute a bureau of information on subjects of importance to our work and interests.

We recommend the following as officers for the ensuing year:

For president, W. Caryl Ely, president International Railway Company, Buffalo, N. Y.

First vice-president, Elwin C. Foster, president New Orleans Railways Company, New Orleans, La.

Second vice-president, John I. Beggs, president and general manager The Milwaukee Electric Railway & Light Company, Milwaukee, Wis.

Third vice-president, Richard McCulloch, assistant general manager St. Louis Transit Company, St. Louis, Mo.

Secretary and treasurer, Thomas C. Penington, treasurer Chicago City Railway Company, Chicago, Ill.

For executive committee—President, vice-presidents and John J. Stanley, general manager Cleveland Electric Railway Company, Cleveland, Ohio; Howard F. Grant, manager Seattle Electric Company, Seattle, Wash.; C. G. Goodrich, vice-president Twin City Rapid Transit Company, Minneapolis, Minn.; Frank G. Jones, vice-president and general manager, Memphis Street Railway Company; W. E. Harrington, general superintendent Public Service Corporation of New Jersey, Camden, N. J.

We recommend that the selection of a time and place for the next annual convention of the association be left to the incoming officers and executive committee. Respectfully submitted,

J. C. HUTCHINS,
Chairman.

H. M. LITTELL,
JOHN I. BEGGS,
ROBERT McCULLOCH,
CHARLES S. SERGEANT.

W. Worth Bean moved that the secretary be authorized to cast the ballot of the convention for the officers nominated.

The secretary cast the ballot, and the gentlemen were declared elected.

President Ely said: "Gentlemen of the Convention: I cannot but greatly feel complimented and highly honored by this mark of your appreciation of the work of the past year. I had firmly resolved upon this subject having been broached to me, and had communicated that resolve to a number of gentlemen, some of whom were upon this nominating committee, that it would be impossible for me to yield to any sense of duty in this matter along the line indicated. However, I suppose that this association is bigger than anybody in it, and that its call is unmistakable, that it constitutes a call of duty. It has not been my practice to shirk duties, and I accept this high mark of your appreciation.

"I would say that during the past year the members of your executive committee have worked very hard and very earnestly, and have always been perfectly willing to go long distances to meetings, and to spend all the time necessary to satisfactorily and properly do the things that were to be done. However, the executive committee and your officers will be powerless to effect good along the lines indicated or to do much that will be found to be beneficial unless there is the heartiest co-operation and assistance afforded by the members of the body of this association. It seems to me that we have all been guilty of a feeling of neglect—that is, a feeling that has manifested itself in a neglectful way. We have laid the affairs of the association down at the end of a convention to be taken up only at the assembling of another convention a year thereafter. Now, if this work is beneficial, if this is not boy's play, but man's work, it should be consecutively prosecuted in an earnest way, and the members of the association, after getting home, should feel that the duty was still upon them to manifest their interest by holding up the arms of the executive committee and the officials of the association. That can be manifested in different ways. We are all pretty well familiar to-day with the things that are contemplated, and I should be glad, and I know that the incoming officers would be glad, to see discussions in the technical press—that is, suggestions offered from highly intelligent sources concerning the nature of the work and the nature of the reformation of the lines of work that suggest themselves to the different members of the association.

"It does seem to me that it is an important thing that every president, every manager of a street railway company who feels that out of co-operative and united work may come good to the great body of the street railway fraternity, should do everything in his power to increase the membership of this association. Out of the large number of street railways in the country, something more than 700, we have less than 200 members. If there is approval of our work, certainly it should take the form of increased membership, and if we should double our present membership, and secure 400 members, we would still only have about 50 per cent of the companies eligible to membership. The dues from 400 members would give us a fund of \$10,000 a year, which would be sufficient to carry on this work in a most intelligent manner, so that the American Street Railway Association will come to be recognized as a body of authority and power, representing authoratively the street railway interests of this country. As the result of this increase in our membership and in the usefulness of the association, you will find that it will take a place among the well recognized and highly respected bodies and associations in the world, and that to be connected with it, either as a member or an officer, will be a matter of credit to all. There is already an International Street Railway Association, international between the different countries of Europe, which has just held a convention in Vienna.

"It seems to me that the tremendous amount of money, between \$2,000,000,000 and \$3,000,000,000, that is represented in our business in the United States, should call for a more vig-

orous support of this association; and if it should come about that we secure as members 75 per cent of the companies of the United States and Canada, the association will become a great progressive organization that will have a tremendous uplift upon our business and all engaged in it, manifesting itself in every direction that is beneficial.

"Without your co-operation the labors of the incoming officers will result in nothing. With your co-operation along the lines suggested, the lines that naturally occur to you, I believe that much can be done in the present year. So far as I am concerned, I am a very busy man. I have enough to do to keep me busy, and have sufficient sacrifices of my time to make in other directions, without the work entailed by this position to which you have again elected me. But I accept it, with all that it means, and with your co-operation will endeavor to perform satisfactory work." (Applause.)

The meeting then adjourned.

CONVENTION OF THE ACCOUNTANTS' ASSOCIATION

The first meeting of the eighth annual convention of the Street Railway Accountants' Association of America was held Thursday afternoon in the Transportation Building. The meeting was called to order at 3:40 by the president, F. E. Smith, of Chicago.

The President—At a meeting of the executive committee at Chicago last April it was voted to proceed with the roll call at the annual meeting.

The Secretary—Instead of calling the names of individuals I shall call the roll of companies, and I would like to have those representing companies respond with their own names so that I can correct the registration where necessary.

The President—When the name of a company is called I wish the gentleman representing it would rise and state his name.

Secretary Brockway then proceeded with the roll call as provided for.

The President—The next business before the meeting will be the reading of the minutes of the previous meeting.

The Secretary—I would like to call the attention of the convention to the custom which has prevailed since this association was first organized, to approve the printed report instead of reading the minutes, and I will offer that as a motion now. The motion was seconded by Mr. Duffy, and, being put to a vote, prevailed.

The President—The next business before the convention is the annual address of the president. (This is printed below.)

PRESIDENT SMITH'S ADDRESS

We are assembled here for our eighth annual convention among surroundings more varied and of an entirely different character than any we have heretofore enjoyed. It is perfectly proper, however, that an association which stands, as does ours, as typical of the advanced ideas of modern electric railroading, should hold its meeting at this Exposition, where are shown the latest and best results of human ideas as exemplified in the arts and sciences. The outside attractions are so great that we shall have to curb our natural desire for sight-seeing and attend strictly to business during the few hours which are allotted to us, if this meeting is to be as successful as those of former years. In this connection let me state that this session is held this afternoon at this place that we may devote the whole of the two days allowed to us in the Transportation Hall to the discussion of the reports there to be presented. It was felt by your executive committee that two sessions a day would not be practical, and we determined to start our meetings a little earlier than usual and continue them a little longer at the one daily session, and let the members spend the rest of the day as they desire. Through the efforts of our secretary and Mr. Henry, the first vice-president, arrangements were made with the hotel people that have resulted in our being where we are at this time.

To-morrow we are to try an experiment in having a joint meeting with the Mechanical and Electrical Association, and I shall be very greatly disappointed if we fail to find that this joint meeting has been productive of good results and that it is but the forerunner

of many others of a similar character in years to come. It may not be out of place to state to you how this came about. Shortly after my appointment last year, I began to think of this year's meeting and of suitable topics for papers and discussions. I took the matter up with the other officers and the executive committee. One of the subjects we decided upon was reports covering operations of car houses and car shops, and a committee was selected, subject to their acceptance of the appointment, to present a report. Before the matter had been taken up with this committee, however, the executive committee of the Mechanical and Electrical Association had held a meeting and selected a committee of one to prepare a paper on practically the same subject; it was then that the idea of having a joint report by committees representing both our associations, to be presented at a session that we could both arrange to attend, occurred to me, and the matter was taken up with the president of the other association, who was heartily in accord with the idea, and has done his share in perfecting the arrangements. To-morrow we are to have the result.

Our members must not forget that inasmuch as this meeting takes place on one of the days allotted to our association, the Mechanical Association are in a sense guests of ours, and we should take especial pains to make them feel at home and be repaid for waiting, as many of them have, to take part in this discussion. I spoke of this as being an experiment for the reason that, so far as I know, it is the first joint session ever held between the accountants of either steam or street railroads and any of the operating departments. I do not think it will be the last. Managers are fast realizing the vast amount of good that can be obtained from our department if they will only call on us for the statistical information we are in a position best to provide them, and the idea that we were simply bookkeepers and that to a large extent the department was a source of needless expense, has practically died out, and we are looked upon as a necessary part of the organization of a railway company. We do not make the wheels go 'round, but the inquisitive one who wants to see how they go, is getting into the habit of looking through our specs to see if they are running right. Before we knew that our time was to be so limited, we had anticipated having a committee prepare and present a report on the proper reports covering the operation of power plants, in so far as it affected the accounting department.

Your executive committee at its meeting in April last, decided it best not to take up that subject this year. I learn a movement is under way to combine the maintenance of way department with the mechanical and electrical and have them all in one association. Should this be brought about there are a number of subjects for future joint meetings that can be most profitably discussed. We shall have for our discussion at the Saturday session the questions as submitted to the Question Box, with such others as may be presented at that time. This Question Box idea is growing. It seems to be a short way to be of mutual help. I was quite a little surprised to see how few of our members had matters which bothered them, or, having them, cared to submit them to the association for discussion. I am particularly pleased to find that answers have been submitted by a number of companies who are not regularly represented at our meetings and that they did not hesitate to sign their answers. This shows that interest in the work of the association is not confined to those representatives who are able to attend the meetings. It is a matter of regret that so many of the members located in the larger cities failed to send in answers, but I trust their representatives will attend this convention and take part in the discussions. From the answers submitted it will be seen that there is quite a diversity of opinion regarding the proper treatment of the matters covered by the questions, and it would seem as though the discussions on the floor ought to be very interesting.

It is a pleasure to be able to state that there has been a slight net gain in our membership during the past year, as will be shown by the report of the secretary. The increase has not been as large as we had hoped. Your officers have written numerous personal letters, with only moderate success, and had it not been for the booklet gotten out by our able secretary, setting forth so admirably the advantages to be derived from being connected with us, it would probably have been my lot to pattern after some of the Russian generals and "regret to report, etc." I am of the opinion that the increase in the State associations is having the effect of retarding our growth, and that it will take the united effort of all our members if we are to have any substantial gains in the future.

The committee which prepared the "Report for Electric Railways," which this association approved in Detroit, and which was approved and adopted by the National Association of Railroad Commissioners last year, thinking they had fully completed their labors, asked to be discharged at the Saratoga convention, and, as they were not a standing committee, this was done. The members of that committee have had considerable correspondence during the year in connection with their report, and are liable to have more at times. It would seem to be, therefore, a good plan to have a per-

manent committee in charge of this subject, and I trust some action will be taken at this convention with that end in view.

You will remember that at the Saratoga convention Mr. Duffy, as chairman of the standardization committee, gave us an outline of a form of report that has been prepared for the Municipal Tramways Association of Great Britain, and spoke of the efforts he had made to have them adopt the form prepared for use in this country. I think it is a misfortune that Mr. Duffy was unable to attend the Glasgow convention as he had expected, as I believe that he would have been able to persuade them that our report could be made to cover their conditions and adapted to their ways (not only maintenance of ways, but other ways), and that they would have adopted a report more nearly like ours than the one they finally adopted. We were invited again this year to have representatives of our association attend their conference, but the invitation came too late to be acted upon. However, it is evident they look with favor upon our association, and it is to be hoped the kindly feeling will continue. We can assure them of our best wishes for their success.

There was held last month in Vienna the biennial convention of the "International Tramways and Light Railways Association," at which time there was presented a report from a committee on a standard form of monthly operating report. This report will be found in full in the STREET RAILWAY JOURNAL of Sept. 10, 1904, and in the same issue a most able editorial on the subject, in which there are pointed out many of the defects in the report and a plea for the adoption by them of the American report. The editor says in concluding his article:

"We must, however, again argue as we did a year ago, for one standard international report. We believe it to be a necessity. The rapid standardization of operating practice must bring standard accounting. One cannot come without the other, as it is impossible that standard operation can come except as it follows standard accounting. Operation cannot be compared, nor can comparisons be utilized unless the accounting shall first be upon a similar basis.

"At this present time the situation is that America has a standard classification and form of report so firmly established and widely adopted by both operating companies and financial interests that it is an actual standard. Its predominant position has been strengthened in this country through its adoption by both the United States Government in its census work and by the National Association of State Railroad Commissioners. It has been in service for a long time, and by its flexibility and utility has given such satisfaction that it could not be changed without endless confusion. On the other hand, as we pointed out a year ago, there is nothing in any of the European forms of reports but could be adapted to the American with but slight changes. It seems to us, therefore, there is hardly more than one side to the question, and we hope that our European confreres are not permitting the word American to deflect them from endeavoring to obtain a standard report that will be actually international. They will certainly not be able to obtain the results which all desire from a standard report if they permit themselves to adopt three forms. Through the operation of the tremendously virile ideas of the last half century, the world has become to all practical purposes very much smaller than it was fifty years ago. Securities are held in other countries than those in which the investments are located, and we submit that the time is coming when, among other demands, a standard form for electric railways will be one. We submit, further, that the one which happened to be composed and adopted first in America, is, by its simplicity and adaptability, one which can be without excess of confusion and no greater expense adopted by Europe, thus clearing what will eventually be, should this course not be followed, the atmosphere of confusion and uncertainty."

It seems to me that our association should take some action in this matter. We are the pioneers of street railway accounting. We have been exceptionally successful in our efforts so far, and may reasonably look for the same success in the future. I think our association should appoint a committee whose duty it would be to get in touch with the associations of Great Britain (as I understand that beside the association of roads owned municipally, there is another made up of the companies controlled by private capital) and also with the International Tramways and Light Railways Association and endeavor to bring about the getting up of a report that should become international. The advantages of such a report cannot be overestimated, and I trust this association will give the subject careful consideration and take such action in the matter as may bring about results which, it seems to me, are so promising for good.

Your president learned indirectly that some of the members of the International Tramways and Light Railways Association purposed visiting this country and attending the Exposition at St. Louis, and an invitation was extended to them through a friend of our association, who was in a position to bring it before them with the least possible delay, to so time their visit as to be here at this time and meet with us. I am afraid, however, that even with these

precautions our invitation went forward too late to be acted upon this year. I trust it will serve the purpose of bringing our association to their notice and that it will result in having them send representatives to our next meeting.

That this association is held in high esteem by the National Association of Railroad Commissioners is again evidenced by the fact that, as your president, I have been called upon to name a committee of three who shall represent us at the annual meeting of that association to be held in Birmingham, Nov. 15, 16 and 17, and have appointed as such committee Messrs. Ham, Duffy and Mackay, all of whom have represented us at other conventions of that association, and I am sure will do so most ably at the coming one. In the event that any of the gentlemen are unable to attend, Mr. Brockway will serve as alternate.

At the Saratoga convention E. M. White, of Hartford, was appointed a committee of one to collect and arrange a new set of blanks for the use of members. This he has done, and you will find them displayed in the rooms set apart for our meetings in the Transportation Building. I am afraid very few of us will appreciate the vast amount of labor it was to get this large number of forms so systematically arranged, and I am sure I but voice the feeling of all our members when, on behalf of the association, I thank him for the great service he has rendered it and assure him of our hearty appreciation of his work.

In concluding, I desire also to thank the officers and committees who have served during the past year for their hearty co-operation and earnest efforts for the success of the association.

Thanking you for your kind attention, we will now proceed to hear the reports of the secretary and treasurer.

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

ANNUAL REPORT OF THE SECRETARY-TREASURER

In submitting my annual report as secretary and treasurer for the year just closed, I have to tell you that we have gained twenty-eight new members; we have lost sixteen, making a net gain of twelve, which is not a very bad showing in view of the fact that mergers are still continuing. The association has suffered considerably from the merger fever in the last five or six years, and it some comfort to me, and I am sure to the executive committee, to advise you that we have made a gain. As a list of reasons for resignations I want to read to you that on account of merger we have lost five out of sixteen; on account of receivers appointed, 2; on account of "cannot afford," 1; on account of practically all steam railroad, 1; three apparently from the records which I have and from their actions in the matter, joined, got their reports and immediately resigned; two gave as their reason that they were outside of control, and two are so far unenlightened that they cannot see any use in the Accountants' Association.

In regard to delinquencies, I have reason to believe that three will be paid.

The companies joining the association in 1903-4, were:
 Fonda, Johnstown & Gloversville Railway, Gloversville, N. Y.
 Rochester & Eastern Rapid Railway, Canandaigua, N. Y.
 Public Works Company, Bangor, Me.
 Pueblo & Southern Traction & Lighting Company, Pueblo, Col.
 Elgin, Aurora & Southern Traction Company, Aurora, Ill.
 Coeur d'Alene & Spokane Railway Company, Spokane, Wash.
 Youngstown & Southern Railway Company, Youngstown, Ohio.
 Cleveland, Painesville & Eastern Railroad, Willoughby, Ohio.
 Niagara, St. Catherines & Toronto Railway, St. Catherines, Ont.
 Northern Texas Traction Company, Fort Worth, Texas.
 Knoxville Traction Company, Knoxville, Tenn.
 Lima Electric Railway & Light Company, Lima, Ohio.
 Cleveland, Painesville & Ashtabula Railroad, Cleveland, Ohio.
 Indiana Northern Traction Company, Marion, Ind.
 Boise Traction Company, Boise, Idaho.
 New Jersey & Hudson River Railway & Ferry Company, New York.
 Pennsylvania & Mahoning Valley Railway Company, New Castle, Pa.
 Cincinnati, Lawrenceburg & Aurora Electric Street Railroad, Cincinnati.
 Norfolk Railway & Light Company, Norfolk, Va.
 Scioto Valley Traction Company, Columbus, Ohio.
 Los Angeles & Redondo Railway Company, Redondo, Cal.
 Montgomery Traction Company, Montgomery, Ala.
 Coal Belt Electric Railway, Marion, Ill.
 City & Suburban Railway, Portland, Oregon.
 Indianapolis & Cincinnati Traction Company, Indianapolis, Ind.
 Camden & Trenton Railway, Riverside, N. J.
 Public Service Corporation of New Jersey, Newark, N. J.
 Interborough Rapid Transit Company, New York, N. Y.
 While anticipating the report of the executive committee I desire

to add that the committee has examined the books of the secretary-treasurer and have certified them as correct.

The gross receipts and expenditure for the preceding year were as follows:

Receipts	\$5,238.59
Expenditures	3,343.63
Cash in bank	\$1,894.96

On motion of Mr. Wilson, seconded by Mr. Simpson, the report of the secretary-treasurer was unanimously adopted.

Mr. Wilson—I would like to ask the secretary how many members we now have in good standing?

The Secretary—We have 148 at the present time.

The President—The next business is the report of the committee to make new collection blanks and forms, by Mr. White, of Hartford.

REPORT OF THE DEPARTMENT OF BLANKS AND FORMS
SUBMITTED BY ELMER M. WHITE

Blanks and forms have always been of interest to members of this association, as the records will show. When the meeting to organize this association in Cleveland, Ohio, March, 1897, was called it included the following: "Delegates are urged to bring complete sets of forms and blanks for exchange and inspection."

At the Boston meeting in 1898 some of you will remember the large collection that was brought for inspection and the great interest shown by the members present; so great was the interest that at that meeting Secretary Brockway was appointed custodian of blanks. The thought as expressed at this meeting was that the collection should be put in a permanent form, so that members could have access to it, and that new blanks should be added from time to time, and so kept up to date.

At the Chicago meeting in 1899 the department of blanks became a permanent feature of the association. Secretary Brockway had arranged the Boston collection, to which had been added many thousands of new blanks, in fourteen large books, thirteen books 20 ins. x 30 inches, and one book 30 ins. x 30 ins. The collection now was in permanent shape, and the arrangement had been so carefully made and indexed that one could readily find the kind of blank he desired, or if the blanks of a certain company were wanted, they also were soon located. It is believed that this collection of blanks from about eighty representative companies of the country has been of great benefit to the association, not alone to the smaller and younger companies, but to the larger and older ones. The collection was shown at the meetings at Kansas City in 1900, New York, 1901, and Saratoga, 1903 (at Detroit in 1902 owing to a delay on the road the blanks did not arrive until after the meeting adjourned).

While the collection has been of great help to the members that have been able to attend the meetings, the members that have not been so fortunate have been able to get such blanks as they desired from the duplicate set, and in that way have been kept informed as to what is the latest and best in any line they may be working.

At the Saratoga meeting the executive committee recommended " * * * the appointment of a committee of one to make a new collection of blanks and forms, as the present collection is over four years old; it has been very valuable and would be still more useful if it were up to date." Mr. Ross moved that the president appoint a committee of one as recommended, and President Davies appointed the undersigned.

On Nov. 2, 1903, a request was sent to the 143 members of the association. This was followed by a second appeal on Dec. 2, 1903. Early in Jan., 1904, members had sent in about 13,000 blanks, so that the committee decided to issue no further calls. However, two or three large sets came in during the next two months, so that the total number of blanks reached nearly 20,000, divided among eighty companies. This does not mean that there were that many different blanks, but it does mean 20,000 separate pieces of paper, which cover the duplicate set and the duplicate and triplicate showing of forms.

