

Electric Railway Journal

Vol. XLI

NEW YORK, SATURDAY, JANUARY 18, 1913

No. 3

PUBLISHED WEEKLY BY

McGraw Publishing Company, Inc.

JAMES H. MCGRAW, President. C. E. WHITTLESEY, Secretary and Treas.
239 West 39th Street, New York.

CHICAGO OFFICE.....1570 Old Colony Building
PHILADELPHIA OFFICE.....Real Estate Trust Building
EUROPEAN OFFICE...Hastings House, Norfolk St., Strand, London, Eng.

TERMS OF SUBSCRIPTION

For 52 weekly issues, and daily convention issues published from time to time in New York City or elsewhere: United States, Cuba and Mexico, \$3.00 per year; Canada, \$4.50 per year; all other countries, \$6.00 per year. Single copies, 10 cents. Foreign subscriptions may be sent to our European office.

Requests for changes of address should be made one week in advance, giving old as well as new address. Date on wrapper indicates the month at the end of which subscription expires.

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Entered as second-class matter at the post office at New York, N. Y.

Of this issue of the ELECTRIC RAILWAY JOURNAL, 8000 copies are printed.

LOCOMOTIVE TYPE DESIGNATIONS In connection with the descriptions of foreign electric locomotives published from time to time in these columns, it may be of interest to explain the method of type designation used by foreign builders. In this country it is customary to employ a series of small and large circles or a succession of numerals to express the arrangement of the pony and driving wheels. On the Continent the pictorial method is dispensed with, while the purely numerical arrangement, showing the number of each kind of wheel, is replaced by a combination in which a numeral represents the number of pony axles and an initial capital letter the number of driving axles. Thus a locomotive with four driving axles only is merely designated as type D, instead of 0-4-0. Similarly, type 1-C-1 means one leading axle, three driving axles and one trailer axle—a combination which Americans would designate as a type 2-6-2 machine. The plus (+) sign is used to show the division of driving axles on separate trucks. Consequently a C+C locomotive is one with three driving axles in each of two trucks. This method of combining numerals and capital letters is as convenient to express or write as plain numbers, with the additional advantage that the typographical contrast between the numbers and letters emphasizes the difference between the two types of axles almost as effectively as the circles.

MIDYEAR MEETING

With the approach of the time for the midyear meeting of the American Electric Railway Association, it is possible to say that the attendance promises to be larger than at any other previous January convention. One reason for this is the growing practice of association committees to hold meetings at this time. This year the meetings of forty-two committees are scheduled in New York during the last four days of the week ending Feb. 1, and the program of the meeting itself will undoubtedly bring to New York a great

many other railway men, so that a large attendance is practically assured. The subjects selected for discussion will make the midyear convention practically a meeting of the association as "a committee of the whole," to consider ways and means for improving the financial status of the companies by an increase in the unit rate of fare. The speakers scheduled to address the meeting are authorities on the topics on which they will treat, and the results of a thorough and free discussion should be beneficial to all. The coming year will be marked with legislative activity in a great many states as well as by a change of federal administration, and the electric railway companies ought to be able at least to suggest some definite program for legislative consideration as a means to make the investment in railway properties more attractive than it is at present. If the meeting shall help to crystallize the ideas of the association as to the form which the increase in fare should take, the result will be of great benefit to the industry.

INFECTION FROM TRANSFERS

In its issue of Dec. 21 the *Medical Record*, of New York, referred to the hygienic aspect of the practice sometimes followed by conductors of moistening their fingers to separate transfers before the transfers are issued to passengers. The discussion was not of an alarmist character, and it was admitted both that there was, perhaps, small likelihood of a street car transfer becoming a means of carrying contagion and that street car conductors, as a whole, were a healthy group of men. But the article said that the fact that millions of the little slips of paper daily pass from hand to hand in the larger cities is sufficient basis for the elimination of all danger, however slight it may be, because a passenger might bring his fingers in actual contact with the moistened area on the paper. It held that railway companies should prohibit this practice and suggested that if the pad of transfers was constructed with a beveled edge a single slip could be easily detached from the others. We heartily agree with the writer that the practice is one which ought to be abandoned for hygienic reasons as well as for those of public decency, whether the slips of paper to be separated are transfers, paper currency, playing cards or the pages of books and magazines. If a person has no regard for his own health, he should have some respect at least for the feelings of others. Hygienically, however, the practice should be less objectionable when applied to a transfer than to a great deal of other paper which passes current in business or in homes, because of the reasons stated and because it is used but once, whereas paper currency and the books and magazines of a circulating library pass through hundreds and perhaps thousands of hands and are carried into many houses where there may be disease. It was undoubtedly a very wise provision of nature that microbes are so small as not to be visible except under the microscope. Other-

wise most people would acquire nervous prostration in trying to avoid them; but there is no difficulty in separating padded transfers without placing moisture on the fingers from the mouth, and the practice should be abandoned.

DECORATIVE TREATMENT OF RAILWAY BUILDINGS

A pleasing feature of much of the building construction which has been carried out in recent years by American electric railways is the attention paid to making their utility structures architecturally attractive. This policy would have been very costly in the earlier days of the industry, when so many buildings were remodeled to meet the change from animal to electric traction. In these times, however, such substantial construction is employed for entirely new properties that the elements of attractive appearance can be included at little or no additional cost. In fact, the difference between beauty and ugliness often lies only in the disposition of the available material.

Germany may be regarded as a leader in the practice of treating as civic ornaments railway buildings, in fact, utility structures of all kinds when they occupy a conspicuous position. In that country, for instance, one will find many handsome power plants, substations, carhouses, waiting rooms, shelters and even signal towers. Nevertheless, it would be as unwise directly to copy German models in this country as it is to place an American porch or piazza upon a Queen Anne cottage. Imitation should be chiefly along the line of making the architectural treatment of the railway buildings harmonize with that of the neighboring structures. A switch tower in the Nuremberg mode adds beauty to a Bavarian landscape, but it would be sadly out of place in an American suburb with brick or wooden houses.

Among American combinations which combine graceful appearance and utility may be named the bridges, switch towers and passenger stations of the New York, Westchester & Boston Railway, several substations and the way department headquarters of the Brooklyn Rapid Transit System and the splendid carhouses of the United Railways & Electric Company of Baltimore. In some instances these buildings are even superior to their surroundings. Installations like switch towers and substations offer the least difficulties to artistic treatment because of the absence of smoke and manufacturing rubbish. Generating plants have been beautified by treating the stacks as towers, while the monotony of a long carhouse roof can be concealed by a castellated parapet or other decorative cresting. The dark background of a parapet will also make the overhead work less obtrusive. In some old foreign carhouses their rather inartistic outlines have been skilfully concealed by a foreground of shrubbery between the tracks. In connection with this subject, it may be pointed out that, where conditions permit, an effective advertisement for the company is possible if some characteristic style of architecture is used for all of its buildings. This policy would make the several railway properties as distinctive as are the public schools built by a municipality during a given period.

Wainscoting or paneling of various kinds is quite common for the interior decoration of power buildings, but

one would hardly expect to find the walls of shops and carhouses treated with ornamental striping or dado. This has actually been done in the new buildings of the Cologne-Bonn and Hamburg systems. At Hamburg this decoration consists of, say, a 12-in. black or brown border next to the floor line, some lighter shade for a width of 6 ft. to 7 ft. and then a decorative border. The rest of the wall, which is beyond the reach of dirty hands, is plain white. The cost of applying this ornamentation is very little, because the patterns can be transferred by means of stencils. Decorative effects of this kind in a well-lighted building are certainly most pleasing, and they offer the further advantage of reminding the workmen to be neat and orderly in their work and to keep the shop floor clear of debris.