Our first work on receipt of a package of blanks was to count them, stamp the date filed, and see if a duplicate set had been sent. The duplicate set was often not considered by the sender when the blank was printed on both sides. I should say that about 20 per cent of the returns were short one or more such duplicate blanks to make their collection complete. Letters had to be written to get the missing blanks. Among the directions that were in the original letter was: "Send all blanks flat. Do not fold anything to a smaller size than 14 ins. x 17 ins.," and "If blanks do not have name of company printed, write name in ink or stamp with rubber stamp." I think there were at least twenty packages that came rolled, some of them so tight that it was almost impossible to straighten out and get into good shape the heavy ledger paper and cards which were sent in this way. Many of the companies

neglected to put their names on the blanks. This was important, for they were to be indexed.

After the blanks had been counted, stamped with date, and names of companies written on, came the distribution to the proper sub-division in the various books. We soon found that it was necessary to write out a brief description of what was to be included in these various sub-divisions, both for our own guidance in distributing and also for the member who wished to find a blank covering a certain subject. Here was one point where I cried, Help! but had to go it alone and do the best I could. I am sure you will not all agree with me in all my sub-divisions and the explanation of them, and I shall not blame you or feel badly if you do not. We do not all look from the same point of view or have the same experience to guide. The explanation of what is in these sub-divisions will be found at the end of this report. It will be of much assistance to members desiring to find a certain kind of blank in the collection here on exhibition, or to the member who wishes to have a certain blank sent to him. In the past it has always been easy for a member to make clear just what was wanted; we trust that we have made the task easier.

The present collection is in sixteen loose leaf books, with 152 sub-divisions. The decimal idea was followed in the numbering of the sub-divisions. Former book 1 we call 100, and each sub-division goes by steps of five from 105. This gives an opportunity to put in new sub-division without using half numbers or letters. Each sub-division in the books of blanks has its own page numbers; each begins at one.

Instead of following the scheme of indexing for companies that was used in the old collection, we have made a separate loose leaf index, using a page for a company, arranged alphabetically by cities. Mr. Brockway has found that that system was preferable. Numbers only are used in this index; for example, a black number 570 indicates "material supplied," a red number five indicates the fifth page of 570. Of course to know the meaning of the black numbers one must consult the second section of this report showing the sub-divisions. A list of books printed on an orange-colored card shows the class of blanks in each book, and a label shows the number of the book. The list shows that Book 500 is "material," and the label on cover is 500, and the blue number on every page is from 505 to 580.

The class of blank in the various books has not been changed from the original collection except that "gas and water" has been added to Book 1400, "Electric Lighting." Book 1500 has been used for "freight and express," which will be found of interest to many, and "Glasgow Corporation Tramways" has been put in Book 1600. This book is also worthy of your attention, for there is much that we can learn from our brothers across the water.

The work has progressed slowly, owing partly to lack of room for handling such a number of pieces of paper, and also the limited time at my command for doing the work that I could not detail to others. My daughter has done all the work, counting, stamping, distributing, pasting, indexing; the scheme of classification numbers and indexing is hers. I examined every blank when it came in, wrote the description of the sub-divisions and checked the blanks after they had been distributed. The work of distributing was very perplexing at times, for the information on some of the blanks covered so many subjects that they could be put almost anywhere and be right. Other blanks I have not yet been able to find out what they were made for, so they will not be found in the collection. I had some thoughts of making a separate book of them, but did not. This work has given me great pleasure, and I think has done me good and I hope I know more about blanks than I did a year ago.

I found many excellent blanks, and I am sure the collection shows that much more thought is given to the matter of blanks than there was when the previous collection was arranged, more thought as to size and quality of paper, arrangement of type, etc. I am sure that the suggestions made by Mr. Brockway at the Chicago meeting have been followed in many cases. There are, however, one or two points that will bear repeating; 1. Always put a form number on every blank. There is no better way of identifying it than this. Use whatever scheme you wish, either consecutively as the blanks are made, or give each class of blank its own hundred numbers; for example, the writer gives all blanks relating to "injuries and damages" some number in the 1000 class, and "maintenance" in the 600 class. The quantity, month and year are usually added to the form number and are of much assistance in keeping track of the number of sheets used in a given time. 2. The name of the company is still the prominent line on many of the blanks in this collection. It is all right, of course, to make a good display of your name when the sheet is to go to the outside world, but of what benefit is it to have a coal report from the power station with the name of the company in large, bold type, and the words "coal report," or the word that tells what the sheet is, so small that it is hard to find or possibly not on at all?

The loose leaf, I find, is being used for many different purposes, from ledger, cash book, voucher record, away down the line. The advantages of it are many, and its use will probably extend into new fields. The loose leaf has had a tendency on the one hand to reduce the size of many forms to a more convenient shape, and on the other hand to increase the size of some, for I find records that were put on a 3-in. x 5-in. card now kept in better shape on a 9 in. x 11 in. sheet. The card system is most excellent for many things, but it cannot be used to advantage for everything. I think there is no doubt that the card system and the "loose leaf" have both come to stay, but let us look carefully at their respective merits before we decide which we adopt for a new form.

I think there is one good thing the "loose leaf" has done, and that is to reduce the size of our "reports." I mean the 20 in. x 30 in. sheet that was covered on both sides with all different kinds of information we could think of, and submitted to the management every month. This sheet was usually folded, backed and put in a pigeonhole. We now have a sheet about 9 ins. x 11 ins. or 10 ins. x 12 ins. One company will use two of these sheets, while another will use a dozen or even more, depending on how much information they tabulate each month. Of course, a company that has electric lighting, gas and water departments keeps them on different sheets. But no matter how many or how few sheets, they will be found in a loose leaf cover, where are added the sheets month by month, so that we may readily have the reports for, say, five years in as convenient form as if the same were in a bound book. You will find in this collection quite a number of different exhibits, and the member who still uses the "blanket" I will ask to stop and look over Book 1206.

The collection is so good that none of us can afford to let the opportunity of a careful examination go by. I will not ask you to look at every one of the 1405 pages, but do give the book or books you are most interested in a little time and see if someone else has not worked out some blank a little better than you have.

(The report was accompanied by sixteen large books with loose leaves on which the blanks had been pasted, and by a comprehensive index.)

The President—The next business is the appointment of a committee on nominations and a committee on resolutions. I will appoint as a committee on nominations the following:

C. N. Duffy, secretary-auditor Chicago City Railway Company, chairman.

P. L. Young, comptroller Public Service Corporation, Newark.

H. C. Mackay, comptroller The Milwaukee Electric Railway & Light Company.

A. L. Linn, Jr., auditor Utica & Mohawk Valley Railway.

J. W. Lester, treasurer Worcester Consolidated Light Company.

As a committee on resolutions:

W. J. Kehl, general auditor Norfolk Railway & Light Company.

W. J. Tharp, auditor Little Rock Railway & Electric Company.

W. J. Lynch, accountant Quebec Railway & Light Company.

P. A. Connolly, auditor Lima Railway & Electric Company.

F. J. Duffy, secretary Beaumont Traction Company.

Mr. Duffy—Mr. President, if it is in order, I would like to move the following resolutions and move their adoption:

Whereas, the American Street Railway Association at its meeting, held this day, adopted the following resolution:

Whereas, during the past year many suggestions have emanated from different sources concerning the desirability of rearranging the lines and methods of work of the American Street Railway Association and its existing auxiliary organizations, the Street Railway Accountants' Association of America, and the American Railway Mechanical and Electrical Association, to the end that through the medium either of these existing organizations, or such other and additional organizations as may be deemed desirable, the work which was originally embraced within the scope of the objects of the parent organization, the American Street Railway Association, may be so enlarged and so prosecuted as to bring about results of greatest value to the street railway corporations of America, and at the same time that whatever organizations may be deemed most desirable to conduct such work shall be brought more closely together along systematic and correlated lines of work and procedure, and

Whereas, at this convention the matter above mentioned has taken such form that representatives of the different organizations have met in an official way and have made some progress in the consideration of the matter; now, therefore, be it

Resolved, that it is the sense of the executive committee of the American Street Railway Association, in formal meeting assembled, that it is desirable that a closer working arrangement should be effected between the different organizations conducting street railway work, and to that end be it further

Resolved, that the executive committee of the American Street

Railway Association hereby recommends to its convention, about to be assembled, such amendments to its by-laws as may be necessary to provide for increase in the size of its executive committee, sufficient to accommodate as members thereof, by virtue of their office, the presidents of such auxiliary organizations engaged in street railway work as may be approved and fostered by the American Street Railway Association; and, be it further

Resolved, that the American Street Railway Association be requested to commit all matters and things concerned in bringing about the above-named objects to its executive committee with power to act. And,

Whereas, by the provisions of the above resolution this association is to be represented by its president on the executive committee of that association; therefore, it is now

Resolved, that the thanks of this association be expressed to the American Street Railway Association for the signal honor thus conferred upon us, and, that, as a representative of this association, the president is directed to take such action in the meetings of the committee of the American Street Railway Association as in his judgment will conserve the best interests of this association and the companies we represent in all matters pertaining to the forming of such an association or an amalgamation of the association so formed.

Mr. Wilson—I desire to second the motion to adopt the resolutions just read.

The President—Perhaps I might say in explanation that Mr. Brockway and myself were present at the executive committee meeting referred to, together with representatives from the Mechanical and Electrical Association. I think this association may safely entrust its future to such a gentleman as the American Street Railway Association may elect president, and I know that that association is very friendly toward us. I hope the resolution will pass.

A vote being then taken upon Mr. Duffy's motion, the resolution was unanimously adopted.

On motion of Mr. Wilson, the meeting adjourned.

FRIDAY'S SESSION

Friday's session of the Accountants' Association was devoted to a joint meeting of the American Railway Mechanical and Electrical Association and the Street Railway Accountants' Association. The business considered at the meeting was the report of the joint committee on "Blanks for Shop Records and Accounts," published on page 700 of the last issue of this paper. The report was presented by H. M. Pease, auditor of the International Traction Company, Buffalo, a member of the committee. In the very extended and comprehensive discussion which ensued, the following-named gentlemen took part: P. S. Young, Jersey City; W. O. Mundy, Pittsburg; H. C. Mackay, Milwaukee; C. N. Duffy, Chicago; J. S. Smith, Kansas City; W. E. Harrington, Camden; F. E. Smith, Chicago; W. G. Ross, Montreal; H. H. Adams, Baltimore; E. W. Olds, Milwaukee; C. L. S. Tingley, Philadelphia; John Lorenz, Jackson, Miss.; Frank R. Henry, St. Louis; W. H. McAloney, Denver; W. B. Brockway, Nashville; J. L. Green, Dayton; D. A. Faut, Chicago.

On motion, the report of the committee was approved, and the members recommended to adopt the systems of shop records presented by the committee as far as practicable in their various companies. A vote of thanks was passed to the committee, and the committee was continued.

On motion of Mr. Olds, of Milwaukee, a vote of thanks was tendered to the Accountants' Association for the hearty cooperation its members had given in the work of the joint committee.

Robert McCulloch, of St. Louis, was present during a portion of the meeting, and being called upon for remarks, expressed his approval of the work done by the Accountants' Association.

SATURDAY'S SESSION

At Saturday's session the first business was the report of the executive committee. This was followed by the report of the committee on a standard system of street railway accounting,

C. N. Duffy, of Chicago, chairman. This is published below. The "Question Box" was then read.

REPORT OF THE STANDING COMMITTEE ON A STANDARD SYSTEM OF STREET RAILWAY ACCOUNTING PRESENTED BY C. N. DUFFY, CHAIRMAN

Your committee on a standard system of street railway accounting beg leave to make the following report:

We recommend that no change be made in the classification of construction and equipment accounts or the classification of operating expense accounts, as revised by the association at its sixth annual convention, held in Detroit, Mich., Oct. 8, 9 and 10, 1902.

From time to time, as far back as the year 1898, your committee has answered certain questions asked by different members, with respect to the disposition and charge of various items in connection with the use of the standard system of street railway accounting. Your committee, deeming this information instructive and valuable to all of the members of the association, thought it advisable to submit the questions asked and the answers given to this convention, with the idea of continuing the presentation of such information annually in future reports of the committee to the association.

Q. 1.—To what account should the salary of the master mechanic be charged?

Answered by C. N. Duffy, Sept. 21, 1898.—Account No. 9—Miscellaneous shop expenses.

Q. 2.—To what account would you charge premiums on a bond given to the city to guarantee the operation of the railroad?

Answered by C. N. Duffy, Sept. 9, 1900.—Operating Expense Account No. 32—Miscellaneous general expenses.

Q. 3.—To what account would you charge premium paid on bond given to the city to comply with city ordinance regarding the running of cars on the street?

Answered by C. N. Duffy, Sept. 9, 1900.—Operating Expense Account No. 32—Miscellaneous general expenses.

Q. 4.—To what account would you charge the rent of the general office while road is being constructed? Also salary of general manager?

Answered by C. N. Duffy, Sept. 9, 1900.—Construction and Equipment Account "O"—Miscellaneous.

Q. 5.—To what account would you charge damage to construction locomotive, and to John Smith's property, which was caused by some unknown person starting the locomotive at night, causing same to run off the track, and running into John Smith's property, damaging locomotive and J. S.'s property?

Answered by C. N. Duffy, Sept. 9, 1900.—Construction and Equipment Account "O"—Miscellaneous.

Q. 6.—To what account would you charge a Wells Light, which cost \$100, and is used at the gravel pit out in the country, so that the men can see to dig gravel at night? This gravel is used to fill up roadbed on which tracks are being laid.

Answered by C. N. Duffy, Sept. 9, 1900.—Construction and Equipment Account "D"—Track and roadway.

Q. 7.—To what account would you charge rent that is paid every six months, for a strip of land on which the tracks are laid?

Answered by C. N. Duffy, Sept. 9, 1900.—Operating Expense Account No. 36—Rent of land and buildings.

Q. 8.—Are all expenses of whatever nature to be charged to construction and equipment account until the road is completed?

Answered by C. N. Duffy, Sept. 9, 1900.—Yes.

Q. 9.—What account should be charged with hose jumpers when they are purchased to take the place of other hose jumpers, and are used on the streets for the purpose of cars going over the hose of a fire engine, in case of a fire?

Answered by C. N. Duffy, July 29, 1901.—Account No. 22—Miscellaneous car service expenses, under the instruction: "Cost of getting derailed cars on track and removing obstructions and wreckage."

Q. 10.—What account should be charged with the construction and laying down of temporary tracks and bending rails for same for the storage of cars for temporary and special occasions; also putting in temporary cross-overs from one track to another?

Answered by C. N. Duffy, July 29, 1901.—Account No. 22—Miscellaneous car service expenses, under the instruction: "And all other car service expenses not otherwise provided for."

Q. 11.—Under the standard system of accounting which this company follows, we are directed to show under miscellaneous income the income from sale of power in excess of the actual cost of producing the same. We are also directed to deduct from the cost of the operation of our power plant the cost of producing the power sold so that the cost of the operating of our power plant as shown by our books will be what it actually costs us to provide power for our railway service only.

As you are aware, there are six accounts under the heading "Operation of Power Plant" and two accounts under the heading "Maintenance," which are all affected, more or less, by production of power. The writer does not quite understand how we are to deduct the cost of producing the power sold from the total cost of our power. We presume, however, that we will deduct from each one

of the six accounts under the heading "Operation of Power Plant" that proportion of the cost of producing the power sold which that particular account bears to the total. Is this the correct way to treat this matter or not? If it is not the correct way, would you kindly write to us explaining how we are to deal with the matter? We would ask you to favor us with an early reply, as we expect in a very short time to be selling power on a very large scale. We are not selling it at present, and therefore the question has not come up, but we are about to make contracts to furnish power for two other roads in our vicinity. We have a very large hydraulic power plant, and it is our intention to sell power on a very extensive scale. In all probability our income from the sale of power will more than exceed what it would cost to produce power for this company for railroad purposes alone.

We are very anxious to follow out the system of the Accountants' Association, as we know it is a good one, but as it is not perfectly clear to the writer's mind, we would ask that you send us some further explanation.

Answered by C. N. Duffy, Jan. 15, 1902.—In order to determine the cost of producing power exclusive of fixed charges and depreciation, the total of Accounts 10, 11, 12, 13 and 14, classified under "Operation of Power Plant," and the total of Accounts 4 and 5, classified under "Maintenance of Equipment," and the cost of maintenance of power plant buildings carried in Account No. 3, classified under "Maintenance of Way and Structures," should be taken. This total represents the cost of producing power. The power used in the operating of your railroad and the power sold can be proportioned according to the meter readings at the power plant. This will enable you to show the cost of producing power used and the cost of producing power sold by apportioning the cost of producing the power between what is used on the railroad as shown by the meter readings and what is sold as shown by the meter readings.

The income from the sale of power should be distributed between the accounts that make up the cost of producing the power, to the extent of the cost, and the profit of selling the power, to "Miscellaneous Income."

The distribution over the accounts that make up the cost of producing power should be in the proportion that each account bears to the total cost.

Q. 12.—We have in connection with our property some air compressors. Some are situated at car houses, and a pump for same is operated by a small motor in the car house. In other cases they are adjacent to our power stations, and the pump is operated by power furnished direct from the station. These compressors are used for filling the tanks on our cars for operating the air brakes on same.

I am somewhat at a loss to know to what account I should charge the maintenance of the air compressors and the motors for operating same.

Answered by H. J. Davies, May 20, 1903.—I should regard your air compressors, pumps, and the motors that operate them as miscellaneous tools, and should charge the expense of maintaining them to Account No. 9. Of course, the expense of maintaining the tanks and air brakes on the cars should be charged to No. 6—Maintenance of cars, and I think the cost of the air, which would include the current for operating the compressors and the labor of getting the air into the tanks, should go to Account No. 21—Car service supplies.

Q. 13.—What operating expense account is chargeable with fire hose and fittings for same when for repairs and renewals of such articles in car houses?

Answered by C. N. Duffy, Dec. 24, 1903.—Account No. 22—Miscellaneous car service expenses.

Q. 14.—What operating expense account is chargeable with fire hose and fittings for same when for repairs and renewals of such articles for power plant?

Answered by C. N. Duffy, Dec. 24, 1903.—Account No. 14—Miscellaneous supplies and expenses of power plant.

Q. 15.—What operating expense account is chargeable with the cost of sulphuric acid used in storage batteries and labor and other expenses of cleaning storage batteries?

Answered by C. N. Duffy, Dec. 24, 1903.—Account No. 14—Miscellaneous supplies and expenses of power plant.

Q. 16.—What operating expense account is chargeable with the expense of care of vines planted close to and running up the sides of car houses, including cost of fertilizer, tools, etc., used in connection therewith?

Answered by C. N. Duffy, Dec. 24, 1903.—Account No. 22—Miscellaneous car service expenses.

Q. 17.—What is the correct charge for the maintenance of a compressed air pump for blowing dust out of motors which is a permanent machine in one of the car houses?

Answered by C. N. Duffy, Jan. 27, 1904.—When this machine was originally bought, undoubtedly it was, or should have been, charged to Construction and Equipment Account "J," shop tools and machinery.

The instructions with reference to such a charge being as follows: "Charge to this account all expenditures for shop tools and machinery for general repair shops, car houses, etc., including foundations and installation."

As the question deals with the maintenance of this machine, the proper charge would be Account No. 9—Miscellaneous shop expenses, which provides for all expenditures for repairs and renewals of shop tools, machinery and appliances, for the reason that the machine is a fixed tool, and not a hand tool, and because the expenditure incurred is a "maintenance" charge; the fact that the machine is placed in the car house, which is practically a

part of or a branch of the general repair shops, or that it is used for blowing dust out of motors, does not warrant the charge to any other account than to Account No. 9.

Q. 18.—To what operating expense account should be charged premium on bonds of general office employees when paid by the company? Does not seem to be specially covered by the classification.

Answered by C. N. Duffy, June 17, 1904.—Account No. 32—Miscellaneous general expenses.

The gentleman who put this question objected to the answer in the following letter:

"I note you state that premium on bonds of general office employees, when paid by the company, should be charged to Account No. 32—Miscellaneous general expenses. I wish to call your attention to the fact that according to the Interstate Commerce classification of operating expenses for steam lines 'premium on bonds of agents and other station employees, when paid by the company, should be charged to station supplies.' On account of this rule, it has been my custom to charge premium on bonds of general office employees of steam lines to 'general office expenses and supplies,' which, as you know, is a similar account covering the general office to the station supplies account covering local stations.

"In street railway accounting, if we follow the general idea covering steam lines classification, it would appear to me that premium on bonds of general office employees of street railways, when paid by the company, would be chargeable to miscellaneous office expenses.

"Will you kindly refer this communication to the standardization committee and advise me of their views in the matter? and oblige."

The chairman of this committee does not agree with the gentleman that Account No. 23—Miscellaneous office expenses, should be charged with premium on bonds of general office employees, when paid by the company, as the expense is certainly one of the general expenses of conducting railway business.

The chairman promised the gentleman that this matter would be presented to the convention.

Q. 19.—To what account should we charge the maintenance of a derrick hoist and stone crusher—two pieces of machinery situated in our yard?

Answered by C. N. Duffy, July 18, 1904.—Assuming the derrick hoist and stone crusher referred to are a part of your track tools and appliances, the proper account to charge the maintenance of same would be Account No. 1—Maintenance of track and roadway.

The report printed above and the Question Box were discussed fully by the following-named members: W. G. McDole, Cleveland; C. N. Duffy, Chicago; C. L. S. Tingley, Philadelphia; Elmer M. White, Hartford; H. C. Mackay, Milwaukee; Irwin Fullerton, Detroit; W. G. Ross, Montreal; W. E. Harrington, Camden; F. J. Duffy, Beaumont, Texas; B. A. Connelly, Lima, Ohio; D. S. Carl, Washington; P. V. Burington, Columbus; A. S. Kibbe, Philadelphia; G. H. Clifford, Ft. Worth, Texas; Frank R. Henry, St. Louis; F. E. Smith, Chicago.

W. Caryl Ely, president of the American Street Railway Association, visited the meeting and in brief remarks commended the work of the association, and complimented them upon the progress they had made, especially in having secured recognition by the National Association of Railroad Commissioners, to which body they were entitled to send delegates at its annual meetings.

A. L. Judson, accountant of the New York State Board of Railroad Commissioners, was also present and took an active part in the discussion of the questions before the meeting.

The following officers were elected for the ensuing year:

President, W. G. Ross, Montreal, Canada.

First vice-president, Frank R. Henry, St. Louis, Mo.

Second vice-president, Isaac McQuilkin, Anderson, Ind.

Third vice-president, J. W. Lester, Worcester, Mass.

Executive committee, F. E. Smith, Chicago, Ill.; G. B. Willcutt, San Francisco, Cal.; Arthur L. Linn, Jr., Utica, N. Y.; P. S. Young, Newark, N. J.

W. B. Brockway, the secretary-treasurer, was renominated, but declined re-election. He was appointed acting secretary-treasurer, to serve till Jan. 1, 1905, at which time his successor is to be appointed by the executive committee.

The Direccion General de Obras Publicas, of Madrid, Spain, has granted a concession for building a tramway from Ubeda to Santuario de la Hiedra, Spain. The Compañia General de Tranvias, of Barcelona, will also construct an electric tramway from Sarria to Ballvidera.

THE SOCIAL SIDE OF THE CONVENTION

The entertainments at the convention were in the hands of the American Street Railway Manufacturers' Association, assisted by the local reception committee, and extended through the entire week. The executive committee wisely decided to omit the annual banquet, but the other entertainments proved most acceptable.

Reeve's Band, which was brought on from Providence by the Manufacturers' Association, added greatly to the pleasure of the delegates, and its engagement was a happy thought. The band gave several concerts at the Southern Hotel in the evenings, and also took part in the entertainment at Music Hall on Friday evening at the presentation of "Louisiana." In addition, the band was in evidence at the World's Fair Grounds during the day, and played at the different State buildings at the afternoon concerts given in compliment to Capt. Robert McCulloch, of the St. Louis Transit Company; President E. C. Foster, of New Orleans; President W. Caryl Ely, of the International Railway Company, and President J. C. Hutchins, of the Detroit United Railway Company. They also lead the delegates into the entertainment on the Boer War on Wednesday evening, and after leaving that entertainment lead the march to the Lagoon, where the gondolas and launches were taken for a trip about the waterways at the Exposition.

This water trip will long remain a delightful memory in the minds of the attendants of the St. Louis convention. The party embarked about 10 o'clock in the evening at the main landing near Electricity Building, and filled to overflowing some fifteen electric launches and gondolas. With the band in the two leading launches, the circuit was made of the lagoons and the trip ended before the grand cascades, where the water made a beautiful effect as it fell over the illuminated waterway descending from Festival Hall. The night was perfect for the trip, and the illuminations and music combined to make the voyage a most enjoyable one to all who participated in it.

A theater party to which all attendants at the convention were invited was given at Music Hall, corner of Thirteenth and Olive Streets, at which a spectacular performance entitled "Louisiana" was rendered. Several references were made during the play to gentlemen prominent in the convention, among them Messrs. Ely, Vreeland, McCulloch, Shaw, Brady, Evans and Lawless, and that they were appreciated was shown by the applause which they evoked. Friday evening was given up to an informal reception at the New York State Building, at which there was dancing and music by the band.

The local committee was most assiduous in caring for the comfort and entertainment of the delegates, and was very successful in doing so. George J. Kobusch especially, who in his dual office of chairman of the local reception committee and member of the executive committee of the Manufacturers' Association, had a large part of this work to perform, was most active during the week in seeing that those in attendance had an enjoyable time.

It was reported during the convention that one of the visiting State Governors to the Exposition had appointed a prominent member of the association his chief of staff, with the title of general. The rumor attracted a great deal of interest and approval on account of the popularity of the supposed recipient to the title and his recognized ability as a railway manager. He received many congratulations on the appointment before he had an opportunity of explaining that he was not a resident of the State from which the Governor came and so was not eligible for the position.

THE DISPLAY OF BLANKS AND FORMS

One of the features of the Accountants' convention was the fine display of blanks and forms prepared by Elmer M. White, of Hartford, and now the property of the Accountants' Asso-

ciation. It will be remembered that a collection of blanks and forms of the different street railway companies was made a number of years ago and proved of inestimable value to the members of the association, as two sets were prepared, and members had the privilege of borrowing one set or such a portion of it as they required for their personal use. The set had become somewhat antique, however, and after a year's work Mr. White has succeeded in compiling a collection which is worthy of the highest commendation. The blanks are systematically arranged, and have been pasted into sixteen large books, made up of loose leaves, which are held in their covers by patent binders. There are altogether 1400 leaves in the books, each of which is devoted to a separate subject. A duplicate set of books is kept as before for the use of members who desire to consult the collection in their home offices. The blanks received the greatest attention on the part not only of the accountants, but of many members of the parent association as well.

THE WORK OF THE ELECTRIC RAILWAY TEST COMMISSION

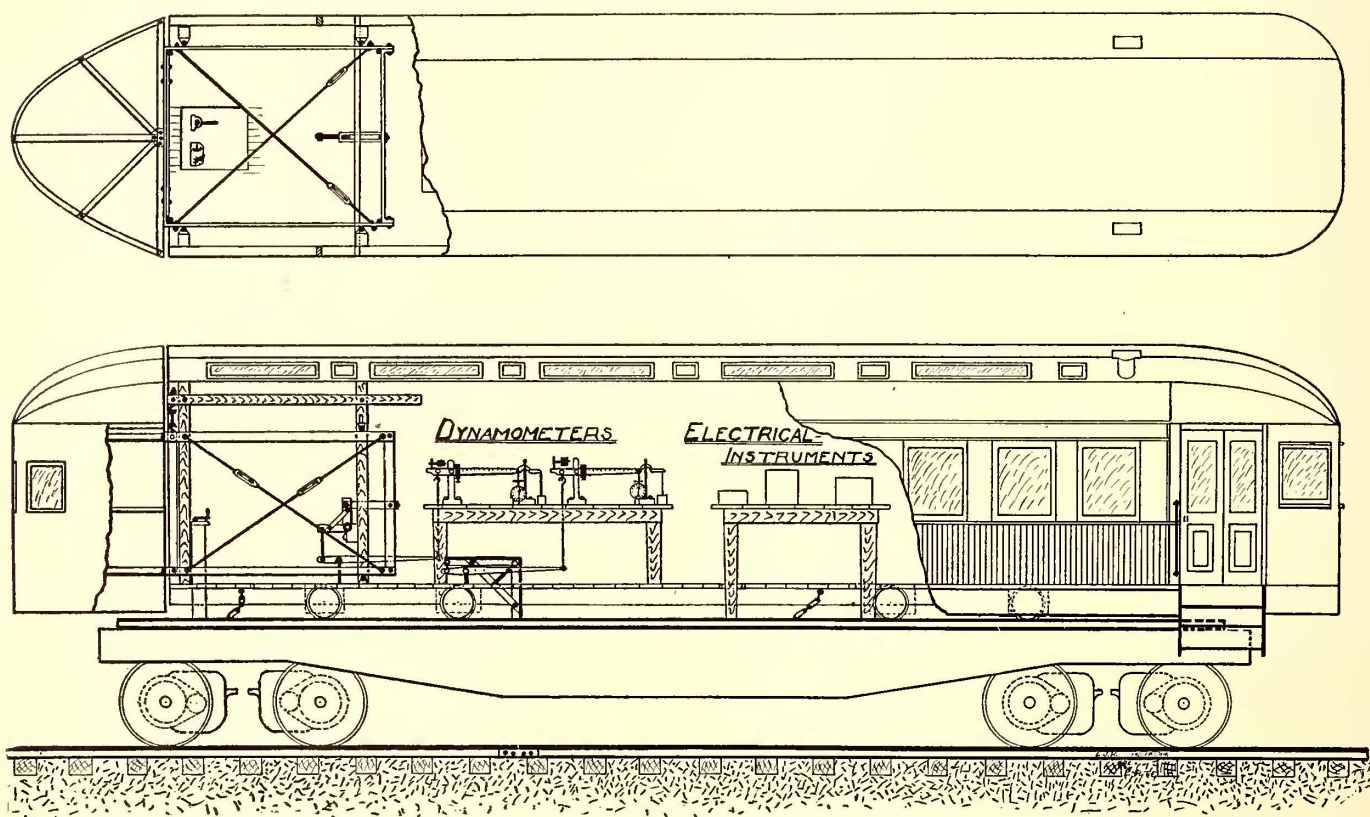
BY HENRY H. NORRIS

The work of the Electric Railway Test Commission has progressed to such a point that a statement of the portion ac-

During the past summer the test corps has been at work upon a number of lines of investigation, and a thorough study of the braking of electric cars under city conditions has been made. This study covers the energy used in compressing air both by means of stationary centrally located compressors and by means of small compressors upon the cars. It also covers the air consumption per stop under different conditions of track and with different motormen, the test having been made under normal running conditions. Tests were made upon the magnetic brake, as well as upon the air brakes and hand brakes, and braking curves were produced for all of these methods used for bringing cars to rest. In investigating each system, the effect of the process of braking upon the motor equipment was determined, this being most important in the case of the magnetic brake.

The car tests were not by any means confined to the braking part of the equipment. In all cases the total energy consumed in the car, the schedule and maximum speeds produced, the rate of acceleration, the current and the power consumption, were all carefully measured, largely by means of autographic recording apparatus. In addition, a special series of tests upon the energy consumption during acceleration at different rates of acceleration was satisfactorily carried out.

The line of work which has aroused great interest is an investigation of the losses in rails carrying alternating current.



PLAN AND SECTION OF CAR TO BE USED IN AIR-RESISTANCE TESTS BY THE ELECTRIC RAILWAY TEST COMMISSION

complished and of the plans for the immediate future may be of interest. The members of the American Street Railway Association who attended the recent convention at St. Louis had an opportunity to study the exhibit made by the commission in the rear of the convention hall. Here were shown a number of charts, curves, diagrams and data books, and members of the test corps were in attendance during the week to explain the exhibit to the visitors. Several members of the corps were present at their routine work of calculation and plotting of results. Upon the test track a car was shown equipped with the instruments used in the recent tests, and this was operated for the information of any of the delegates to the convention who desired to study the methods used.

This work has occupied the attention of a part of the corps all summer, and a vast amount of information has been accumulated and will be put into convenient shape for reference. The demands for this information are pouring in at an increasing rate, showing the interest which exists in regard to the application of alternating current to electric traction. The study covered different rail sections, steel bars of various shapes and even pipe was considered. All commercial frequencies and current densities were employed.

Another feature of the summer's work has been the collection of data from the car builders and large operating companies in regard to present practice in American car building for electric railways. A large number of companies have re-

sponded to the requests for this information by filling out printed forms which were prepared for the purpose. These were sent to about sixty companies, each of whom filled out blanks for all of the typical cars used by them, the figures covering all parts of the car body, trucks and equipment.

The work which has yet to be done constitutes the most important part of the task laid out by the commission, and upon it much preparation has been put during the past summer. This work is the determination of the components of train resistance, particularly that offered by the air at high speeds. The first section of the work already described covered particularly city conditions, while that yet remaining is of direct importance to interurban car operation. The interurban tests will be conducted upon the lines of the Indiana Union Traction Company. A somewhat radical plan has been devised for measuring directly the several components of car resistance with special reference to the components due to the air. This plan has the approval of all the engineers who have been consulted in regard to it, and all agree that the investigation is by all means the most important to which the commission can devote its efforts.

In brief, the plan is as follows: A strong flat car (furnished by the Pressed Steel Car Company) is mounted upon special Baldwin trucks equipped with four No. 85 Westinghouse motors of a total normal capacity of 300 hp, but capable of exceeding this amount by several hundred horse-power for short periods. This flat car carries the car body of which the resistances are to be measured, the body being mounted upon four pairs of small wheels carried in frictionless ball-bearings, the wheels rolling upon rails spiked to the floor of the flat car. These bearings are so nearly frictionless that practically no resistance is offered to the movement of the body. It is evident that the car body is free to run backward and forward upon the rails, but this movement is resisted by suitable dynamometers which measure the back pressure. The body will not be allowed to move more than a few inches, and numerous safety stops and chains will insure the safety of the observers. This part of the experiment will give, by mechanical measurement of pressure and speed, the power consumption under normal working conditions. At the same time electrical power measurements will be made, and by means of auxiliary tests of the efficiency of the motors and gearing an exact check upon the mechanical measurements will be had.

Another feature of these tests is a plan for separating the head pressure from other losses. The front vestibule and platform will be mounted in a flexible manner so that they may react as a whole upon a dynamometer. In order to determine the effect upon the head resistance of a change in the form of the vestibule, several of such forms will be used, varying in shape from the sharp wedge through the parabola and circle to a perfectly flat surface. The first tests will be upon the parabolic vestibule, which is now under construction by the G. Brill Company. This company has already shipped to Anderson a specially prepared heavy interurban car body for the tests under consideration. This car will be equipped in the rear with standard and with special vestibules, in order to determine the effect upon the total resistance of a variation in the form at the rear. The rear pressure will be investigated by operating the car backward.

The preparation of this special dynamometer car has made possible a number of auxiliary tests which will be carried out if means and time permit. The commission contemplates such measurements as the friction losses in the trucks and bearings at various speeds, both in still air and under normal conditions. In order to obtain still air about the motors, the flat car with the upper body removed will be covered with a protecting shield coming down to the rails. This shield will be driven from the flat car through a dynamometer, so that the pressure thus lost may be separated from the total force needed to drive the whole equipment. Brake tests of the motors and trucks under normal

conditions of loading will render possible the separation of the friction losses from the total losses. The larger part of the apparatus described is now on its way to Anderson, and part of the test corps will go at once to the shops of the Indiana Union Traction Company to assemble the equipment. It is expected that within a very few weeks these tests can be started and that the whole work can be completed within the time originally assigned to it. The commission has received encouragement in this work in all directions, both from the manufacturers and from the operating companies.

THE FAMOUS OIL FILTER

One of the features of the World's Fair power plant is the Famous automatic lubricating system, installed by the Famous Filter Company, of St. Louis. It automatically lubricates the bearings of the engines and machinery, doing this continuously twenty-four hours every day. The load varies from 200 gals.



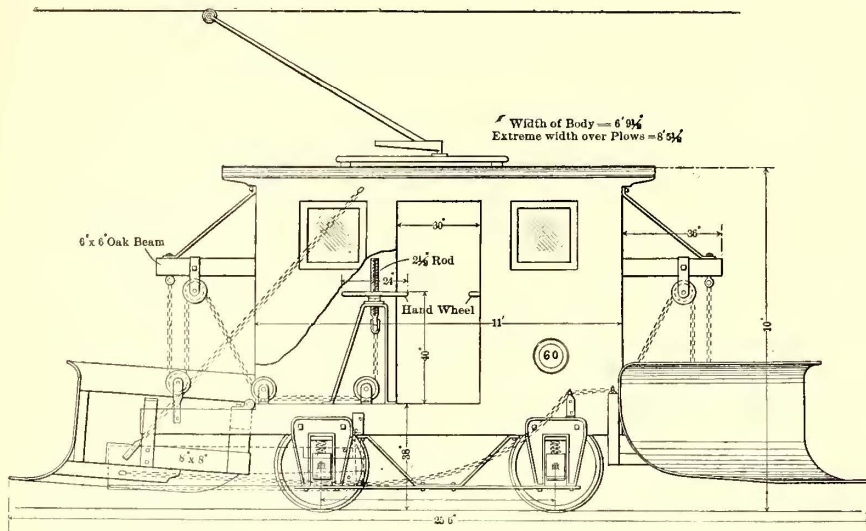
AN INSTALLATION OF THE FAMOUS OIL FILTER SYSTEM

to 1200 gals. per hour. The system comprises one separator, six purifiers and one pressure oiling device. The separator receives the dirty oil, water, etc., from the engines through drain pipes, the oil being separated from the water by two safety straining cylinders. The water is automatically discharged into the sewer by the water discharge trap, and the oil is discharged into the purifiers through the distributing pipes and valves. The six purifiers are connected up into one battery, and each unit can be cut in or out at will. The oil passes down through the two fine mesh strainers in each purifier, traveling away around in the large settling chamber, and in an upward direction, before it reaches the filtering chamber. The oil then filters through three removable filtering cylinders and passes into the pure oil reservoir.

The oil is treated to a mild purifying temperature bath by the compound steam jackets, and to revive the lubricating power of the oil, the temperature is raised every few days to the refining point by simply admitting a little more steam to the filter jackets for a few minutes. All precipitated water is automatically discharged from each purifier by its water trap, the drain valves withdrawing all impurities. Each purifier is provided with temperature gage and oil gage. The oiling device embodies two special automatically-controlled oil pumps, with an air-cushioned pressure reservoir. These pumps are also fitted with automatic by-pass, and with air valves for supplying the reservoir with air whenever needed. This device then takes the pure oil from the purifiers and delivers it to the bearings by distributing pipes and oil feeders, under a constant head of 30 lbs. Any sudden and abnormal variations and demands in the supply of oil are promptly met by the air-cushioned reservoir, the by-pass valves, and also the pump governor. Each pump is large enough to supply the system, and can be operated independently of the other, or both can be operated together. The air-cushioned reservoir also separates the air from the oil under pressure, thus insuring a uniform feed of pure oil to the bearings.

A NEW DESIGN OF SNOW PLOW—HARTFORD STREET RAILWAY COMPANY

An interesting new design of snow plow was used last winter on the lines of the Hartford Street Railway Company,



VIEW ILLUSTRATING GENERAL TYPE OF THE HARTFORD SNOW PLOW AND THE METHOD OF MOUNTING AND ADJUSTING THE HEIGHTS OF THE PLOWS

Hartford, Conn., which is of interest both on account of a new arrangement of mounting the plows and of other improvements of construction. One difficulty that has been experienced in snow plow construction has been in so supporting the plow as to enable it to be handled easily when in operation for adjustment to the various heights.

The method of construction of the plow which was adopted embodies the result of much study upon the subject, and it was found in subsequent operation to eliminate many of the troubles experienced in the usual styles of plows. The accompanying drawing illustrates the general type of the car and the method of mounting and adjusting the heights of the plows. As may be seen, each plow is carried by tackle hung upon a 6-in. x 6-in. beam, which projects from the end of the car body, as shown; this carries the chain connection and pulley support, by means of which the nose of the plow is raised or lowered. The actual method of adjusting the nose by movement of the chain is accomplished by the hand wheel, mounted upon the standard within the car body, which raises a threaded stud attached to the inside end of the chain. There are two of these, one for each nose, each operating in the same manner.

Further details of the construction of the plow are apparent upon inspection of the drawing. Each plow is hinged to the car body upon the projecting sills of the car. They are heavily constructed of formed steel plates and reinforced by a strong timber backing. The plow car embodies a very stiff and strong construction of body, measuring 11 ft. long x 6 $\frac{3}{4}$ ft. wide. The length over all is 25 ft. 6 ins., the extreme width over plows being 8 ft. 5 $\frac{1}{2}$ ins. A 30-in. door is provided on each side, together with ample window provisions. The car is carried by a truck of simple construction, the power equipment consisting of two General Electric type-1200 motors.

This plow was completed in time last fall to anticipate the extreme winter weather which was experienced in all parts of the country, and was thus submitted to the extreme test of the

worst possible conditions of snow. It proved equal to the emergency and was found to give perfect satisfaction. The forethought which had been given to the many important details of construction anticipated a great deal of trouble; in one particular was this of unusual value, in the protection of the wiring from the influence of salt spread upon the tracks to prevent freezing at switches, etc. It has been customary in snow plow construction to carry the motor leads and control wire beneath the car body, after the manner of motor car construction. After exposure for some time to the salt, which inevitably gets to them, and to the effects of the weather, however, the insulation gives way and dangerous short-circuits occur, with the usual disappointing delays. Such troubles have been prevented in this car by arranging the entire system of wiring inside the car body, so that only the leads running from the floor down to the motor are exposed to the effects of weather, and it is a comparatively easy task to insulate such connections so that they will withstand the effects of weather conditions and, furthermore, to take care of them when trouble occurs.