THE MYRIAWATT AS A UNIT OF POWER

The recommendations of a joint committee, composed of members of the American Institute of Electrical Engineers and the American Society of Mechanical Engineers, to the effect that the myriawatt, or 10,000 watts, be adopted as a universal unit for expressing power inputs are recorded elsewhere in this issue. It is intended to apply to measurements of the different forms of power delivered from any source of energy to prime movers of all types. It includes not only a rating for the power of steam delivered by a boiler to its engine or turbine but also for that of water delivered by a penstock to a waterwheel and for that of potential heat in the nineties, supplied by a gas producer to a gas engine.

The adoption of a single standard unit for this purpose has appeared to be inevitable for some time past, although the action of the joint committee is considerably in advance of the expectations of engineers in general. The use of the myriawatt in place of the boiler horse-power is, of course, absolutely logical, and the change from one term to another can be made without the slightest degree of confusion for the reason that the myriawatt is only 2 per cent larger than the older term. At best, the boiler horse-power is a peculiarly arbitrary unit developed at a time when the needs of the present day could not have been foreseen and for a purpose which is to-day practically outgrown. Based as it was upon the steam required to produce 1 hp from an engine of a type which entered into a decline in the early nineties, its actual value expressed something which never was definite and always was difficult of conversion into any other unit. Its adoption was in fact at such an early date in the art of steam engineering that the figure upon which its value was based, namely, 30 lb. of steam evaporated from feed water at 70 deg. and at 70 lb. pressure, was not even reducible to a round number when expressed on the basis of pounds of water evaporated from and at 212 deg. As this later became the universal method of expressing steam boiler capacities, the unsatisfactory figure of 34½ lb. had to be used. Under all ordinary conditions the change from the boiler horse-power to the myriawatt simply means a substitution of words, and the 2 per cent difference is negligible aside from the necessities of the most accurate tests or the largest types of power plants.

For the other uses recommended for the new unit, such as measuring inputs on hydraulic turbines, the desirability of

a change may not perhaps be so readily discernible. It is, however, an undoubted fact that the familiarity with one unit and its various factors of conversion is a distinct step in the right direction. The term "water horse-power" is at best a gross misnomer, and the time is certainly ripe for discarding it.

For a satisfactory means of expression to replace it the myriawatt will do as well as any other, and since practically all water power is now converted into electricity it has all the advantages which apply to the opportunity for expressing output and input in terms which are easily converted to each other. In addition, there is the convenient fact in calculations that, roughly, 26,500,000 ft.-lb. equals 1 mw, which applies, of course, in the case of water measurements as well as in any other case.

For gas-engine work the convenience of the myriawatt is again obvious because its conversion factor on the thermal basis is 34,150 b.t.u., a number which can readily be memorized and forms a definite standard method of expression for rating gas producers, a thing which has hitherto been badly needed.

Notwithstanding the fact that the new unit has not been officially adopted as yet by the two societies, there is no doubt that the recommendations of the joint committee will be followed to the letter, in view of the fact that the new unit will afford such great assistance to the engineering profession. When it is once established only a few conversion factors need be remembered by the busy engineer and it is to be hoped that official action will be prompt and thorough.

TURBO-ALTERNATOR DESIGN AND CONSTRUCTION

The paper delivered before the American Institute of Electrical Engineers last week by B. G. Lamme, chief engineer of the Westinghouse Electric & Manufacturing Company, contained much suggestive information. The author explained in simple language the reasons for the use of certain forms and proportions of the parts of the high-speed alternator. He showed that ventilation, limitation of temperature rise and improvement in quality of insulating material are the features in which design progress has been made. Mr. Lamme has been connected with the development of the turbo-alternator from its beginning and has successfully solved difficult problems as they have arisen. Hence his summary of the obstacles overcome and still to be overcome is worthy of careful study.

The problems met in the early designing of turbo-alternators were different from those of the present time. Then the limitations were not those of the materials employed but, rather, were due to lack of experience and skill on the part of the designers. Bearings gave difficulty and generators were noisy, but these troubles were easily eliminated, leaving the designers to struggle with the real problems involving the introduction of new materials and construction methods.

The experience which was gained from low-speed generator practice was of little assistance because these machines were open and naturally well ventilated. The mechanical problems, also, were quite definite. In the high-speed generators heat is generated at a rapid rate in a confined space, and even if the efficiency of the transforma-

tion from mechanical to electrical power is high, in large units there is great heat congestion. At the same time the peripheral velocities are so great that only the very best materials, skilfully disposed, can stand the stresses to which they are subjected.

At the present time there is an urgent demand for low-priced, and therefore high-speed, turbines. This condition exists, of course, in connection with all rotating machinery, because a high-speed machine is not only cheap but it is compact, and a reduction in necessary floor space is usually highly desirable. Accompanying the demand for high speed is another for high capacity. It is the combination of these which has brought about the situation existing at the present time.

The problem of ventilation involves several elements, namely, the rate at which heat is developed, the extent of the radiating surfaces from which this heat can be removed and the rate of flow and temperature of the air available for cooling. The losses may not be great in percentage of the total capacity of a machine, say 3.5 per cent out of 15,000 kw, but they are large in relation to the available radiating surfaces, particularly in large units. In the above example the loss is 565 kw, requiring, according to Mr. Lamme's calculation, 50,000 cu. ft. of cooling air per minute to prevent excessive temperature rise. Not only must air pass through the cores and windings at a rapid rate, but it must come in contact with the hot surfaces. Various plans for insuring this contact are in commercial use. Radial and axial ducts are employed, and air is forced in through the air-gap and the ducts by fans on the rotor shaft or by separate blowers.

The rate at which cooling air must be supplied is settled largely by the allowable rise in temperature of coils and cores. There is a limit to the temperature to which insulating material can be safely subjected. The modern mica covering can stand possibly 125 deg. C., but lower values are advisable. The limiting temperature is not that at the radiating surface but that in the buried parts of coils. These are warmer than the exposed parts by the amount of temperature head necessary to maintain the heat flow, which is retarded by many obstructions. As the methods ordinarily used for measuring internal temperatures are unsatisfactory, conservative practice in temperature rise is necessary. It is probable that temperature rises much greater than have been supposed to exist have been common in past practice. Some progress in designing insulating coverings to withstand high temperature has been made, but even with mica, as ordinarily used with combustible binding material, only moderate temperature rises are allowable.

As was pointed out by W. L. R. Emmet in the discussion of Mr. Lamme's paper, the user of a generator should have some conception of the problems which the designer has to meet and should be reasonable in his requirements. Specifications should call for only such standards as are necessary, especially in view of the difficulties which have been described. The study of a paper of this sort should tend to produce a spirit of co-operation, not only because it states the designer's problems clearly but also for the reason that it calls attention to the fundamental laws underlying the solution of these problems.