This journal is indebted to Frank Caum, superintendent of the Hartford Street Railway Company, for this interesting information:

TRACK WASHOUT IN SAN FRANCISCO

The United Railroads of San Francisco sustained considerable damage on its extensive street railway system by the unprecedented rain storm which began Sept. 22. The storm was accompanied by lightning, which is very rare in the city, but there was not much wind. The total rainfall for the twenty-



TRACK AT THE FOOT OF FILLMORE STREET, WASHED OUT FOR A DISTANCE OF 150 FT. THE TRACKS DROPPED 15 FT. IN ONE NIGHT

four hours from 5 p. m., Sept. 22, to 5 p. m., Sept. 23, was 3.09 ins. On both nights the service on many car lines was interrupted by sand which was deposited on the tracks by the rush of storm water. At some points the tracks were flooded to a depth of 2 ft. The basements of several of the car houses were flooded, the one on Twenty-Ninth Street containing 5 ft. of water. A force of several hundred men was put to work shoveling the accumulated sand from the tracks and buildings. As

the regular rainy season was not due for nearly a month, the rain was unexpected, and the roofs of many of the company's buildings were found to be leaky, causing considerable trouble.

The most extensive damage sustained by the United Railroads, however, was on the Fillmore Street electric line. At the foot of that street the roadbed was washed out and the tracks dropped 15 ft. The bulkhead where the large brick sewer following the center line of Fillmore Street empties into the bay was washed out and the sewer caved in for some distance beneath the tracks. The storm water sluiced out 5000 cubic yards of earth in a few hours, destroying the street for nearly a block, and the waters of the bay flowed into the gap.

On the night of the 22d the United Railroads Company's double-track line sunk into the depression for a distance of 150 ft. back from the terminal, and the damage extended further on the following day. A new roadbed will have to be constructed for an entire block. The storm continued less violently on the 24th and 25th, the total rainfall of the four days exceeding 5 ins.

The San Mateo line was temporarily affected by many tons of sand on the tracks. Other street car companies had more or less trouble. A cable car of the Presidio & Ferries Railroad Company was washed from the tracks at the intersection of Baker and Union Streets the first night of the storm, the tracks having spread.



WASHOUT AT THE TERMINAL OF THE FILLMORE STREET LINE OF THE UNITED RAILROADS OF SAN FRANCISCO. THE X SHOWS THE OPENING OF THE MAIN SEWER WHICH CAVED IN

NEW CARS FOR OKLAHOMA CITY

The car shown in the accompanying illustrations is one of eight recently delivered to the Oklahoma City Railway Company by the American Car Company, and is particularly interesting on account of the long "Detroit" platform at the rear end. This platform is 7 ft. from end panels over crown piece. Seldom, if ever, has a platform of this length been put on a car of 20-ft. body. The advantages of the "Detroit" platform,

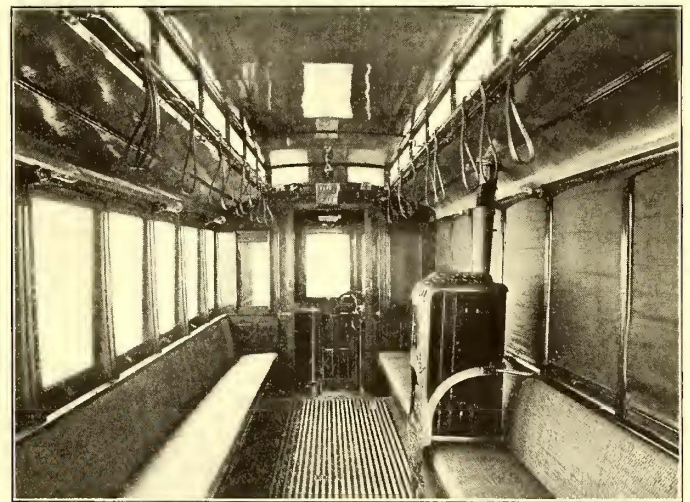


A 20-FT. CAR BODY HAVING CLOSED VESTIBULE AND DETROIT PLATFORM

the large standing space and the railing to prevent obstruction of the passage from door to step, are well known and need not be further described. The cars at Oklahoma City run in one direction, and therefore the entrances are on one side. The cars are admirably adapted to the service of this busy center. The traffic is large and growing rapidly, the population having doubled in four years. Several of the cars are mounted on the Brill 21-E trucks, which carry the bodies unusually low, so that the platform steps are but 15¼ ins. from the rail hoods, and from step to platform, 12 ins. This, together with the freedom of moving in and out of the car by reason of the use of longitudinal seats, facilitates the movement of passengers and reduces the time consumed by stops at street corners.

The cars are 20 ft. long over end panels, and 31 ft. over the crown piece; from end panels over crown piece at front end, 4 ft., and at rear end, 7 ft.; width over sills, including panels, 6 ft. 3 ins., and over posts at belt, 7 ft. 5½ ins. The sweep of

the posts is 7½ ins.; centers of posts, 2 ft. 9½ ins.; thickness of corner posts, 3¾ ins., and side posts, 1¾ ins. The side sills are of long leaf yellow pine, 3¾ ins. x 7 ins., and the end sills are of white oak, 4¾ ins. x 6 ins. The interior finish is cherry, with birch ceilings; the seats are upholstered in seat cane, and



INTERIOR OF THE OKLAHOMA CAR

the window sashes drop into pockets. The truck wheel base is 8 ft., and the sills are 33 ins. The cars are equipped with two motors of 25 hp each.

The Boston Elevated Railway Company has quite recently pensioned two more of its old employees. Both of these men date their services back to the old horse car days. One of them began his railroad career forty-two years ago, while the other began some thirty-five years. They were well known to the residents of the city, and always attracted the attention of visitors by the number of service stripes they wore. Both were starters at the time of their retirement.

A NOVEL TYPE OF CAR FOR CLEVELAND

The car shown in the accompanying illustrations was referred to in an article on a similar type built for the Montreal Street Railway Company. The car described in the present



THE SEMI-CONVERTIBLE SIDE OF THE NEW CLEVELAND TRAIL CAR

article was built by the J. G. Brill Company for the Cleveland Electric Railway Company, and is to be used as a trailer. One side is convertible and the other semi-convertible, the systems being the well-known patented forms of the builder. The car for Montreal was mounted on motor trucks and had entrances at either end, while this car, as the illustrations show, has a vestibule at the center, with side entrances from running boards when sashes and panels are raised into the roof pockets. The partition which divides the car into two compartments extends from the side to a central post against which the doors leading into either compartment meet. These doors are suspended by means of swiveled wheels to curved trucks, which guide them from a closed position to a position at the side of the short partitions extending from the convertible side of the car. The arrangement economizes space and the doors are easily opened and closed. The clear space between the vestibule posts is 4 ft., and the vestibule step is 5 ft. in length. The rear half of the car is used as a smoker and furnished with slat seats, while in the forward compartment the seats are upholstered in seat cane. Curved seats for six passengers each are at either end.

belt; from center to center posts, 2 ft. 8 ins.; sweep of posts on the semi-convertible side, $1\frac{1}{4}$ ins. The corner posts are $5\frac{3}{4}$ ins. thick, and the side posts on the semi-convertible side, $3\frac{1}{4}$ ins., and on the convertible side, $3\frac{3}{8}$ ins. The size of side sills, $4\frac{3}{4}$ ins. x 7 ins., with 8-in. x $\frac{5}{8}$ -in. sill plates on the outside. The center sills are $3\frac{1}{2}$ ins. x 6 ins.; intermediate sills, $2\frac{3}{4}$ ins. x $4\frac{1}{2}$ ins., and the end sills, $5\frac{1}{4}$ ins. x 7 ins. The seats are $36\frac{1}{4}$ ins. long on the convertible side and 37 ins. on the semi-convertible side. The seats are staggered to permit those on the semi-convertible side being placed against the side lining between the posts, thereby saving $3\frac{1}{2}$ ins. to the interior width of the car. The aisle is 19 ins.



AN INTERIOR VIEW OF THE NEW CLEVELAND TRAIL CAR



VIEW OF THE NEW CLEVELAND TRAIL CAR, SHOWING ONE PART OF THE CONVERTIBLE SIDE CLOSED AND THE OTHER OPEN

and the total seating capacity is fifty-two. The bright and attractive appearance is obtained for the interior by the use of ash for the woodwork and birch for the ceilings. As the brakes will only be required while shifting the car at the car houses, a vertical wheel placed on a high shaft against the vestibule partition close to the hood lining of the side roof, while not being ornamental in appearance, saves room and is an excellent idea.

The car measures 37 ft. over the crown pieces, and is 7 ft. $10\frac{1}{2}$ ins. wide over the sills, and 8 ft. 2 ins. over the posts at

trailer service. The weight of the car trucks is 21,260 lbs. wide. The height from the rails to the under side of the sills is 26 ins. The height from the rail to the tread of the running board is $18\frac{1}{2}$ ins., and from the running board to the car floor, $15\frac{1}{4}$ ins. Angle-iron bumpers, radial draw-bars and round-corner seat-end panels of the builders' manufacture are among the finishings. The trucks are Brill No. 23 type, which is modification of a truck patented by the builders some years ago, and is particularly adapted to

The steam railroads entering Indianapolis that have to meet trolley competition are selling "two-trip" tickets to passengers with a thirty days' limitation. These tickets are sold at a rate almost as low as the interurban rate. They are good for bearer and accepted for passage in either direction; they also are good for one person for a round trip, or for two persons one way between the points named.

CONVENTION AND EXHIBIT NOTES

The exhibits at the Louisiana Purchase Exposition, of course, took the place of the usual convention exhibits. Most of these Exposition exhibits which are of interest to street railway men have been described in previous issues of the *STREET RAILWAY JOURNAL*. The following notes are mainly on those not before described or on those to which some new features were added for the convention. A number of exhibits in the street railway line were placed late in the season especially for the convention:

THE ST. LOUIS CAR COMPANY had the private car "Mabel" at the disposal of the delegates every afternoon of the convention week for the purpose of taking them to visit the company's immense plant in the northern part of the city. The announcement is made that this company has secured the rights to manufacture the Illinois Central type of suburban side-entrance, side-aisle car, which was fully described in the *STREET RAILWAY JOURNAL* of April 30, 1904. This is made under the patents of A. W. Sullivan, formerly of the Illinois Central and now general manager of the Missouri Pacific.

THE AMERICAN DIESEL ENGINE COMPANY had many visitors to inspect the Diesel engines which drive the power and lighting plant in the Tyrolean Alps, as a result of the remarkably clear explanation of the principles and performance of this type of engine which was given by Col. E. D. Meier before the American Street Railway Association. The Tyrolean Alps exhibit is lighted from a separate lighting plant, in which the power is furnished by an installation of American Diesel engines. The engineers of this company are keeping careful records of the showing these engines are making as to economy, efficiency and reliability under all operating conditions.

THE CAHALL SALES DEPARTMENT, of Pittsburg, has one of the finest steam boiler displays at the Exposition. In Machinery Building horizontal and upright water-tube boilers and chain-grate stokers are shown in section in such a way that their construction can easily be seen. In the Exposition boiler plant is an immense capacity in Cahall boilers, there being no less than 8014 hp. The representatives of the Cahall Sales Department and the Aultman & Taylor Machinery Company included W. W. Darley, J. W. Gardner, W. J. Williams, J. J. Merrill, W. A. Cook, and M. H. Detrick.

THE CUTTER COMPANY, of Philadelphia, furnished a full set of I.-T.-E. 550-volt, direct-current circuit breakers for the switchboard of the intramural railway, the power plant of which is in Machinery Building.

THE DEARBORN DRUG & CHEMICAL WORKS are supplying boiler compounds for use in the Exposition boiler plant. Their representatives at the convention included Charles M. Eddy, Robert L. Carr, G. W. Spear and Frank Eardly.

THE GOLDSCHMIDT THERMIT COMPANY made a special exhibition of rail welding by the Thermit process in front of the Metal Pavilion at 4 p. m. each day during the convention, in charge of Chief Engineer W. H. Cole. This was given especially for street railway men, and never failed to draw a crowd of convention badge wearers.

THE OHIO BRASS COMPANY furnished the soldered rail bonds on the mining gulch railway. This type of bond is becoming deservedly popular. The company's representatives at the convention included A. L. Wilkinson, N. M. Garland, E. F. Wickwire, George Mead and Burt Gellatly.

THE R. THOMAS & SONS COMPANY, of East Liverpool, Ohio, has a fine display of high-tension insulators in the Western Electric Company exhibit, Electricity Building.

THE WESTON ELECTRICAL INSTRUMENT COMPANY has a booth in Electricity Building, into which is crowded probably more money value in apparatus than in any other space of similar size in the building. Weston ammeters, voltmeters and wattmeters of all sizes and kinds are here exhibited. It is unnecessary to say that no other exhibit of commercial electrical measuring instruments at the Exposition approaches it in size or variety.

THE STANDARD STEEL CAR COMPANY.—The exhibit of the Standard Steel Car Company, of Pittsburg, Pa., is located on Aisle E, opposite Post 51, Transportation Building. It consists of two new types of forged steel trucks for electric cars. There are ten new features shown in the design of these trucks, which are of interest, as follows: Solid forged weldless side frames, equalizer bars in a short wheel-base truck with outside suspended motors, equalizer bars rigidly secured to journal boxes, new type elliptic bolster springs, compression springs on the brake hanger bolts, brakes carried on the equalizer bars, brakes which slack away from

the wheels slightly when car is on a sharp curve, a curved brake evener in a short wheel-base truck having only one live lever, motors suspended from the equalizer bars and journal boxes machine finished inside to fit the journal bearings. Owing to the simple form of construction and the high quality material used, these trucks can be made very light and still have ample strength for carrying the heaviest cars. The Standard Steel Car Company is a very large manufacturer of steam railway equipment and has recently entered the electric railway field. It was represented at the convention by W. G. Price and H. A. Smith.

WM. WHARTON, JR., & COMPANY, of Philadelphia, was represented by Wm. Wharton, Jr., president; Victor Angerer, vice-president; J. H. Budd and A. S. Partridge. The Wharton exhibit of frogs, switches, etc., is a prominent feature of the Transportation Building.

THE MACON-EVANS VARNISH COMPANY, of Pittsburg, which was recently organized for the manufacture of all kinds of insulating varnishes, was represented by L. S. Macon, Cadwallader Evans, Jr., and T. S. Bailie.

THE STERLING ELECTRICAL MANUFACTURING COMPANY, of Warren, Ohio, showed in the Electricity Building a full line of its incandescent lamps. This company has just completed one of the biggest contracts for lamps with the United States Government ever placed.

THE SPEER CARBON COMPANY, of St. Mary's, Pa., was represented by John S. Speer and G. P. Fryling, who made their headquarters at the Inside Inn. Mrs. Speer and Mrs. Fryling accompanied their husbands who, after the convention adjourned, started for the Maine woods, where they expect to get a moose.

THE STANDARD STEEL WORKS, of Philadelphia, whose exhibit is in the Transportation Building, were represented by E. Sidney Lewis and J. Murray Africa. This exhibit, which has already been described in the *STREET RAILWAY JOURNAL*, consists of steel-tired car wheels, in addition to forgings, castings, etc.

THE STANDARD UNDERGROUND CABLE COMPANY, of Pittsburg, has an interesting exhibit of wires and cables, insulating tapes and compounds in the Electricity Building.

THE BUCKEYE ENGINE COMPANY, of Salem, Ohio, exhibited its well-known engines in the Machinery Building. Its interests were looked after by C. H. Weeks, vice-president; C. B. Hunt and L. F. Mahler.

THE DEMING COMPANY, of Salem, Ohio, has a prominent exhibit of a full line of its triplex pumps, where are made in many types and sizes, and are operated by any power.

THE HARRISBURG FOUNDRY AND MACHINE COMPANY, of Harrisburg, Pa., has a very effective exhibit in the Machinery Building, consisting of a four-valve railway engine, and a small single cylinder Fleming engine mounted on top of the large engine frame.

THE LEONHARDT WAGON MANUFACTURING COMPANY, of Baltimore, has an exhibit of its well-known tower wagon in the Electricity Building.

THE BALDWIN LOCOMOTIVE WORKS, of Philadelphia, were represented by J. R. Dickey, G. Greenough, W. P. Evans and E. Sidney Lewis. The Baldwin exhibits of steam and electric locomotives and car trucks are among the most prominent features of the Transportation and Electricity buildings.

W. W. LINDSAY & COMPANY, of Philadelphia, showed a model storage battery plant in the exhibit of the Electric Storage Battery Company.

THE PITTSBURG REDUCTION COMPANY has a very effective exhibit in the Metal Pavilion of the Department of Mines. The exhibit is, of course, devoted to aluminum and its products—the industry with the development of which the Pittsburg Reduction Company has been so prominently identified.

THE PHOENIX IRON WORKS COMPANY, of Meadville, Pa., has a working exhibit at the Fair, in the form of an engine in the Government Building at the Philippine exhibit.

THE DUFF MANUFACTURING COMPANY, of Allegheny, Pa., had three exhibits of its "Barrett Jacks." They were in the Machinery Building, Transportation Building and the Liberal Arts Building. T. A. McGinley, who represented the company, made many personal friends among the street railway men, who for years have known the "Barrett Jack."

THE ELECTRIC STORAGE BATTERY COMPANY, of Philadelphia, was represented by Albert Taylor, G. H. Atkin, Jos. Appleton, J. M. S. Waring, T. B. Entz, J. A. White, W. A. Fraser, T. A. Cressey, H. H. Scaman and H. B. Gay. The excellent exhibit of this company in the Electricity Building has been described and illustrated in previous issues of the *STREET RAILWAY JOURNAL*.

THE FRANKLIN RAILWAY SUPPLY COMPANY. The interests of the Franklin Railway Supply Company were looked after by K. D. Hequembourg, Paul Weiler, Wm. Mason and Henry S. Hayward, Jr. Mr. Hequembourg reported the sale of many heaters during the convention.

THE LAGONDA MANUFACTURING COMPANY, of Springfield, Ohio, has received from the Jury of Awards of the Louisiana Purchase Exposition, at St. Louis, the gold medal for its Weinland boiler tube cleaners. The many users and friends of these cleaners will congratulate the company on this further evidence of the superior merit of its machines.

THE WESTERN ELECTRIC COMPANY, of Chicago and New York, was represented at the convention by R. M. Campbell, R. A. Griffin, F. A. Killion, S. J. Baldwin, G. Swope, Eugene Devine and Mr. Cobb. An illustrated description of this company's exhibit at the World's Fair was published in the STREET RAILWAY JOURNAL for June 11.

G. M. GEST, whose name has become so prominently identified with underground conduit construction, was present in person and was also represented by W. T. Jackson. Mr. Gest's attractive exhibit in the Electricity Building has already been illustrated in the STREET RAILWAY JOURNAL.

THE BRADY BRASS COMPANY, of New York, was represented by its president, Daniel M. Brady, who was re-elected chairman of the American Street Railway Manufacturers' Association. The Brady Brass Company was also represented by other members of its staff, and entertained as its guests a number of prominent railroad men.

PRATT & LAMBERT, Buffalo, were represented by J. P. Gowing.

THE WEBER RAILWAY JOINT MANUFACTURING COMPANY, of New York, was represented at the convention by James C. Barr, Arthur T. Herr, F. A. Poor, Alfred K. Downs, W. Thalthern, W. C. Holloway and G. M. Lindsay.

THE ALPHONS CUSTODIS CHIMNEY CONSTRUCTION COMPANY, of New York, was represented by Conr. Worms.

THE PECKHAM MANUFACTURING COMPANY'S interests were ably taken care of by the sales agent, William Wampler, of New York, J. A. Hanna and F. A. Richards.

THE INGERSOLL-SERGEANT DRILL COMPANY was represented at the convention by A. A. Bonsack, M. W. Priseler, J. C. Campbell, W. B. Stamford, W. E. Webb, W. B. Bogardus and W. R. Gage.

THE MCGRAW PUBLISHING COMPANY was represented at the convention by James H. McGraw, J. M. Wakeman, Henry W. Blake, J. R. Cravath, Harold S. Bittenheim, H. B. Abbott, W. K. Beard, C. A. Babbiste.

THE STANDARD VARNISH WORKS, of New York, was represented by Arthur Davis and John C. Dolph, who distributed as a souvenir an artistic watch fob.

THE COLUMBIA MACHINE AND MALLEABLE IRON WORKS, of Brooklyn, N. Y., was represented by its president, John G. Buchler, James Grady, R. D. Kane and W. R. Kerschner.

THE CONSOLIDATED CAR HEATING COMPANY, Albany, N. Y., has an exceedingly extensive exhibit of car heating apparatus for both steam and electric service at the Exposition. The exhibit is located in the Transportation Building, Aisle K. The standard types of heaters as well as the special types designed for the Manhattan Elevated and subway cars in New York were shown. Several types of heaters designed to meet the requirements of cross-seat cars, in which the heating elements are identical with its standard and special types, are also exhibited. The company was represented at the convention by Cornell S. Hawley, S. B. Keys, W. S. Hammond, Jr., C. C. Nickols and A. A. Eggert.

THE BLAKE SIGNAL & MANUFACTURING COMPANY, of Boston, Mass., was represented by its president, E. J. Burke.

W. R. CONANT, of Cambridge, Mass., was present at the convention in the interests of his field coil and bond-testing instruments.