Brooklyn Motor, Truck and Brakeshoe Improvements

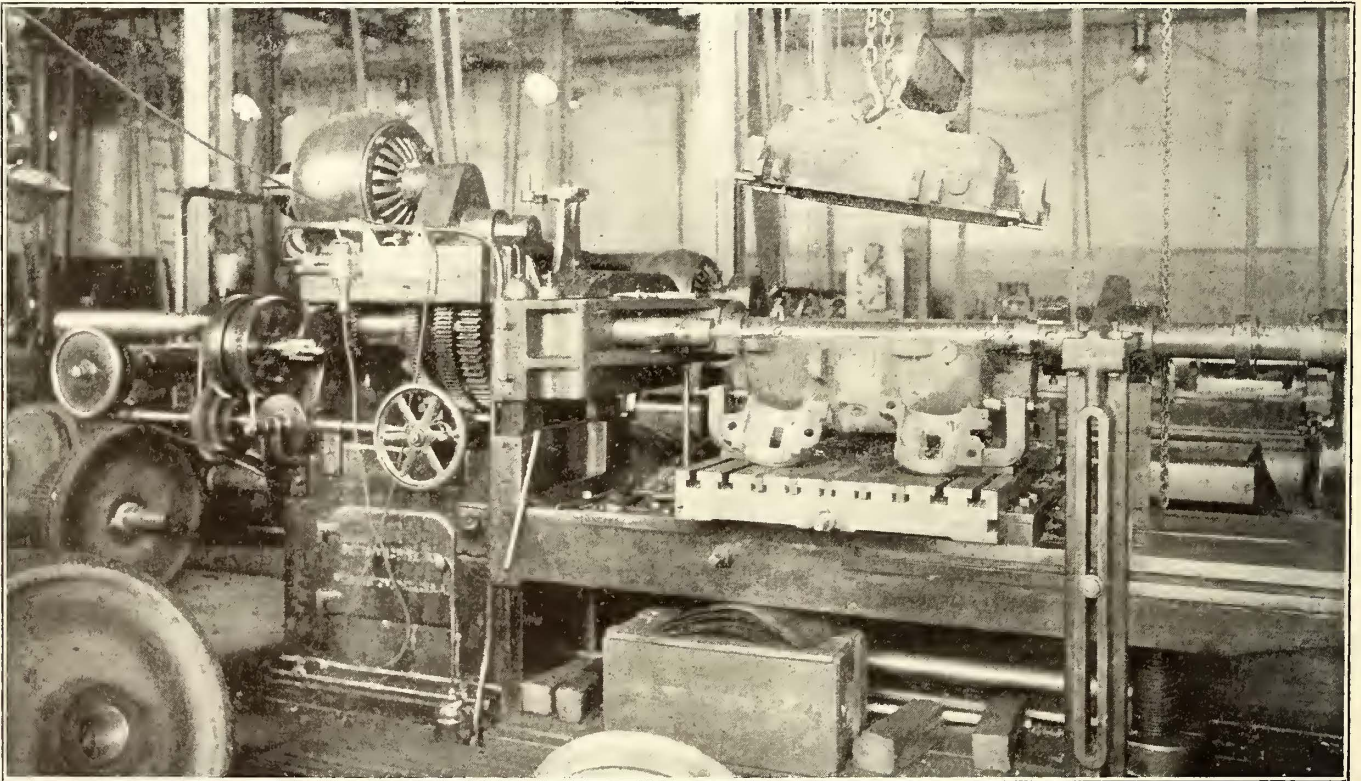
Description of Brooklyn Rapid Transit Company's Practice in Reboring Motor Shells—Types of Bearings and Brasses Used—Truck Changes, Brakeshoe Economies, Etc.

The present article, which is the third in this series on some recent interesting work of the mechanical department of the Brooklyn Rapid Transit Company, is devoted to a description of miscellaneous improvements in motor, truck, brakeshoe and other running gear practices.

REBORING OF MOTOR SHELLS AND EFFECT ON OVERHAUL MILEAGE

One of the most important tasks in the rehabilitation and general improvement of electrical apparatus has been the reboring of the older types of motor shells in order to take up the wear in the axle and armature bearing housings and thus prolong the life of the motors. The economy of this practice is apparent from the fact that with the machine in

"The special inspection and cleaning to be given the motors is to consist of a thorough cleaning of all parts of motors by the use of compressed air in blowing out the dirt accumulated after the top and bottom covers and hand-hole plates have been removed. Then the interior of the motor is to be wiped out with cheese-cloth and special attention is to be given to wiping off the commutators and brush holders and the brush-holder insulation. The brush holder is then to receive a coat of shellac and allowed to become thoroughly dry before the car is placed in service again. The motor covers and hand-hole plates are then to be replaced. Special attention should be given to the armature and axle cap covers, gear castings, etc., to make certain that all



B. R. T. Running Gear—Two-Spindle Machine for Reboring Motor Housings

use at East New York four Westinghouse No. 81 shells a day are bored at a labor cost (one man at \$2.75 and one man at \$1.75 a day) of \$1.12 each, whereas a new shell would cost about \$100. The Brooklyn company completed the boring of its 1517 Westinghouse No. 68 shells in April of this year, and of the 1820 Westinghouse No. 81 motors approximately 50 per cent had been rebored by Jan. 1, 1913. About two and one-half years more will be required to complete this work, which is carried out in step with the standardization of axle diameters from 4 in. to 4 $\frac{5}{8}$ in. as described elsewhere in these articles.

As the result of the reboring and other modernization of the Westinghouse No. 81 shells, the overhauling mileage of this motor has been lengthened from a 7000-mile to a 10,000-mile basis, except that for every intermediate run of 5000 miles the rebored motor receives what the company terms a "heavy inspection." This treatment is defined exactly as follows:

are in good condition. This work is to be done on the pits and without removing trucks from under the car body."

The practice of "heavy inspection" was inaugurated on Nov. 17, 1911. Should it prove generally successful, it is expected that the overhauling period of the Westinghouse No. 81 motor, for instance, will be lengthened to 12,000 miles.

PROCEDURE IN REBORING SHELLS—AUXILIARY IMPROVEMENTS

Reboring of motor shells and the auxiliary changes in connection therewith are conducted at both the East New York and the Fifty-second Street shops. In preparing a shell for reboring, the fields and pole pieces are removed, the motor shell is thoroughly cleaned and then the shell is brought to the boring machine. The next step is to insert a cored drum casting illustrated on page 101. This is used to center the armature bearings accurately for the action of the boring bar. Then the two halves of the shell are bolted together.

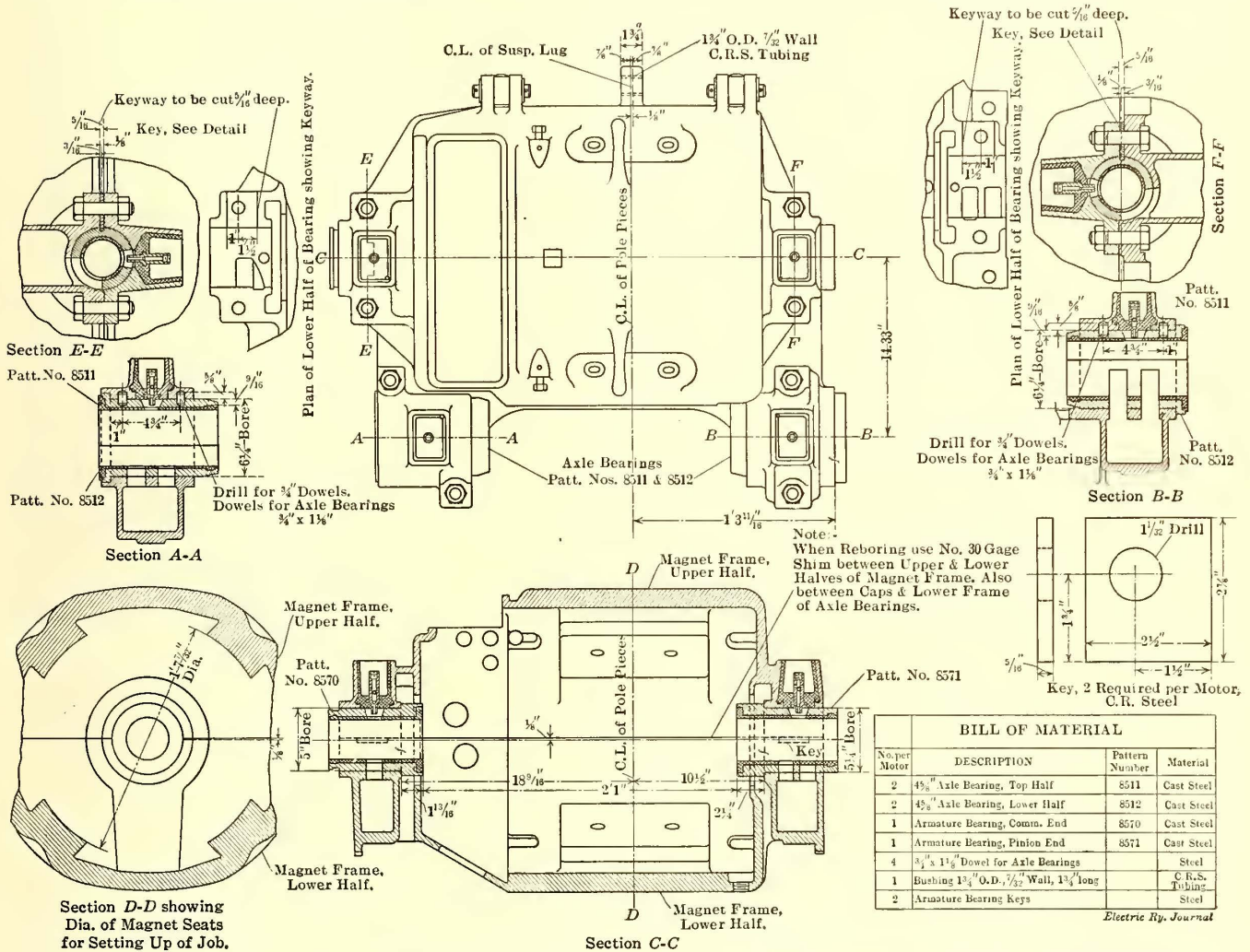
An engine lathe is used at Fifty-second Street, but at East New York the boring is done on a Betts machine which was changed from a one-spindle to a two-spindle unit during 1911 so that the four housings are bored out at the same time. The cutting tools on the boring bars are adjustable for any variations in the diameter of the bearings. When the boring is finished the drum is removed to permit the facing off of the housing collars. The completed shell is placed in position for ready removal merely by sliding the armature boring bar through the tailstock and removing the axle cap. The new bearings are fitted with the standard tin-base babbitt which has been described elsewhere. The illustration on this page is an assembly of the Westinghouse 81 motor which shows the rebored bearing fits.