THE H. W. JOHNS-MANVILLE COMPANY was represented at the convention by C. R. Manville, J. W. Perry, the manager of its electrical department; J. E. Meek, John Ross, Wm. A. Buddecke, G. H. Pogue, Samuel Loevy, J. A. Landrigan and H. E. Dammer.

THE GOLD CAR HEATING & LIGHTING COMPANY, of New York, was represented by President Edward E. Gold, John E. Ward, W. H. Stocks, B. H. Hawkins, A. E. Robbins and E. B. Wilson.

THE BARBOUR-STOCKWELL COMPANY, of Cambridge, Mass., was represented at the convention by H. R. Luther.

THE BROWN HOISTING MACHINERY COMPANY, of Cleveland, Ohio, was represented at the convention by F. G. Tallman. This company's exhibit of hoisting and conveying machinery, illustrated in the STREET RAILWAY JOURNAL for June 18, is one of the features of the Machinery Building.

F. E. HUNTRESS, of Boston, Mass., took care of his own interests at the convention, as well as those of the St. Louis Car Company.

THE CONTINUOUS RAIL JOINT COMPANY, of Newark, N. J., was represented at the convention by L. F. Braine, B. M. Barr, J. M. Atkinson, S. H. Armstrong, C. E. Irwin, E. A. Condit, D. J. Evans and Jos. Miller. The company's exhibit in the Transportation Building was of special interest to the street railway delegates.

MASSACHUSETTS CHEMICAL COMPANY, Boston, Mass., had present at the convention Louis O. Duolos, F. W. Hitchings, E. B. Hill, E. C. Green and H. P. Lee.

THOS. PROSSER & SON were represented at the convention by F. A. Barbey, George H. Bryant and J. A. Dorney, who explained to delegates the advantages of Krupp steel-tired ear wheels.

THE CROCKER-WHEELER COMPANY, of Ampere, N. J., was represented at the convention by F. B. De Gress, S. Russell, Jr., Julian Roe, W. F. Sullivan, Jas. A. Dorney, B. A. Schroeder and F. M. Holbrook. Much attention was, of course, attracted by the excellent exhibit of the Crocker-Wheeler Company in the Machinery Building.

THE NATIONAL LOCK WASHER COMPANY, of Newark, N. J., was represented at the convention by R. L. Thomas, James A. Warren and J. Q. Barlow.

THE STANDARD PAINT COMPANY, of New York, was represented at the convention by E. R. Willard, J. N. Richards, Charles Earnshaw, C. H. Mowry and J. M. Donoghue.

THE GENERAL ELECTRIC COMPANY, of Schenectady, N. Y., had the following representatives present: H. P. Ball, W. C. Halsey, Geo. Anthon, F. E. Case, J. W. Buell, C. C. Peirce, T. P. Bailey, S. W. Trawick, R. E. Moore, Wm. Hand, C. R. Croning, W. B. Potter, Richard H. Riee, H. L. Monroe, R. J. Cash, Frank Gale, Geo. D. Rosenthal, J. C. Caliseh, J. G. Barry, W. M. Wood, W. C. Montague, W. J. Ferris and A. S. Kappella. In addition to its able representatives, the General Electric Company was very prominently in evidence by means of its large and attractive exhibits in the Electricity and Machinery Buildings, which have already been described and illustrated in the STREET RAILWAY JOURNAL.

THE WILLIAM S. SILVER COMPANY, of New York, was represented at the convention by its president, William S. Silver.

THE AMERICAN ELECTRICAL WORKS, of Providence, R. I., was represented at the convention by Francis E. Donohue.

THE ROSSITER MAC GOVERN COMPANY, of New York, was represented at the convention by Frank MacGovern, J. A. Pierce, H. N. Emmons, Charles McDonald, J. W. Archer, H. R. Wilson and R. J. Randolph.

THE OKONITE COMPANY, of New York, was represented at the convention by Geo. T. Manson, Chas. E. Brown, Frank D. Lawrence, W. H. Elliott and John Langham.

THE WATSON-STILLMAN COMPANY, of New York, was represented at the convention by Francis T. West.

HEYWOOD BROTHERS & WAKEFIELD COMPANY.—Samples of some fine reversible ear seats were shown at the Consolidated Car Heating Company's booth, Aisle E, Post 57, Transportation Building. The seats shown are of the Wheeler slideover type, with pedestal bases and automatic adjustable foot rests. The seats are upholstered in leather, and have bronzed back bands and mahogany arm rests. They are equipped with Consolidated car heaters.

THE AMERICAN AUTOMATIC SWITCH COMPANY of New York, was represented at the convention by H. N. Powers.

THE O. M. EDWARDS COMPANY, of Syracuse, N. Y., exhibited its latest improved window fixtures installed on the splendid Missouri Pacific train on exhibition in the Transportation Building.

THE NATIONAL BRAKE COMPANY, of Buffalo, N. Y., was represented by its president, G. S. Ackley, and Wm. D. Brewster, secretary. The company exhibited some very excellent models of the Peacock brake, in which many of the delegates seemed very much interested. Over one hundred roads are now using the Peacock brake.

SECURITY REGISTER COMPANY, of St. Louis and New York.—In the Transportation Building, Section 29, Aisle C, the company had an excellent exhibit of all types of the fare registers and other products manufactured and sold by this company. The company was represented at the convention by its president, Giles S. Allison; its secretary, Harry C. Donecker, Fred Stephenson and George Deal.

THE ANTI-FRICTION HANDLE COMPANY, of Amsterdam, N. Y., had on exhibition its ball-bearing brake and controller handles in the Transportation Building, Aisle D, Track 15. A Stephenson car was equipped with these handles, so that a practical demonstration of their efficiency could be seen by the delegates to the convention.

WM. C. BAKER, of New York, had an exhibit of his hot water heaters for both steam and electric service in the Transportation Building, Aisles Q and H. The actual plans of a car were shown with heaters, valves, connections and piping throughout, making an exhibit both instructive and interesting.

THE BALL & WOOD COMPANY, of New York, had an exhibit consisting of an installation of a 300 hp Corliss valve engine, operating the power plant of the Philippine exhibit. This installation was open for inspection to all visitors.

IN MACHINERY HALL, Block 24, in the general exhibit of presses manufactured by the E. W. Bliss Company, of Brooklyn, N. Y., were exhibited the "Bliss Projectile" brand of gears and pinions for street railway motors. Here was shown a motor gear surrounded by and meshed with eight standard pinions of from fourteen to twenty-one teeth. The accuracy of construction was such that by the slightest pressure of the hand the gears and pinions revolved in perfect unison. The "Projectile Brand" gears are manufactured from open hearth steel castings, and the pinions of special high grade carbon steel.

WM. T. BONNER, of Boston, had an interesting exhibit of boiler fittings, cocks, valves, gaskets and water gages in the Machinery Building, Section 27, Aisle H.

THE BALDWIN & ROWLAND SWITCH & SIGNAL COMPANY, of New Haven, Conn., was represented at the convention by George D. Foote.

THE GOULD STORAGE BATTERY COMPANY, New York, has a complete exhibit of its various products in the Electricity Building, Block 16, Aisle A. A 60 Gould accumulator of No. 515 type is installed, giving a practical demonstration of the application of storage batteries to electric railway lighting engineering work. By means of an induction motor coupled to a double generator or rotary converter in connection with a booster set, various conditions can be produced, illustrating the operation of the Gould accumulators. By using the induction motor to drive the generator as a direct-current generator, charging the batteries in connection with the booster set, a direct-current power house operating with a regulating battery in connection with a booster, is practically illustrated. The practicability of close regulation of the Gould type of accumulators under severest conditions is also demonstrated. A unipolar generator and two U-type cells having a capacity of from 3000 to 5000 amps., to work in connection with the battery and motor generator, are also installed. A group of four cells having a discharge capacity of 27,000 ampere-hours, at 2000 amps. discharge rate, is also shown. After the adjournment on Thursday of the American Street Railway Association, the company gave a lunch at its space in Electricity Building, to which all delegates were invited. This proved to be a very pleasant occasion, and one especially enjoyed by the ladies, as the daintiness of the lunch and its serving were in striking contrast to the service of the Exposition restaurants.

THE HIPWOOD BARRETT CAR & VEHICLE FENDER COMPANY, of Lakeport, N. H., had an excellent exhibit of its fenders for street railway cars in the Electricity Building, Section 17, Aisles A, B and W, in the general exhibit of the Western Electric Company. The representatives of the Western Electric Company took good care of the interests of this company.

JORDAN BROTHERS, New York, had among the exhibits of the Wesco Supply Company, its well-known commutator truing device.

THE NATIONAL CAR WHEEL COMPANY, of New York, had an exhibit of its steel-tired and chilled cast iron wheels in the Transportation Building. The interests of this company were well taken care of by its sales agent, E. H. Chapin, of New York, and George C. Morse, of Taunton, Mass.

IN THE VARIED INDUSTRIES BUILDING the Pantasote Company, of New York, had a complete exhibit of all of its varied products. That pertaining to the upholstering of steam and electric railway cars was illustrated by a complete section of a railway car, in which were placed parlor car chairs upholstered with Pan-

tasote. The curtains of the car showed also the various patterns of Pantasote manufactured for car curtain use. The company was represented at the convention by John M. High and D. E. Bonner.

THE RAILWAY STEEL SPRING COMPANY, of New York, had, in the Transportation Building, Aisle G, an excellent exhibit of its truck and tender wheels.

THE ROBINS CONVEYING BELT COMPANY, of New York, showed in the Machinery Building, Block 1, Section 1, a belt conveyor, a complete section of a power house and a Richardson scale. This miniature installation was in constant operation, giving an actual demonstration of the conveying and weighing of coal. Delegates to the convention were very much interested in watching its operation.

THE WALWORTH MACHINERY COMPANY, of Boston, had in the Machinery Building one of the best exhibits of its kind at the Exposition. All types and sizes of valves, together with power house supplies of every description, systematically and neatly arranged, are to be found in the exhibit.

THE TAYLOR IRON & STEEL COMPANY, of High Bridge, N. J., has its steel-tired wheels on exhibition under the John Stephenson cars and the D., L. & W. locomotive in the Transportation Building. There is also an attractive exhibit of the Taylor Iron & Steel products in the Mines Building. The company was represented at the convention by Knox Taylor and H. A. Johann.

FORT WAYNE ELECTRIC WORKS.—This exhibit is among the finest in the Electricity Building. The power for operating the exhibit is all taken from the Exposition mains and is divided between the 500-volt direct-current and 220-volt three-wire direct-current lines. These service lines lead to a ten-panel switchboard fully equipped with appliances for utilizing the current. Arranged in front of the switchboard mounted on concrete foundations are four motor generator sets. The motors of these sets are driven by the Exposition service and controlled by a black slate motor panel on the left end of the switchboard. Two of the motors operate on the 500-volt circuit and two on the 220 three-wire circuit. The generators and the motor generator sets consist of one thirty-five light series "Wood" arc dynamo, one 37½-kw 1100-volt "Wood" 60-cycle alternator, one 15-kw 110-volt, 140-cycle single-phase alternator, and one 5-kw, 110-volt, two-phase, 60-cycle alternator. The current produced by these generators is distributed to arc lamps, fan motors, regulators, etc., operating in the exhibit. Mounted on these panels are type K wattmeters, "Wood" ammeters and voltmeters, electrostatic ground detectors, circuit breakers, etc., all in active service measuring, recording and regulating the current produced. In the rear of the switchboard are a bank of type A transformers, which furnish the necessary voltage for the different service. In the northeast corner of the space is a large arc lamp-rack holding some sixty enclosed form C "Wood" arc lamps, all connected to some circuit of the plant. Each lamp is supplied with the proper current and voltage for which it is designed. There are about twenty-five series direct-current lamps furnished with current from the series arc dynamo near the switchboard. There are also twenty-two series alternating-current arc lamps supplied with constant current through the new current regulator installed with its individual switchboard panel near the arc lamp-rack. A group of multiple series power circuit arc lamps is also installed on this rack, operating on the 500-volt Exposition power circuit. In addition to these lamps there are several other types, besides fan motors, transformers, etc. In the Machinery Hall they have a 300-kw direct-current power generator driven by a Greenwald engine in the exhibitors' service plant of the exhibit. This outfit is making a record for continuous performance.

N. A. CHRISTENSEN, of Milwaukee, was able to show his air compressors in practical operation in connection with the exhibits of the Pneumatic Signal Company, the Standard Railway Equipment Company, and the Weber Gas & Gasoline Engine Company. Mr. Christensen's device for cleaning carpets by means of compressed air, was to be seen in operation at the Southern Hotel. Mr. Christensen was present in person at the street railway convention.

THE McGUIRE-CUMMINGS MANUFACTURING COMPANY, of Chicago, has an imposing exhibit, occupying 150 ft. of track space in the Transportation Building. This exhibit, which consists of a pneumatic sprinkler, a snow sweeper, trucks, fenders, etc., was illustrated in the STREET RAILWAY JOURNAL for August 13. Among the representatives of the company present at the street railway convention were J. J. Cummings, president; B. F. Stewart, W. J. Cook, J. L. Green, H. Johnson, W. H. Davis, M. R. Greffat, T. Lenox, B. F. Jacobs.

THE STERLING-MEAKER COMPANY, of Newark, N. J., showed its various types of registers in connection with the exhibit of Messrs. Watts and Uthoff, its St. Louis representatives.

THE JOHN STEPHENSON COMPANY'S handsome car on exhibition in the Transportation Building, was described and illustrated in the STREET RAILWAY JOURNAL for June 11. The company was represented at the convention by E. J. Lawless, who renewed his wide acquaintance with street railway officials.

THE CURTAIN SUPPLY COMPANY, of Chicago, was represented at the convention by W. H. Forsyth, A. L. Whipple, F. C. Kenly, L. H. Haker, P. J. Faber and R. F. Hayes. It has no regular exhibit under its own name, although its curtain fixtures can be seen in the exhibit cars and trains in all the Intramural cars, the American Car & Foundry Company's Missouri Pacific World's Fair train, and on the John Stephenson Company's exhibit car. These cars are fitted with Forsyth adjustable roller tip fixture, style No. 86, which has met with great favor since its introduction on account of its simplicity, strength and adjustability. In the two exhibit trains of the Pullman Company will be seen a modified form of this fixture designed especially to meet the requirements of the Pullman cars. In the Pantasote exhibit, in addition to the New York Central train and other exhibit cars, can also be seen the various other styles of fixtures which the company manufactures, and which are in use at the present time.

THE BENJAMIN ELECTRIC MANUFACTURING COMPANY, of Chicago, has an exhibit in Electricity Building, showing the make-up of the Benjamin wireless clusters so extensively used in electric car lighting, and also a new design of twin socket for window signs, which is also well adapted for car signs. The central feature of the display is a twenty-light cluster with Pagoda reflectors.

THE WHEEL TRUING BRAKE-SHOE COMPANY, of Detroit, Mich., which has an exhibit in the Wesco Supply Company's space, was represented by Dr. J. M. Griffin, who distributed a very neat cigar cutter.

THE STAR BRASS WORKS, of Kalamazoo, was represented at the convention by F. P. Crockett and George E. Pratt, who had as a souvenir some very handsome aluminum paper cutters. Messrs. Crockett and Pratt reported an increasing demand for the Kalamazoo wheel.

THE UNITED STATES METAL POLISH COMPANY, of Indianapolis, Ind., distributed samples of its polish around its exhibit in the Machinery Building, J. R. Evans being in charge.

THE TRUSCOTT BOAT MANUFACTURING COMPANY, of St. Joseph, Mich., had a superb exhibit in the Transportation Building in charge of J. M. Truscott. This consisted of a full-cabin cruising yacht, equipped with a 65-hp engine, designed for a speed of 12 miles an hour. The cost of this yacht was \$20,000. Open gasoline launches of 25 ft., 21 ft. and 16 ft. in length, with a complete line of canoes, row-boats and marine motors, were shown. This company built the thirty-two electric launches for the Exposition lagoons. These are 30 ft. long, 7-ft. beam, with capacity for thirty-seven passengers. These launches will be for sale at the close of the Exposition, so that street railway park managers will have an opportunity to secure good launches at a reduced price. This company also has an exhibit in the Forest, Fish and Game Building.

THE CLIMAX STOCK GUARD COMPANY, Chicago, exhibits its vitrified clay stock guards in the Transportation Building at the exhibit of Zehner Supply Company.

THE MERRILL-STEVENS MANUFACTURING COMPANY, of Kalamazoo, Mich., exhibited a complete line of car jacks in the Transportation Building, and also Cook's flat steel cattle guard, which vibrates when stepped upon.

THE MORE-JONES BRASS & METAL COMPANY, St. Louis, made an exhibit of Arctic journal bearings and Babbitt metals in Transportation Building.

THE LIGHT INSPECTION CAR COMPANY, at Hagerstown, Ind., showed a line of light cars suitable for inspectors on interurban roads, which have proved great conveniences on many roads of this class, especially during construction.

THE AMERICAN FROG & SWITCH COMPANY, Hamilton, Ohio, exhibited its signals, frogs and switches in the Transportation Building.

THE KILBOURNE & JACOBS MANUFACTURING COMPANY, of Columbus, Ohio, showed a dump-car for construction work in the Transportation Building.

THE CLEVELAND FROG & CROSSING COMPANY, of Cleveland, Ohio, showed its special designs of "Hard Service" frogs and crossings at its space in the Transportation Building. G. C. Lucas and George Stanton were in attendance.

THE WASHBURN COMPANY, Minneapolis, Minn., in the Transportation Building, showed car couplers for interurban cars.

THE RAILWAY JOURNAL LUBRICATING COMPANY, of Chicago, had a model showing the principal features of its lubricating device in Electricity Building. This lubricator works on the principle of ball-bearing idler wheels, which carry the oil from the oil chamber to the journal bearing. Many improvements have been made in this device since it was recently brought out and described in these columns. Burton R. Stare, William H. Stare, James P. Becket and William H. Baumann were in attendance.

THE INDIANAPOLIS SWITCH & FROG COMPANY, of Springfield, Ohio, represented by W. H. Thomas, chief engineer, had in the Transportation Building, a heavy crossing of 80-lb. T-rail, with extra heavy corner irons. Other features of the exhibit were a spring frog, a stiff frog, and a set of split switches made according to standard Pennsylvania Railroad specifications of last January; heavy construction, large radius tongue switch and mate of 70-lb. rail; main line and yard switches of all descriptions, and small T-rail frogs for mine work.

THE RAILWAY APPLIANCES COMPANY, of Chicago, exhibits the Q. & C. rail saws, Stanwood steel steps, derailleurs, and Bonanza joints in the Transportation Building.

ELLIOTT FROG & SWITCH COMPANY, of East St. Louis, has space in the Transportation Building, where it exhibits frogs, switches and signals.

THE J. G. BRILL COMPANY, of Philadelphia; AMERICAN CAR COMPANY, of St. Louis, and G. C. Kuhlman Car Company, of Collinwood, Ohio, were represented by W. H. Heulings, Jr., Samuel M. Curwen, J. E. Brill, Z. I. Markham, D. B. Dean, G. M. Haskell, William Lloyd, Jr., H. A. Morsman, W. L. Haymond, N. J. Mackley, W. T. Tonum, A. N. Hargrove, George H. Tontrup, E. D. Bronenkamp and J. R. Williams. The cars shown by these companies in the Transportation Building were described and illustrated in the STREET RAILWAY JOURNAL for June 11. The exhibit shows in an effective manner some of the many important features in car and truck construction introduced by the J. G. Brill Company in recent years.

THE ECLIPSE RAILWAY SUPPLY COMPANY, of Cleveland and Kansas City, was in evidence at St. Louis through the tests conducted two or three times each day on the test track adjoining the Transportation Building. Here the Eclipse life guard repeated the performance which has become quite habitual with it—that of picking up, uninjured, a live man standing in front of a moving car, in various positions and at different rates of speed. The company's representatives at the convention included C. B. Forward, Benjamin Lev, J. W. Range, R. H. Smith, C. H. Graham, H. Brinkman and Ross Forward. On Kansas City Day, which was the last day of the convention, a demonstration was also given for the benefit of Kansas City people near the Kansas City Casino to show what a Metropolitan car in Kansas City, equipped with the Eclipse fender, would do to a person accidentally getting in front of a moving car.

THE AMERICAN BRAKE-SHOE & FOUNDRY COMPANY had a large staff of representatives at the convention, including A. L. Streeter, J. W. Gerhard, J. S. Thompson, H. C. Buxton, E. A. Adreon, Jr., H. A. Anston and J. W. Clark. The company's exhibit in the Transportation Building, consisting of brake-shoes, castings, etc., was described and illustrated in the STREET RAILWAY JOURNAL for June 11.

THE AMERICAN CAR & SHIP HARDWARE MANUFACTURING COMPANY, of New Castle, Pa., showed evidence of the vigor with which it is entering the electric railway supply business, through its representation at the convention in the persons of J. W. Paterson, general manager, and W. S. Avis. The company is making a specialty of the manufacture of car trimmings and interior fittings of every description.

THE ALBERT & J. M. ANDERSON MANUFACTURING COMPANY, of Boston, was represented by C. R. Harris, W. W. Hincer, and Ernest Woltmann.

THE EMPIRE SAFETY TREAD COMPANY, of Brooklyn, N. Y., was on hand to tell all about the carborundum safety treads—the treads which "prevent slipping and never wear smooth." In addition to F. H. Newcomb, the company was represented by Messrs. Eastman and McGee.

THE HALE & KILBURN MANUFACTURING COMPANY, of Philadelphia, has an exhibit at the World's Fair which is one of the most attractive features of the Transportation Building. It consists of the famous Walkover seats, and also fireproof seating, rattan seat covering, etc. The company's representatives at the convention included H. T. Bigelow, A. F. Old and F. C. Cameron.

THE LACKAWANNA STEEL COMPANY, of Buffalo, N. Y., was represented at the convention in the person of C. D. Rhodes.

THE SIMPLEX ELECTRICAL COMPANY was represented by J. G. Brobeck, H. R. Hixson and Everett Morss.

THE STANLEY ELECTRIC MANUFACTURING COMPANY, of Pittsfield, Mass., had as its representatives at the convention Edward L. Ball and Locke Etheridge.

THE TAYLOR ELECTRIC TRUCK COMPANY, of Troy, N. Y., was present in the person of F. M. Nicholl.

WENDELL & MACDUFFIE, of New York, were represented by Jacob Wendell, Jr., and Henry E. Oesterreich. Regret was expressed that pressure of business prevented Mr. MacDuffie from being present also. As is now well known, Wendell & MacDuffie are making a specialty of asbestos and magnesia building lumber for use in car construction and other purposes, as well as handling the excellent line of general railway and electrical supplies, for which they have become so well known.

THE SHEPHERD ENGINEERING COMPANY, of Franklin, Pa., has been furnishing power for the Philippine Village at the exposition, by means of Shepherd engines driving direct-coupled electric generators. The contrast between this modern equipment and some of the low types of civilization in the Philippine exhibit, is one of the most marked to be seen at the Exposition.

THE HARRISON SAFETY BOILER WORKS, of Philadelphia, has its World's Fair headquarters in the Steam, Gas and Fuels Building. Cochrane heaters, separators and Sorge-Cochrane systems are also found in practical operation in the Intramural Power Plant, Underwriters Fire Pump Station, the exhibit of Westinghouse, Church, Kerr & Company, etc.

THE WALKER ELECTRIC COMPANY, of Philadelphia, is prominently in evidence at the Exposition, through having furnished the complete switchboard equipment for the Intramural plant, as well as switchboards in the Crocker-Wheeler and Gould Storage Battery companies' exhibits.

THE NILES-BEMENT-POND COMPANY'S exhibit in the Machinery Building, consisting of an extensive line of machine tools, was described in a recent issue of the STREET RAILWAY JOURNAL. This exhibit was visited by many of the delegates to the convention, and attracted much favorable comment. The company was represented by James T. MacMurray, general manager of the Pond Machine Tool Works, at Plainfield. Mr. MacMurray is one of the State Commissioners from New Jersey to the Exposition, and entertained a number of the prominent delegates at a luncheon in the New Jersey Building.

THE TROLLEY SUPPLY COMPANY, of Canton, Ohio, has an exhibit of its trolley retrievers and catchers in the space of the Wesco Supply Company, its St. Louis representatives. The delegates to the convention were also able to see the Knutson retrievers in practical operation on the Intramural Railway cars.

THE W. T. VAN DORN COMPANY, of Chicago, has not found it necessary to make a special exhibit at the World's Fair, for the reason that the Van Dorn draw-bars are to be found on all the Intramural cars. Mr. Van Dorn was present in person at the Street Railway Convention.

THE CONVERTIBLE CAR COMPANY, LTD., of Buffalo, N. Y., and Toronto, Canada, has a section of its convertible car on exhibition in the Transportation Building. A. C. Willliats, manager of the company, was present at the Street Railway Convention to explain to delegates the important features of this new type of car.

THE BROWN-CORLISS ENGINE COMPANY, Corliss, Wis., has been able to show street railway delegates to the Exposition its engines in practical service, the company having installed two of the generating units for the Intramural Railway plant. These engines are among the prominent features of the Machinery Building.

THE BURT MANUFACTURING COMPANY, of Akron, Ohio, is making an exhibit of the Cross oil filters in the Machinery Building, and also has several installations of these filters in practical operation in the main service plant, and in connection with some of the prominent engine and turbine exhibits.

THE ALLIS-CHALMERS COMPANY and the BULLOCK ELECTRIC MANUFACTURING COMPANY are very prominently represented in the Machinery, Electricity and Mines buildings. The exhibits of these companies have been described and illustrated in previous issues of the STREET RAILWAY JOURNAL. The companies were represented at the Street Railway Convention by a large staff, including W. H. Whiteside, A. Hoppin, H. J. Horseman, D. H. Robinson, R. York, G. Mulhausen, H. P. Hill, L. C. Marburg, N. W. Napwell, E. J. Meisenheimer, E. W. Stull, A. V. Moyer, Ward S. Arnold, R. K. LeBlond, C. J. Larson, George S. Phillips, J. W. Dunbield and J. W. Hardy.

THE EGRY AUTOGRAPHIC REGISTER COMPANY, of Dayton, Ohio, has an exceedingly attractive exhibit of its registers and train-despatching system in the Varied Industries Building. This exhibit was described and illustrated in the STREET RAILWAY JOURNAL for Aug. 2.

THE ELECTRIC RAILWAY EQUIPMENT COMPANY, of Cincinnati, makes an excellent showing in the Electricity Building, its exhibit including overhead line material and other electric railway and lighting apparatus. The company has also installed its iron poles and brackets on the test track in the Transportation Building. The company was represented at the convention by W. A. McCallum, H. Van Runyan, M. L. Cooke, W. M. Moore and L. M. Levinson.

THE PENNSYLVANIA STEEL COMPANY was represented by Howard F. Martin, general manager of sales, Philadelphia; J. V. W. Reynders, superintendent bridge construction department, Steelton, Pa.; Charles W. Reinoehl, superintendent frog and switch department, Steelton, Pa.; George W. Parsons, of Steelton, Pa.; Charles S. Clark, sales agent, Boston; Clifford J. Ellis, sales agent, Chicago; Robert E. Belknap, assistant sales agent, Chicago; P. W. Moore, of the Chicago office; J. G. Miller, sales agent, St. Louis, and C. E. Irwin, of the St. Louis office.

THE GALENA SIGNAL OIL COMPANY, of Franklin, Pa., had one of the most prominent exhibits at the convention. The company's booth is located at the left of the main entrance to the Transportation Building, and directly at the foot of the staircase leading to the convention hall. The company's large space is fitted up as a parlor, and this fact permitted its use in a semi-official way as a sort of rendezvous for the delegates before coming to the meeting hall and after adjournment. The hospitality of the company and the attention which its many representatives gave to the visiting delegates and the ladies proved most acceptable, and made this exhibit one of the most popular at the fair grounds. From a technical standpoint also the exhibit attracted a great deal of interest, owing to the growing interest which railway companies are taking in lubrication. The latest developments along these lines, especially in lubrication of car journal and motor bearings, were carefully explained, and a full opportunity was afforded to all interested in this subject to compare the results of oil with grease lubrication, as shown by the records on various roads. The company had a host of representatives present, among whom were: General Charles Miller, W. H. Pape, E. H. Baker, S. A. Megeath, J. Gettrust, John A. Wilson, F. B. Baker, A. Green, J. S. Patterson, J. E. Hall, C. E. Schauffer, Clarence Miller, E. C. Finlay, George A. Barnes, O. Huber, J. A. Roosevelt, E. E. McVicar, William Garstang, Fred. Garstang, Ed. Wilson and C. C. Steinbrenner.

THE WESTINGHOUSE INTERESTS.—The elaborate and important exhibits made by the different Westinghouse interests were so varied and extensive that no attempt will be made in this brief summary of the St. Louis convention exhibits to more than refer to them. From the main service plant, which was located in Machinery Hall, to the smallest measuring instrument in the Palace of Electricity, they included apparatus, the examination of which would have kept any technical visitor profitably employed during the entire week of the convention. The companies represented were the Westinghouse Electric, Machine, Air Brake and Traction Brake Companies; Westinghouse, Church, Kerr & Company; the various foreign companies, like the British, French, German and Russian; also the Union Switch & Signal Company, American Brake Company, R. D. Nuttall Company, Bryant Electric Company, Perkins Electric Switch Manufacturing Company, and other allied corporations. To the railway visitor all sections of the exhibit of this vast organization were of interest, and many features received very careful consideration. A practical insight was given into the methods of carrying on construction at Pittsburg by the biograph views of the shops, furnaces and foundries of the companies in the Westinghouse auditorium in Machinery Hall. This moving-picture display was presented three times during the day, and always attracted a large crowd. There were so many representatives of the company present that it is impossible to give the name of all, but the following are a few of those present from the Westinghouse Electric & Manufacturing

Company: L. A. Osborne, H. P. Davis, W. K. Dunlap, W. F. Fowler, C. S. Cook, Frank S. Smith, Calvert Townley, C. B. Humphrey, N. W. Storer, D. E. Webster, Guido Pantaleoni, John H. Gordon, J. C. McQuiston, R. S. Brown, W. O. Mundy, F. P. Gaylord, George B. Dusenberre and W. S. Rugg. Among those present from the Westinghouse Machine Company were Edwin Yawger. Among the representatives from the Westinghouse Traction Brake Company at the convention were J. R. Ellicott, G. A. Hager, S. D. Hutchins, H. S. Kolseth, C. R. Ellicott, E. L. Adreon, N. F. Neiderlander and E. V. Green. This company's exhibit attracted special attention from the fact that it is by far the largest of its various brakes ever shown at one place, and included all the company's different types of air brakes and magnetic brakes. Tests were made during the convention in the company's space in the Transportation Building, and the large installation of Westinghouse storage air brakes on the lines of the St. Louis Transit Company received careful attention. A brief guide of the Westinghouse exhibits was published in the form of a neat folder, which showed maps of St. Louis and of the exhibition grounds. These maps were among the most convenient distributed, and were largely used by the visiting delegates.

THE R. D. NUTTALL COMPANY, of Pittsburg, Pa., was represented at the convention by its genial president, F. A. Estep, one of the best known men in the whole street railway supply field. Mr. Estep was accompanied by C. B. Price, of Pittsburg. The Nuttall exhibit, which is to be found in the Westinghouse space in the Machinery Building, consists of an excellent display of the gears, pinions and trolleys, of which the electric railway industry is so familiar through long continued use.

THE WESCO SUPPLY COMPANY, of St. Louis, has a large and attractive exhibit in the Electricity Building, which was described in the STREET RAILWAY JOURNAL for June 18. At the street railway convention the company distributed an early edition of its house organ entitled "Live Wire," a publication containing items of interest to the electric railway industry. In the current issue of "Live Wire," the electric railway test track at the Exposition is illustrated. The Wesco Supply Company would be glad to send this publication regularly to anyone making application for it.

THE ST. LOUIS CAR WHEEL COMPANY invited the street railway delegates to inspect its attractive exhibit in the Transportation Building, which was described in the STREET RAILWAY JOURNAL for June 11. The company's representatives at the convention included John W. Nute, president, and J. J. Morse, treasurer.

THE HEINE SAFETY BOILER COMPANY, of St. Louis, was represented by Col. E. D. Meier, president; E. R. Fish, secretary; H. C. Meinholtz, superintendent, and J. C. Murphy. The company's exhibit at the World's Fair is in the Steam, Gas and Fuels Building, and has already been illustrated in the STREET RAILWAY JOURNAL.

THE NILES CAR & MANUFACTURING COMPANY, of Niles, Ohio, was represented by its president, F. C. Robbins.

THE BUDA FOUNDRY & MANUFACTURING COMPANY and Paige Iron Works' representation included E. S. Nethercut, J. A. Manchester, W. H. Bloss and E. M. Adams. The exhibits of these companies in the Transportation Building were illustrated in the STREET RAILWAY JOURNAL for June 11.

THE JEWETT CAR COMPANY, of Newark, Ohio, was represented by its president, A. H. Sisson, and by other members of its staff.

THE VAN DORN & DUTTON COMPANY, of Cleveland, was present in the person of its secretary-treasurer, W. A. Dutton.

THE OHMER FARE REGISTER COMPANY was on hand as usual, its representative being E. B. Grimes, who contributed towards the rapidly extending acquaintance of street railway officials with the Ohmer registers. Mr. Ohmer's absence in Europe prevented his being present also.

PORTER & BERG, the well-known supply dealers, of Chicago, were represented by Max A. Berg and W. L. Fergus.

THE SHERWIN-WILLIAMS COMPANY, of Cleveland, Ohio, was in evidence at the Southern Hotel and the Exposition grounds, in the persons of E. M. Williams, F. A. Elmquist and F. A. Billan.

THE PETER SMITH HEATER COMPANY, of Detroit, Mich., was represented by E. J. Smith. The company was also fortunate in having present at the convention George S. Hastings, of Cleveland, whose efforts have contributed so materially to the widespread use of the Peter Smith heater.

THE CENTRAL UNION BRASS COMPANY, of St. Louis, was represented at the convention by George Kingsland, president; Abe. Cook, vice-president; F. L. Bouquet, secretary; T. C. White and R. D. MacMillan. This company supplied a large part of the line material for the intramural railway, in addition to having

executed several large orders for brass and iron castings for the Exposition.

THE GRIFFIN WHEEL COMPANY, of Chicago, was represented by T. A. Griffin, F. T. Whitcomb, C. K. Knickerbocker and B. Von Schlegel.

THE INTERESTS OF THE FALK COMPANY, of Milwaukee, were ably cared for at the convention by General Otto Falk, president; E. A. Wurster, secretary and treasurer, and W. Frank Carr.

THE FEDERAL MANUFACTURING COMPANY, of Elyria, Ohio, was represented by H. E. Keeler, Charles Tewksbury and E. L. Ludlow, who explained to the street railway delegates the important features of the Keeler "pinch handle" curtain fixture, the Shelby trolley poles and other specialties manufactured by this company.

THE ELLIOT FROG & SWITCH COMPANY, of East St. Louis, Ill., was represented by W. H. Elliot, H. J. Elliot and E. R. Einstein.

THE ARNOLD ELECTRIC POWER STATION COMPANY, of Chicago, was present in the person of George A. Damon.

THE LORAIN STEEL COMPANY was represented by Major H. C. Evans, without whom no street railway convention would be complete.

THE DAYTON MANUFACTURING COMPANY was in attendance at the convention in the persons of Joseph Leidenger, Peter Leidenger and M. Emmons, Jr. The headlights and car trimmings manufactured by the Dayton Manufacturing Company are to be found in the exhibit cars at the World's Fair, built by the American Car & Foundry Company, the John Stephenson Company, American Car Company, St. Louis Car Company and Cincinnati Car Company.

THE HOOVEN, OWENS, RENTSCHLER COMPANY, of Hamilton, Ohio, was able to show street railway delegates the Hamilton-Holzwarth steam turbine, which it is now prepared to manufacture, and which was illustrated in the STREET RAILWAY JOURNAL for Oct. 8. The steam engine exhibit of Hooven, Owens, Renschler Company is also of a size and character to make it one of the most prominent features of the Machinery Building. The company had a large staff in attendance at the convention, including J. C. Hooven, C. O. Richter, H. Holzwarth, F. E. Bausch, G. E. Hooven, Earl Hooven, J. J. Sullivan, Charles Giles, Carol Krebs, O. F. Bausch, E. Summa, A. Bausch.

THE INTERNATIONAL REGISTER COMPANY, of Chicago, was represented at the convention by John Benham, W. H. Brown and A. N. Loper. It was a source of regret to the many friends of A. H. Woodward, president of the company, that his absence on the Pacific Coast prevented his being in attendance. The International Register Company's exhibit in the Transportation Building was described and illustrated in the STREET RAILWAY JOURNAL for June 11.

THE NATIONAL ELECTRIC COMPANY, of Milwaukee, is very prominently in evidence at the World's Fair, owing to its exhibits of Christensen air brakes and electrical machinery in the Electricity and Machinery Buildings. These exhibits were described and illustrated in the STREET RAILWAY JOURNAL for June 11 and Aug. 6. The company had a large staff of representatives at the Street Railway convention, including F. C. Randall, J. T. Cunningham, C. P. Tolman, A. H. Metzelaar, C. G. Burton, S. I. Wailes, George Voigt, H. N. Ransom, J. H. Denton, B. T. Becker, George Anthon, Jno. J. Nef, W. W. Power, J. J. Riley.

W. N. MATTHEWS & BROTHER, of St. Louis, were represented by W. N. Matthews, C. L. Matthews and W. M. Eckle. The guy anchors exhibited by this company are to be found in Section 8 of the Electricity Building.

THE W. R. GARTON COMPANY, of Chicago, was ably represented by its secretary, Ray T. Lee, and F. S. Hill.

PIERCE, RICHARDSON & NEILER, engineers, of Chicago and Boston, were represented by Richard H. Pierce.

HENRY R. WORTHINGTON, BLAKE-KNOWLES STEAM PUMP WORKS exhibits, and those of other associated companies, are among the most prominent features of the Machinery Building, and the Steam, Gas and Fuels Building. An illustrated description of these exhibits appeared in the STREET RAILWAY JOURNAL for July 9. Those desiring more detailed information on this subject, as well as facts regarding the condensers, pumps, cooling towers, etc., which these companies have installed in connection with other exhibits at St. Louis, should apply for a copy of an attractive book entitled "Pumping Machines at St. Louis," which these companies are distributing at the Exposition.

FINANCIAL INTELLIGENCE

WALL STREET, Oct., 19, 1904.

The Money Market

Increasing ease developed in the money market this week, rates for all classes of securities ruling substantially below those prevailing at the close of a week ago. At the opening demand funds commanded $2\frac{1}{2}$ per cent, but later on the rate broke sharply to $1\frac{3}{4}$ on the heavy offerings by some of the large local financial institutions and by out-of-town banks. The liberal supply of call funds was also reflected in a general reduction in rates for fixed periods, despite the unusually heavy dealings and pronounced strength in the securities market. Brokers generally reported an effort to place over the year contracts at $3\frac{3}{4}$ per cent, but the volume of business at that figure was comparatively small. Sixty-day contracts were extremely dull, with 3 per cent the prevailing rate, as against $3\frac{1}{2}$ per cent a week ago. The commercial paper market was only moderately active, and rates were inclined to a lower level in sympathy with the decline in other departments of the market. Specialists report a fair supply of prime material, which is readily absorbed at 4 to $4\frac{1}{4}$ per cent, according to indorsements. Other grades are quoted at from $4\frac{1}{2}$ to 5 per cent. The sterling exchange market ruled strong, owing to the higher discounts at London and on the Continent. The supply of cotton and other classes of bills continued large, but the demand from remitters and from arbitrage houses was sufficient to absorb all offerings. At the close the market displayed a heavy tone at a slight concession from the high rates.

The Stock Market

Dealings upon the Stock Exchange assumed very large proportions this week, the number of issues dealt in and the total transactions on several occasions being the largest recorded on any previous day since May 9, 1901, the date of the Northern Pacific corner. These heavy dealings were accompanied by a further sharp rise in values, prices for a number of issues establishing new high records for the year. Particularly strong features were the United States Steel issues, St. Paul, Reading and some of the less active issues. The stocks in which the pools were especially interested received most attention, and prices for them were marked up to new high levels, and many of the minor issues scored sharp advances in sympathy with the upward movements in the more prominent issues. The news of the week was rather mixed, but none of it had the slightest influence upon prices. For instance, the bank statement published on Saturday was generally considered favorable, showing a large contraction in loans and an increase in the surplus reserve. It was generally thought that at the opening of the present week prices would continue the upward movement, but contrary to expectations the market developed considerable irregularity. Arbitrage houses which were heavy buyers of stocks at the close of last week reversed their positions and sold liberally. In addition there was considerable realizing for local account, but all stocks offered were readily absorbed and the general opinion at the close was that the buying was much stronger than the selling. The bond market was also extremely active and strong, the noteworthy feature being the United States Steel Sinking Fund 5's, Union Pacific Convertibles, Brooklyn Rapid Transit Convertible 4's, Consolidated Tobacco 5's and Mexican Central first and second incomes.

In the local traction issues interest centered almost exclusively in Brooklyn Rapid Transit, which was extremely active and decidedly strong, the price touching $68\frac{5}{8}$ on Friday last, the highest point attained upon the present upward movement. Metropolitan Street Railway, Metropolitan Securities, Manhattan Railway and the other traction stocks ruled quiet and without material change in prices.

Philadelphia

Advancing prices have been the rule among the Philadelphia tractions during the week. There was no particular feature to the dealings; the rise was entirely sympathetic with the general market tendency. Philadelphia Electric went from $67\frac{3}{8}$ to $8\frac{1}{4}$, and Philadelphia Company common from $42\frac{5}{8}$ to $43\frac{3}{8}$. These were the two most active stocks. Philadelphia Company preferred made a new high price for the year at $47\frac{1}{4}$ after an advance from 46. Union Traction also repeated the season's high record at $56\frac{3}{8}$. Philadelphia Traction sold between $97\frac{5}{8}$ and 98. Railways Gen-

eral became more active, moving up from $27\frac{3}{8}$ to $3\frac{1}{4}$. Four hundred American Railways sold between $47\frac{1}{2}$ and 48. One thousand Rapid Transit change hands at 15. Consolidated of New Jersey declined from 75 to $74\frac{1}{2}$, but subsequently recovered its loss, about 300 shares being dealt in. One hundred Germantown Passenger went at $132\frac{1}{2}$.