The same drawing also shows the positions of the 5/16-in.

of leads at the commutator in accordance with the company's standard instruction prints. The application of the integral type of babbitted oil cup to this motor has been described in the article on lubrication.

The overhauled Westinghouse 68 and 81 motors, and a so GE-57's and GE-68's, are finished with a new form of axle cap, which has an extension over the end of the bearing to protect the bearing from wheel wash. The article on the lubrication practice of the company in the issue of Dec. 7, 1912, described this feature in greater detail. Furthermore, all mild steel axle cap bolts throughout the system have been replaced by high-grade bolts of 1/8 in. larger diameter, which have the high tensile strength of 80,000 lb. per square inch.

Metal shims for armature bearings have been superseded by canvas shims on the Westinghouse 81 and other surface



B. R. T. Running Gear—Assembly of Westinghouse 81 Motor, Showing Rebored Bearing Fits, Keyways, etc.

x 3-in. flat bearing keys, which have replaced the original round dowel pins. This change eliminates the breaking through of the casting at the edge of worn-out dowel pin holes. In order to install the keys it is necessary to plane out the motor shells as indicated in an accompanying half-tone and to provide a slot in the armature bearings. The keys can be readily removed while the motor is being overhauled, and they can also be easily replaced if worn to any extent. In fact, they must be taken out by the shopman before he can remove the armature, whereas the dowel pins were often allowed to wear too long because the men would not take the trouble to examine them.

As each rebored shell is returned to the electrical shops, it is fitted with impregnated fields in accordance with the company's latest practice. Incidentally, the arrangement of bringing out the leads is changed to reduce the number

motors whose shells have not been rebored as yet. The canvas shims are filled with white lead and are made in several specified thicknesses according to the amount of wear in the motor shells. The canvas shims were adopted because they make a tighter fit than metal and because they are noiseless even if there is a little lost motion between the motor shell and the armature bearing. Canvas shims are also used occasionally in elevated service.