Chicago

Officials of the Metropolitan West Side Elevated Railroad report splendid results from the new Fifth Avenue terminal. They have not figured an average gain from that source as yet, and no attempt will be made to do so until the end of the month. It is stated, however, that the results thus far have been fully up to expectation. Congestions have been relieved and great crowds are now being carried during the rush hours of the evening with comparative ease. The company has received about twenty-five of its sixty-eight new cars, and the bulk of the remainder will be delivered during the balance of the month. When all the cars are in use, officials expect to be able to give service never before equalled by any of the overhead lines.

Only the scantiest sort of trading has been done in the week's market for the Chicago tractions. City Railway sold at 175. West Chicago, in odd lots, between 52 and 50; 100 shares of North Chicago at 80, 100 shares of Oak Park Elevated common at $6\frac{1}{2}$, and odd lots of Northwestern preferred at 58, and South Side at 91. Metropolitan Elevated preferred advanced from 64 to 65 on the purchase of 240 shares.

Other Traction Securities

Trading in the Boston specialties was very light. A few fractional lots of Elevated sold between $153\frac{1}{2}$ and 153. Massachusetts Electric issues ceased to be pressed for sale, but showed no inclination toward recovery. The common after rallying to 14 fell back to $13\frac{1}{2}$. The preferred rose from 55 to 56, then reacted to $55\frac{1}{2}$. West End common was idle between $91\frac{3}{4}$ and 91, and the preferred between 111 and 110. On the Baltimore Exchange the United Railways issues were stronger. The stock advanced from $7\frac{5}{8}$ to 8, at which figure 360 shares changed hands. The income bonds gained $1\frac{5}{8}$ from $45\frac{3}{8}$ to 47, and the general mortgage 4's rose a half point from $90\frac{1}{2}$ to 91. The movement in the Norfolk Railway & Lighting securities continued. The 5 per cent bonds rose two points further to 90. The stock hardened from $10\frac{1}{2}$ to $10\frac{3}{4}$ on sales of 225 shares, but later a lot of 75 shares sold at 10. Other traction bonds made small gains, the Virginia Electric Railway and Development 5's from $94\frac{1}{2}$ to 95, the Washington City and Suburban 5's from $103\frac{1}{2}$ to $104\frac{1}{2}$, and the Anacostia & Potomac 5's from $103\frac{1}{4}$ to 104. Macon Street Railway 5's sold at $91\frac{1}{2}$.

Interborough Rapid Transit on the New York curb was much less active than it has been for some time past. Only 5000 shares were dealt in all last week, the price declining from $148\frac{1}{2}$ to $146\frac{1}{4}$, and then rallying to 148. A thousand Washington Electric preferred sold on an advance from 72 to 75, and the bonds were fairly active at $83\frac{1}{2}$. Two hundred New Orleans common went at 10. St. Louis Transit was traded in more largely than usual, the stock recovering from $8\frac{1}{8}$ to 10 on a volume of 2300 shares. One hundred of the preferred sold at $65\frac{1}{2}$. An odd lot of American Light & Traction changed hands at 62.

Cincinnati, Newport & Covington preferred featured at Cincinnati last week. About 2000 shares sold at $93\frac{1}{2}$ to $93\frac{3}{4}$, 1000 shares of this being in one lot. Several lots of the common sold at $31\frac{1}{2}$ to $31\frac{3}{4}$. Eighteen thousand dollars' worth of the first 5's sold at 109. Detroit United displayed considerable activity, sales numbering 1320 shares, with a range of from $71\frac{1}{4}$ to 72. About 1200 shares of Cincinnati Street Railway sold at $144\frac{1}{2}$ to 145.

Tractions were dead in Cleveland last week, the only sales being a few small lots of Cleveland Electric at $73\frac{1}{2}$ to 74. Monday a small block of Aurora, Elgin & Chicago 5's receipts sold at $81\frac{1}{2}$.

At Toledo the interest in Toledo & Western continued, and the selling price advanced to 17. Several small lots of Toledo Railways & Light sold at $21\frac{3}{8}$.

Iron and Steel

The iron market continues in a very excited condition. That the tendency is toward improvement is agreed very generally, but both buyers and sellers are very undecided regarding the immediate terms that ought to be fixed for contracts. Prices have been

advanced quite sharply this week by pig iron makers in the east. In the South it is reported that furnacemen have not yet met with much success in attracting higher bids from their customers. A better business, however, is doing all over the country, and the increasing activity is fairly distinguishable in other branches of the industry. Quotations are as follows: Bessemer pig iron \$12.75 to \$13, Bessemer steel \$19.50, steel rails \$28.

Metals.

Quotations for the leading metals are as follows: Copper 13 cents, tin 28 $\frac{3}{8}$ cents, lead 4 $\frac{3}{8}$ cents, and spelter 5 1-16 cents.

Security Quotations

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

	Closing Bid	
	Oct. 11	Oct. 18
American Railways	47 $\frac{1}{2}$	47 $\frac{3}{4}$
Aurora, Elgin & Chicago	—	5
Boston Elevated	153 $\frac{3}{4}$	153
Brooklyn Rapid Transit	60 $\frac{3}{4}$	67 $\frac{1}{2}$
Chicago City	177	170
Chicago Union Traction (common).....	7 $\frac{1}{2}$	7 $\frac{1}{2}$
Chicago Union Traction (preferred).....	33	—
Cleveland Electric	73	74 $\frac{3}{8}$
Consolidated Traction of New Jersey.....	74 $\frac{1}{2}$	74
Consolidated Traction of New Jersey 5s.....	109 $\frac{3}{4}$	110 $\frac{1}{2}$
Detroit United	71	73 $\frac{1}{2}$
Interborough Rapid Transit	146	148 $\frac{1}{2}$
Lake Shore Electric (preferred)	—	—
Lake Street Elevated	3 $\frac{1}{2}$	3 $\frac{1}{2}$
Manhattan Railway	154 $\frac{3}{8}$	158
Massachusetts Electric Cos. (common).....	13 $\frac{1}{2}$	a14
Massachusetts Electric Cos. (preferred).....	55	54 $\frac{1}{2}$
Metropolitan Elevated, Chicago (common).....	23 $\frac{1}{2}$	23 $\frac{1}{2}$
Metropolitan Elevated, Chicago (preferred).....	63	66
Metropolitan Street	120 $\frac{5}{8}$	122 $\frac{3}{8}$
Metropolitan Securities	82	84
New Orleans Railways (common).....	9 $\frac{1}{2}$	10
New Orleans Railways (preferred)	26	27
New Orleans Railways, 4 $\frac{1}{2}$ s	76	76
North American	94 $\frac{1}{2}$	97
Northern Ohio Traction & Light	14 $\frac{1}{2}$	13 $\frac{1}{2}$
Philadelphia Company (common)	42 $\frac{3}{4}$	42 $\frac{3}{8}$
Philadelphia Rapid Transit	15	15
Philadelphia Traction	98	97 $\frac{7}{8}$
St. Louis (common)	8	9 $\frac{1}{2}$
South Side Elevated (Chicago).....	90	92
Third Avenue	128 $\frac{1}{2}$	128 $\frac{1}{2}$
Twin City, Minneapolis (common).....	102 $\frac{3}{4}$	103 $\frac{1}{2}$
Union Traction (Philadelphia)	55 $\frac{3}{4}$	56 $\frac{1}{2}$
United Railways, St. Louis (preferred)	62	68 $\frac{1}{4}$
West End (common)	91	91 $\frac{1}{4}$
West End (preferred)	110	110

a Asked.

ATTEMPT AT TRAIN WRECKING IN BROOKLYN—LIFE SENTENCE FOR GEORGIA WRECKER

A few days ago another dastardly attempt was made in the outskirts of Brooklyn to wreck a motor train of the Brooklyn Rapid Transit Company. This time, as in a similar attempt noted in the STREET RAILWAY JOURNAL a few weeks ago, a railroad tie was used to effect the derailment. Although the attempt at wrecking was made in an unfrequented and poorly lighted part of the city, the obstruction was discovered in time to prevent an accident. It seems, from the recent similar occurrences, that an organized attempt is being made at wrecking a train. The company is doing its best to run the offenders down, and has offered a reward of \$500 for the arrest and conviction of those concerned in the latest offense.

In Georgia the courts have just dealt severe punishment to a negro who attempted to wreck a car of the Savannah Electric Company. The punishment was hard labor for life in the penitentiary. The evidence against the accused was purely circumstantial, yet step by step the prosecution built up its case until there existed little doubt of the guilt of the accused. It was shown that the negro had been put off the car near the trestle at Bonaventure Cemetery, because of disorderly conduct, and that as he left he made a threat about getting even with the conductor and the woman with whom he had had a quarrel. Little attention was paid to the threat, the motorman and conductor looking upon it as merely a boast. On the return trip the car struck a board that had been nailed upright between the cross-ties of a trestle. Only the fact that the obstruction was of decayed wood, and was easily battered down by the force of contact, saved the car from being pitched from the trestle, filled, as it was, with women and children.

PRESIDENT TRUMBULL OF THE COLORADO & SOUTHERN IN NEW YORK

President Trumbull, of the Colorado & Southern Railway Company, was in New York a few days ago for a short visit. It is understood that he took up in the East the question of introducing electricity on some of the lines of the Colorado & Southern Railroad, reference to which change was recently made in the STREET RAILWAY JOURNAL. A separate company, as already noted in these columns, has been organized for the purpose of making the change in power. It is not improbable that the Colorado & Southern Company will guarantee some of the securities of the new company.

THE RECORD DAY IN ST. LOUIS

More than 1,000,000 people were carried by the St. Louis Transit Company on Veiled Prophet's day, Tuesday, Oct. 4, establishing a new record that far exceeds any previous one made by the company. Adding the passengers transported by the St. Louis & Suburban Railway and by the Wabash shuttle trains, the figure reaches nearly to 1,500,000.

Not only did the Transit Company establish a record, but the Terminal Association as well exceeded previous records, no less than 137,500 persons passing through the Union Station. Officials of the latter company say that never before in the history of the station has so large a crowd been handled.

Transfers were issued by the Transit Company to 284,000 passengers, while the Suburban Company transferred 24,000. The record for the day follows:

	Passengers	Receipts
Transit Company	1,162,976	\$42,347
Suburban Company	147,000	5,700
Shuttle trains	4,650	465
Total traction lines	1,314,626	\$48,512

A PLAN FOR TERMINATING EASTERN OHIO RECEIVERSHIP

A plan has been presented to stockholders of the Eastern Ohio Traction Company for removing the property from the hands of the receiver, where it has been for a year or more. The plan calls for an assessment of \$15 per share. This would raise \$375,000, which would be used in paying pressing debts, supplying additional power, and otherwise improving the system. This amount of money would not take care of the bond debt, and the bondholders, who are also largely stockholders, have been asked to waive their rights to interest for a year or two longer. It is understood that the large stockholders have agreed to pay the assessment.

RECEIVER FOR CLEVELAND, PAINESVILLE & ASHTABULA

On an action brought by Jethro G. Mitchell, of Toledo, the Cleveland, Painesville & Ashtabula Railway Company has been placed in the hands of A. B. Cleveland, president of the company, as receiver. The plaintiff is a stockholder and bondholder of the company. The petition states that a bond issue of \$750,000 was made for building purposes and that the company was capitalized at \$1,000,000. The Electric Construction Company was formed by certain of the directors for the purpose of building the road. It is alleged that the construction company built the road at a large profit, the road costing not more than \$500,000, and that the company failed to comply with its contract to the extent of \$100,000. It is alleged that when the road was completed it was fraudulently turned over to the railway company; that bonds to the amount of \$100,000 were issued for improvements that were never made, and that some of the directors bought the Geneva lighting plant for \$15,000, and then sold it to the railway company for \$50,000. It is alleged that the company is insolvent and that its credit is impaired. An injunction restraining the sale or disposal of bonds has been granted. A. B. Cleveland was superseded as general manager a few weeks ago by J. R. Curtiss. Now Mr. Cleveland, as receiver, again takes up the management, and Mr. Curtiss is dismissed. The entire controversy seems to be summed up in a row between two factions for the control of the property. It is probable that the appointment of a receiver will delay the plans for building a new car house and repair shop which were to have been built at Geneva.

CONSTITUTION OF THE MANUFACTURERS' ASSOCIATION

One of the actions taken at the St. Louis Convention was the adoption of a different name by the Manufacturers' committee, which will hereafter be known as the American Street Railway Manufacturers' Association. Another was the increase in the number of members of the executive committee from ten to fifteen, as mentioned last week. The constitution and by-laws of the association, as adopted at St. Louis, are given below:

CONSTITUTION

Article I.—Name

The name of this association shall be "The American Street Railway Manufacturers' Association." Its office shall be that of its secretary.

Article II.—Object

The object of this association shall be to advance the interests of its members and of the American Street Railway Association by providing for and having custody of such exhibits of material as may be made at the annual conventions, and the establishment of friendly co-operation and relations with each other and with the delegates of the railway companies.

Article III.—Membership

Section 1. The members of this association shall be manufacturers of street railway material, their agents or representatives, engineers or contractors engaged in railway construction, publishers and editors of the technical press and others interested in street railways, but not engaged in the operation thereof.

Sec. 2. Individuals, firms and corporations who are eligible may become members upon signifying their desire so to do in writing and paying the annual dues.

Sec. 3. Each member shall be entitled to one vote by a delegate presenting proper credentials.

Article IV.—Management.

Section 1. The management of the affairs of this association shall be entrusted to an executive committee of fifteen, who shall be members or their representatives.

Sec. 2. At its first meeting after the annual election of Oct. 10, 1904, the executive committee shall divide itself by lot into three classes of five each, the first class to hold office for one year, the second class for two years and the third for three years. Thereafter, at each annual meeting five members of the executive committee shall be elected for terms of three years to fill the places of those whose terms have expired.

Sec. 3. Vacancies occurring in any class of the executive committee may be filled for the unexpired term by a majority vote of the remaining members of the committee.

Article V.—Officers and Committees

Section 1. The executive committee shall elect annually from its own body a chairman who shall take office at the close of the meeting at which he is elected and hold office for one year. They shall also appoint a secretary, who shall hold office during the pleasure of the committee. The secretary shall be paid a salary to be fixed by the executive committee.

Sec. 2. The executive committee may appoint such sub-committees as may be necessary from time to time. The chairmen of such committees shall report to the chairman of the executive committee.

Article VI.—Amendments

This constitution may be amended by a two-thirds vote of members represented and voting, either at a meeting or by letter ballot, at least thirty days previous notice in writing having been given.

BY-LAWS

Article I.—Meetings

Section 1. The annual meeting shall be held on the opening day of the annual convention of the American Street Railway Association, notice of time and place having been given to the members in writing by the secretary.

Sec. 2. Meetings of the executive committee may be called at any time by the chairman.

Article II.—Quorums

Section 1. At the annual meeting fifteen members shall constitute a quorum.

Sec. 2. At meetings of the executive committee three members shall constitute a quorum.

Article III.—Dues.

The dues shall be fixed annually by the executive committee at such a figure as the finances and requirements of the association may demand, but shall not exceed \$35. In the event of the expenses of the association falling below the amount collected, a rebate shall be given to all members.

Article IV.—Order of Business

Section 1. At the annual meeting: 1. Roll call. 2. The reading of minutes of the last annual meeting. 3. Report of executive committee. 4. Reports of secretary. 5. Reports of special committees. 6. Election of officers.

Sec. 2. At meetings of executive committee: 1. Roll call. 2. Reading of minutes. 3. Reports of committees. 4. Unfinished business. 5. New business.

Article V.—Amendments

These by-laws may be amended or suspended at any meeting by a vote of two-thirds of the members present and voting.

THE EAST ST. LOUIS & SUBURBAN ENTERTAINS

The management of the East St. Louis & Suburban Electric Railway Company gave a "family party" Oct. 10, the guests being attaches of the lines in different cities directed by E. W. Clark & Company, of Philadelphia. The entire system was covered in the special car "The Bluffs," which was elaborately trimmed with carnations, roses and smilax. Luncheon was served by a caterer. At Winstanley a surprise was sprung, the guests being transferred from the elegant special to one of the company's huge coal cars, which, however, was new and spotless. Then the party were pulled to the sheds by an electric locomotive, and at the latter place, the new special car "Darrach" was christened, F. H. Thomas, of East St. Louis, making the address. In the evening the guests were entertained at a banquet at the Missouri Athletic Club, St. Louis, and were then taken in a special to the World's Fair.

On the trip were H. I. Clark, of E. W. Clark & Company, of Philadelphia; R. E. Danforth, general manager; J. Wilcoxon, division superintendent; S. P. Maize, master mechanic; C. B. Wilson, passenger agent of the Rochester Railway Company, of Rochester, N. Y.; Frank Silliman, Jr., general manager Scranton Railway Company, of Scranton, Pa.; M. S. Hopkins, general superintendent, and P. V. Burington, secretary and auditor, Columbus Railway & Light Company, of Columbus, Ohio; Emil G. Schmidt, general manager Consolidated Railway Company, of Springfield, Ill.; W. S. Butler, superintendent, and John C. Madigan, master of transportation, Grand Rapids Railway Company, of Grand Rapids, Mich.; J. C. Young, vice-president Saginaw Bay City Railway & Light Company, of Saginaw, Mich.; F. Dillman, master mechanic, St. Joseph Railway Company, of St. Joseph, Mo.; J. F. Porter, president, and F. E. Allen, vice-president, Alton, Granite & St. Louis Traction Company, of Alton, Ill., and L. C. Haynes, vice-president; J. M. Branlette, T. W. Gregory, F. H. Thomas, W. A. Bennett, Lee Massengale, C. E. Wilson, C. S. Darrach, W. H. Guyton, F. A. Campbell and Dr. H. Starkel, of the East St. Louis & Suburban Company.

AWARDS TO THE ALLIS-CHALMERS COMPANY

The Allis-Chalmers Company announces that it has been awarded at the St. Louis Exposition, a grand prize in every department; viz., for its steam engines, electrical and mining machinery, as well as a gold medal for the Bullock system of operating variable speed electric motors for driving machinery. One grand prize was for the Allis-Chalmers "big reliable" engine, the largest ever seen on exhibition, another grand prize was for the Bullock electric generator, these two machines comprising the huge unit which supplies the famous decorative lighting and much of the power at the St. Louis Exposition. Another grand prize was given for the company's exhibit in the Department of Mines and Metallurgy.

RAPID TRANSIT COMMISSION INSPECTS SUBWAY

An examination of the block system and other safety devices in the subway was made Tuesday, Oct. 11, by the Rapid Transit Commission. Nearly all the members of the commission took part in the examination, assisted by William Barclay Parsons, the chief engineer of the commission, and his assistant, Mr. Rice. August Belmont, president of the Interborough Rapid Transit Company, with General Manager Hedley, Chief Engineer Deyo and A. I. Merritt, the company's superintendent of construction, also accompanied the party.

A train of six cars was boarded at the City Hall station at 2 p. m. Early in the day both local and express trains were being run on schedule time, without passengers, but on account of the inspection by the Rapid Transit Commission the express trains were withdrawn in the afternoon to give a clear track for the special train.

The train was first run to 145th Street and Broadway, making stops at several stations on the way to permit of careful examination of stations and appliances. Then the train was run back to Ninety-Sixth Street, switched to the east track and run through the east branch of the subway to 148th Street. Then it was run back to the City Hall.

The Interborough Company has begun to run seven-car trains on the elevated roads at the rush hours, morning and evening. Nearly all the trains on the Third Avenue line, and several trains on the Sixth Avenue line were made up of seven cars each at the rush hours Tuesday, Oct. 11. The running of such long trains on the elevated lines has been made possible by lengthening the station platforms and by the addition of many new cars.

THE PLANS FOR OPENING THE NEW YORK SUBWAY

The Interborough Rapid Transit Company is now concerned with the question of how best to open the subway system so as to avoid any great rush on the part of the curious public to have the distinction of being "first" to have a ride. It seems that the decision now is to begin regular operation on the stroke of midnight, Oct. 27, the service to extend from City Hall to 145th Street on the West Side.

The formal ceremonies attending the opening will be simple, and held at 1 o'clock in the afternoon in the Aldermanic Chamber, Mayor McClellan presiding. Invitations will be sent to the President of the United States, Members of Congress, the Governor, the Legislature, the heads of all municipal departments, judges of the courts, Archbishop Farley and Bishop Potter and the heads of the other religious denominations of the city, presidents of the colleges, the presidents of the business associations, foreign consuls and the presidents of all railroads and companies having to do with rapid transit.

Mr. Alexander E. Orr, president of the Rapid Transit Commission, will make the formal notification that in the opinion of the commission the subway on the west side is complete and safe for public traffic. He will then turn that branch of it over to the city. The Mayor will accept the structure in behalf of the city and immediately turn it over to August Belmont, president of the Interborough Railroad Company, the operating company. Mr. Belmont is expected to speak, and so is John B. McDonald, the contractor, the municipal heads and others.

MEETING OF THE NEW ENGLAND STREET RAILWAY CLUB

The October meeting of the New England Street Railway Club will be held at Wesleyan Hall, Bromfield Street, Boston, on Thursday evening, Oct. 27, at 7.30 o'clock. The meeting will be of an unusually interesting nature from the fact that three papers will be presented, on the subject of "Track Construction and Maintenance," by Gilbert Hodges, consulting engineer, of Boston; David Curtin, roadmaster of the Boston & Northern and Old Colony Street Railways, and H. M. Steward, roadmaster "L" division, Boston Elevated Railway Company. A general discussion will follow.

The club also proposes to change its by-laws and constitution so that the annual meeting will be held the fourth Thursday in March, instead of the fourth Thursday in January; also that the members of the executive committee shall be elected for three years instead of for one year, as at present. It is proposed at the next election to elect two members for three years, two for two years, and two for one year, and so ultimately to provide for the election of two new members only each year. It is also proposed to change the method of making nominations for officers so that two candidates for president shall be presented and not less than twice the number of candidates for executive members, as there are vacancies to be filled.

CONTRACT LET FOR LINE FROM BOSTON TO PROVIDENCE

James F. Shaw & Company, of Boston, Mass., have been awarded the contract for building the proposed double-track high-speed electric railway between Boston and Providence. The new road is being promoted by interests identified with the Boston & Worcester Electric Companies, and will be closely related to the line of that company operated between Boston & Worcester. In fact, it is proposed to utilize the tracks of the Boston & Worcester Electric Railway as far out from Boston as the suburb of Newton, 8 miles distant, from whence the new line will start directly south, running through Needham, Dover, Walpole, Wrentham, North Attleboro, Attleboro and Pawtucket, into Providence. The road will be double-tracked throughout, and will be heavily ballasted for high-speed operation. The plans call for the building of a total of thirty-four miles of double track, a large proportion of which will be upon private right of way. Where highways are used it is proposed to make use of the boulevard system of arrangement of tracks, with centerpole construction. Large cars of the most recent construction will be provided, and they will be heavily powered for high-speed operation. It is expected that the total distance between the two cities, 43 miles, will be covered in a little over two hours. The line is to be equipped with a system of signaling for the safe operation of trains, and a despatching system similar to that used upon the Boston & Worcester line will be installed. It is thought that power for the line will be furnished by the present power plant of the Boston & Worcester line at South Framingham. The cost of construction is estimated at \$2,500,000.

BIDS WANTED FOR CONSTRUCTION OF WESTERN SYSTEM

The Roberts & Abbott Company, of Cleveland, consulting engineer for the Michigan & Indiana Traction Company, is receiving bids for the construction and equipment of the new road, which will be about 50 miles in length. The power house will be equipped with two 900-hp cross-compound condensing engines operating with 160 lbs. of steam and 100 degs. superheat to be direct-connected to two 600-kw. three-phase 25-cycle generators operating at 125 r. p. m.; two 60-hp exciter engines direct connected to 40-kw generators; five 300-kw rotary converters, static step-up and step-down transformers for 16,500 volts transmission, switchboard, etc.; four 400-hp water-tube boilers equipped with superheaters, individual stacks and automatic stokers; a 30-ton hand-power crane with two 15-ton trolleys. There will be a sub-station in the main house, a portable sub-station and three line sub-stations. The buildings will be of brick and steel construction and alternative proposals may be submitted on concrete block or hollow block construction. Alternative bids will also be received on single-phase a. c. current equipment and motors; also on steam turbines in place of reciprocating engines. There will be a car house and a repair shop, and proposals will be received for the building and equipping of these. There will be eight 51-ft. passenger coaches, one baggage car and one work car, each equipped with four 75-hp motors. The track will be laid with 70-lb. T-rail, and the overhead equipment will be of heavy construction. There will be several steel bridges and considerable concrete work. A block signal system and a telephone system will be installed. Plans and specifications for all the equipment are on file at office of the Roberts & Abbott Company, Cleveland, and at the office of the Traction Company, care Phelps Sanitarium, Battle Creek, Mich.

THE MELROSE ACCIDENT

Reference has already been made in the STREET RAILWAY JOURNAL to the terrible accident which occurred in Melrose, Mass., on the night of Sept. 21, when nine passengers lost their lives, and about forty others were injured, through the explosion of dynamite which had fallen upon the tracks of the Boston & Northern Street Railway Company from an express wagon that was being driven through the city. The report of Judge Sweetser of the Malden District Court, who held the inquest, has now been filed with the Superior Court at East Cambridge. The Boston & Northern Company has been acquitted of all responsibility in the matter. The foreman of the express company and the driver of the wagon are held "jointly and criminally negligent in suffering a large quantity of dynamite to be so carelessly loaded and transported upon a wagon that a portion of the same fell unnoticed upon the tracks, * * * whereby the said dynamite came to be exploded by the impact of a car, then and there properly operated by the said corporation, and lawfully upon the said track."

Evidence shows that the car was moving slowly at the time of impact, and that the motorman had slackened speed for a full stop at the next street, Wyoming Avenue, when the explosion occurred. The motorman was killed in the accident, and there is no evidence that he saw the box in time to stop the car. No other witness has been produced who saw the box. The electric light at the corner of Main Street and Wyoming Avenue was not lighted at the time, and it was dark at the spot where the accident happened, on account of shadows caused by trees and buildings, although the moon gave ample light in the open.

The lesson of the catastrophe to street railway men lies in Judge Sweetser's statement: "The calamity might have been avoided if it had not been for the unhappy economy common to most suburban cities and towns, of extinguishing the street lights on moonlight nights, irrespective of conditions in particular localities. Furthermore, the explosive was 'packed' in cheap wooden boxes which allowed the cartridges to rattle around loosely, the box being so frail that it could hardly fail to break in falling. The conclusion is that the weight of 50 lbs. of dynamite falling from the wagon broke open the box, scattering the contents, one or more cartridges going on the rail; that the car ran against one cartridge, which in turn exploded the others—a point consistent with the testimony of many witnesses, who heard two explosions. It would appear that substantial packing might also have averted the calamity."

The proper lighting of city streets is shown by this explosion to be a matter of real concern to street railway companies, and it would seem highly desirable for every street railway man to advocate and encourage the "all night and every night" lighting schedule, which is the only sure plan of obtaining satisfactory illumination. Certainly it is not the business of a railway company to illuminate the highway at large.

INSPECTION OF NEW YORK SUBWAY BY PENNSYLVANIA RAILROAD OFFICIALS

A trip of inspection was made through the new subway system of the Interborough Rapid Transit Company, of New York, on Wednesday, Oct. 12, by a party of officials of the Pennsylvania Railroad. The details of the construction work upon the subway have been of great interest to the Pennsylvania officials on account of the rapid progress being made upon their new New York City tunnel terminal, now under construction, and in which trains are to be operated electrically.

One of the important features of the operation of a railroad system of such magnitude as that embraced in the subway system is the signaling system, whereby trains may be operated with maximum safety. In order to demonstrate the possibilities of operation and signaling under subway conditions when properly designed, a train was, through the courtesy of Frank Hedley, general manager of the subway division of the Interborough Company, placed at the disposal of the visiting party, and a trip was made from the City Hall station to One Hundred and Thirty-Seventh Street upon the local track, with the return upon the express track at a high speed, in order to show the possibilities of the equipment.

The party consisted of about 250 of the officials from the operating and engineering departments of the Pennsylvania Railroad lines east of Pittsburg. The party was engaged in a tour of inspection of the lines of the company, and upon arrival at Jersey City, was invited by the Union Switch & Signal Company to make the inspection of the new subway signal system, with special reference to the severe limiting conditions. The signal system was carefully examined by the visiting officials and created unusual interest. Their successful operation under the peculiar conditions imposed by the subway and electrical operation appealed to the visitors as an achievement of more than ordinary importance. The tour of inspection was under the direct charge of H. M. Sperry, signal engineer of the Union Switch & Signal Company, who was closely identified with the design and installation of the subway signaling system.

A NEW STREET INDICATOR

The Cleveland Electric Railway Company is experimenting on its Euclid Avenue line with a device for indicating the names of streets to car passengers. The device is the invention of D. P. Jones and N. C. Butler, of Cleveland, who are preparing to place it on the market. There is an indicator in each car containing the names of all the streets on a certain line in consecutive order, while below the indicator is given the number corresponding to the number of the block the street is from the starting point. As the car runs along, a rod projecting from the top of the car strikes, just before it reaches each block, a weight resembling a window weight which is suspended by two wires from the span wires over the devil strip. This blow to the rod causes it to fly back, releasing a spring which moves the indicator point forward to the name of the next street. The indicator is set for a round trip and can be regulated by the conductor.

THE OAKLAND & MARYSVILLE RAILROAD

Officials of the Southern Pacific Railroad Company and the California Gas & Electric Company deny having any connection with the Oakland & Marysville Railroad Company, which has been incorporated in San Francisco, with a capital stock of \$4,000,000 divided into 40,000 shares. The incorporators have subscribed the following amounts: Frederick W. Zeile, \$100,000; John D. McKee, John Zeile, W. B. Cope and R. T. Hooper, \$10,000 each. F. W. Zeile, the treasurer of the new corporation, represents the Mercantile Trust Company in the organization work. He admitted that the Trust Company is merely acting for the real projectors of the new road, but refused to tell who those capitalists are. However, there are those who have brought forward reasons to support their assertions that the Huntington-Hellman syndicate or H. E. Huntington is behind a new electric railway system, of which the Oakland & Marysville road will form an important part. They call attention to the conferences of Southern California capitalists, engineers and attorneys, connected with the Huntington electric railway interests, held in San Francisco during the past two months. This new organization was also taken to be a fulfillment of the assertion made last summer that the Huntington-Hellman interests were preparing to launch a new company in order to extend their business. For a year or two past, it has been reported that in addition to completing 500 miles of interurban electric roads in the territory surrounding Los Angeles, an electric trunk line would be constructed up the San Joaquin and Sacra-

mento valleys, and that eventually Huntington's Fresno and San Joaquin electric roads would be connected with the Los Angeles division. It was also predicted that in a few years this electric railway system would parallel the Southern Pacific railroad lines from Southern California to Oregon.

The present line of the Southern Pacific to Marysville via Woodland is 123 miles in length, or about 20 miles shorter than its main line, but it is subject to overflow in places from the rivers during the rainy season. By judiciously locating the route of the electric road, which will be only 115 miles in length, and keeping well above high-water mark, it is said that it will greatly improve on the steam roads.

CONNECTICUT TROLLEY REPORTS

The annual report of the State Treasurer of Connecticut shows that, for the first time since electric railway development began, the tendency toward expanding revenues from street railway taxes has been arrested and reversed. The contributions of the electric railway corporations to the State Treasury for the year aggregated \$250,379, a figure smaller by \$1,760 than the amount for the preceding year. Up to the past fiscal year the annual public revenues from this source have displayed a steady and substantial increment, having grown from \$72,952 in 1895, to \$252,139 in 1903, when they attained their maximum. The recession of the past year is attributed largely to the decrease in the market value of the securities of the Connecticut Railway & Light Company, whose financial operations were impaired by the costly strikes in Waterbury and Bridgeport.

TECHNICAL LITERATURE AT PRATT LIBRARY, BROOKLYN

The Pratt Institute Free Library has just opened to the public an applied science reference room, devoted to technical and trade literature. It is desired to make this department as useful as possible to the practical men engaged in the various trades and industries. The room contains books, bound periodicals and current periodicals, including, of course, the STREET RAILWAY JOURNAL. It is in charge of Herbert L. Cowing, a graduate of the mechanical engineering course of Cornell University. The room is open every day from 2 until 6, and on Monday, Wednesday and Saturday evenings until 9:30. A cordial invitation is extended to all who are interested.

The Library wishes to form a collection of trade catalogues and bulletins bearing upon all branches of industry. These catalogues will be accessible to the public, and the library would like to receive such printed matter from any of the advertisers in, or readers of, the STREET RAILWAY JOURNAL.

PART OF BELAIR ELECTRIC RAILWAY IS OPENED

The first section of the Baltimore & Belair Electric Railway, which has just been completed from the terminus of the Harford road line of the United Railways & Electric Company, of Washington, at Hamilton to Carney, on the Baltimore and Harford turnpike, a distance of 8 miles from the city, was opened for public travel Saturday, Oct. 15. The power and cars which will be used on the new road have been leased for the present from the United Railways & Electric Company, but the Baltimore & Belair Company proposes to erect its own power house at the crossing of the Big Gunpowder River, about 11 miles from Washington. This plant, it is expected, will be in operation when the line is completed as far as Belair. The company also intends to develop a pleasure park at this point.

The company has a traffic agreement with the United Railways for the interchange of business, and will carry freight and express as soon as the road is completed to Belair. The Post-office Department has already arranged for the carrying of mail to the points reached by the first division.

Work on the second section, which extends to the Gunpowder River, will be started in the near future, and it is hoped to open this section, which will be built on a private right of way near the Harford turnpike, for travel by the early spring. Material is largely on the ground. The new line is planning to reach Belair, but it is likely it will be extended to the Susquehanna on its completion to that point. The latter route is owned by S. A. Williams and George J. Jewett. It was graded for a steam railway some years ago, but was abandoned during the financial depression.

The officers of the Baltimore & Belair Electric Railway Company are: S. A. Williams, president; J. D. Worthington, secretary-treasurer; J. A. Shriver, general manager; C. O. Vandevanter, of Baltimore, chief engineer. The directors are: Charles J. Bonaparte, John M. Griffith, Judge George L. Van Bibber, O. A. Kirkland, Albert M. Graham, S. A. Williams, J. A. Shriver.

ATTEMPT TO DEFRAUD THE BOSTON & WORCESTER COMPANY

An alleged conspiracy and scheme to defraud the Boston & Worcester Street Railway was run to earth Tuesday, Oct. 11, by the arrest of Nelson L. Malway, the night watchman at the Administration Building of the company in South Framingham, and William Dolt, a conductor on the system.

Both lived at Wellesley, Malway being married and the father of four children. Dolt roomed with Malway, taking his meals at different points along the road.

Dolt had a run from Boston and Brookline to the Shrewsbury-Worcester line. Conductors on that division take up tickets, which are sold at both terminals of the system. Tickets taken up and canceled by Dolt would be turned in by him at night, sorted and locked up in a closet in the administration building, where Malway was night watchman.

It is alleged that Malway would open the closet in which the canceled tickets were kept and sort those turned in bearing the cancellation punch of Dolt. These would then be turned over to Dolt the following day and again turned in by him that night. In this way, it is alleged, the two kept up an endless chain from day to day, the same canceled tickets being turned in nightly and picked out of the basket again by the night watchman.

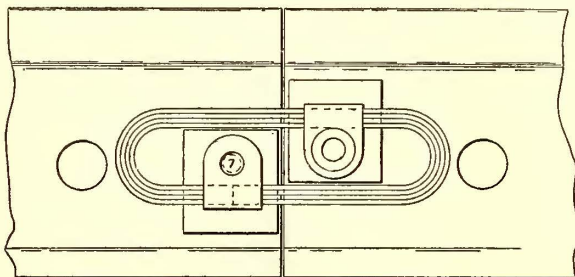
E. P. Shaw, Jr., general manager of the system, and A. E. Stone, auditor, convinced that some one who had access to the offices was the guilty party, decided to issue an order that the shades in the office be drawn at night so that burglars could not detect the safes in the offices. One of the shades was drawn within a few inches of the window sill, so that a watch might be kept from the outside on the movements of the night watchman. An electric buzzer was also connected with the room in which the tickets were kept, and made to ring in the Soxonville Road. A watch was set, and when the bell rang one of those on guard ran to the office, looked in at the window where the shade was up from the bottom, and saw the watchman in the act of sorting out and looking at the punch marks of the canceled tickets. In the morning, when the office was opened, it was found that the drawer in which the key was kept had been opened during the night, showing how the watchman gained access to the closet. In order to make detection complete the numbers of the various tickets were taken each night and in the morning were checked off to show what were missing. A complete record also was kept of every ticket missing, and the numbers on these tickets were compared with those turned in on subsequent days, to show just how many stolen tickets were received by the company. As an additional precaution many of the tickets were marked. Each of the offenders is now held in \$500 bail.

STREET RAILWAY PATENTS

[This department is conducted by Rosenbaum & Stockbridge, patent attorneys, 140 Nassau Street, New York.]

UNITED STATES PATENTS ISSUED OCT. 11, 1904

771,875. Overhead Trolley Wire System; Coleman De Kando, Budapest, Austria-Hungary. App. filed Oct. 14, 1903. The conductor is formed by two wires of the same polarity which are attached alternately to successive points of suspension and form



PATENT NO. 772,188

alternating loops and the sagging central parts of the loops are connected to the upwardly curving parts of the adjacent loops by wires.

771,922. Car Fender; John McGuire, St. Louis, Mo. App. filed Aug. 5, 1903. A plurality of bars arranged to project in front of the car, unconnected at their forward ends and provided at their edges with spring-strips.

772,066. Automatic Switch; Charley M. Staley, Rorrer, Va. App. filed April 16, 1904. Relates to mechanism whereby the switch tongue is thrown from the car platform, electro-magnetically.

772,087. Trolley; Henry B. Clarke, Chicago, Ill. App. filed Nov. 9, 1903. The trolley wheel has a restoring wheel positioned

alongside thereof and a rotably-movable guard having an inwardly-inclined periphery positioned alongside the restoring wheel.

772,110. Convertible Street Car; William A. McCarrell, Jr., Altoona, Pa. App. filed Dec. 9, 1903. Details of a sliding panel.

772,172. Rail Bond; William E. Oakley, Millbury, Mass. App. filed Jan. 2, 1903. The steel end of a flexible copper bond is cast around the bond so as to be intimately connected with it.

772,188. Rail Bond; Edward G. Thomas, Waltham, Mass. App. filed March 26, 1903. A laminated rail bond comprising an elongated, closed loop and attaching means secured to the sides of the loop at unequal distances from each end thereof.

772,189. Method of Attaching Rail Bonds to Rails; Edward G. Thomas, Waltham, Mass. App. filed July 29, 1903. In order that the bond may be soldered to the under side of the rail piece, a metal plate is interposed between the end of the bond and the rail and the parts bolted together, the edge of the plate extending outward and turned up to receive solder.

772,282. Sleet Cutter and Contact for Electric Railways; Charles T. Leonard, Leonardo, N. J. App. filed Feb. 29, 1904. A frame or housing having mounted therein a contact, a scraper and cutter wheel, and means for yieldingly presenting the scraper and wheel to a conductor.

772,298; Trolley Wire Support; William H. Spiller, Aurora, Ill. App. filed Feb. 2, 1904. Details of a clip.

772,321. Trolley; Perry Anderson, Sharpsburg, Pa. App. filed June 20, 1904. The trolley wheel has a disc mounted adjacent thereto which carries an overreaching lug which holds the wheel on the wire, but is itself held in place by a spring, so that it may yield laterally and release the wire.

PERSONAL MENTION

MR. H. R. WALLACE has resigned as general manager, superintendent and purchasing agent of the Las Vegas & Hot Springs Electric Railway company, of Las Vegas, N. M.

MR. H. R. WILSON, formerly St. Louis representative of the Stanley Electric Manufacturing Company, is now assistant manager of the St. Louis office of Rossiter, MacGovern & Company.

PROFESSOR HARRY E. CLIFFORD has been appointed acting head of the department of electrical engineering at the Massachusetts Institute of Technology, Boston, vice Dr. Louis Duncan, resigned.

MR. JAMES A. COX, auditor and general passenger and freight agent of the Ohio River & Western Railway, died at his home in Zanesville, last week. He was a prominent Mason and had been a steam railroad man for many years.

MR. E. U. HARLAN has been appointed manager of the Monterey Electric Street Railway, Light & Power Company, of Monterey, Mex., recently formed for the purpose of equipping the horse car system at Monterey with electricity.

GEN. WM. A. BANCROFT, president of the Boston Elevated Railway Company, and Mr. Herbert A. Pasho, superintendent of the elevated division of that company, have gone to Europe on a six weeks' trip for the purpose of inspecting underground and elevated railways in various cities of Great Britain and the Continent. They left Boston Oct. 13, and sailed from New York the following day.

MR. JOHN LAMBDEN has resigned his position as chief engineer of the Ninety-Sixth Street power station of the New York City Railway Company, of New York. On leaving the company Mr. Lambden was presented by his fellow employees with a handsome buffet and a cut-glass service. Mr. Lambden, before becoming chief engineer of the Ninety-Sixth Street station, held a similar position at the Houston Street station of the same company.

MR. J. R. CURTISS, of Cleveland, has been appointed general superintendent of the Cleveland, Painesville & Ashtabula Railway Company, succeeding to the duties of Mr. A. B. Cleveland, president of the company, who has been acting as general manager; the office of general manager has been abolished. Mr. Curtiss was formerly with the Northern Ohio Traction & Light Company, the Eastern Ohio Traction Company and the Buffalo, Dunkirk & Western Railway. The operating offices of the company will be removed from Painesville to Geneva.

MR. E. E. DOWNS, president and general manager of the Winnebago Traction Company, of Oshkosh, Wis., has tendered his resignation to take effect as soon as his successor has been decided upon. The Winnebago Traction Company is one of the properties controlled by the McMillin syndicate. Mr. Downs has not announced what his plans are for the future. He has had the management of the Winnebago Traction Company since 1897. During that time the city system in Oshkosh has been increased from 7 miles to 17 miles, and interurban lines have been built to Neenah and Omro.