ELECTRICAL AND MECHANICAL CLEARANCES

Careful attention is given to secure uniform and most efficient practice in the matter of electrical clearances. This is shown in Table I, which gives for each type of motor the total air gap, standard distance between armature and pole piece top and bottom and minimum allowable clearance.

When it is necessary to shim housings of surface arma-

signed and made as shown in two accompanying drawings. Thimbles of No. 21 seamless hard-drawn copper tubing of 5/16-in. outside diameter are furnished with each terminal. The thimbles are soldered to the leads, and then both are installed in the terminals. This change has eliminated trouble due to rough and ready splicing methods. Furthermore, all leads are lettered so that outside men in calling for supplies ask definitely for A-80, B-101, etc.

TRUCK CHANGES

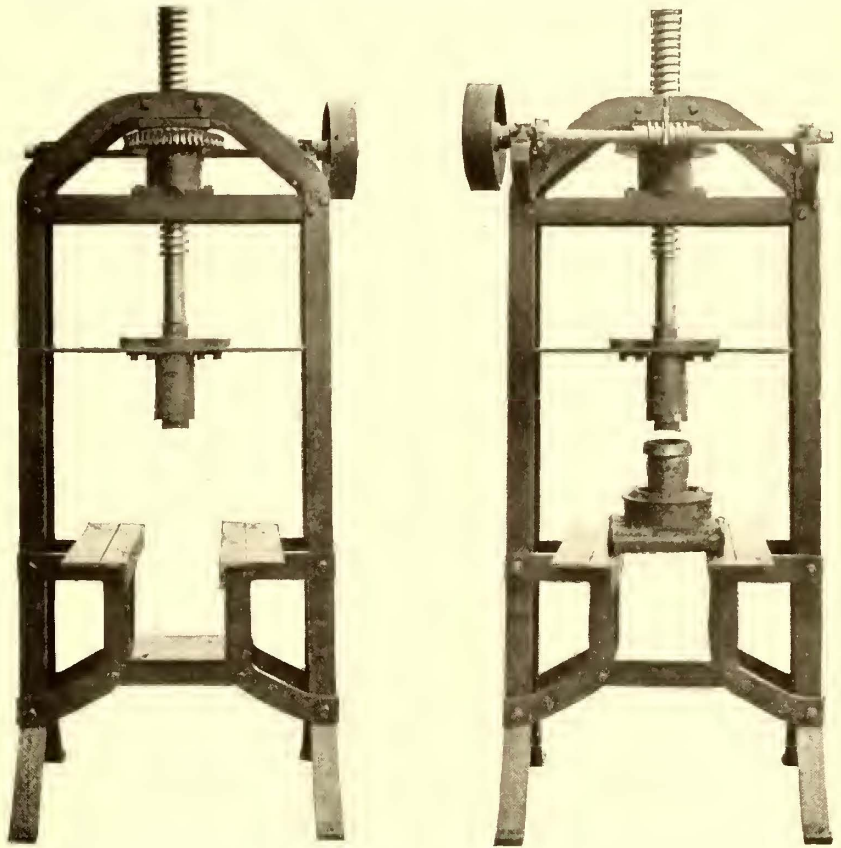
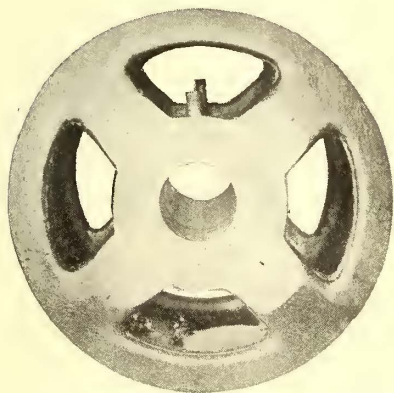
The company has not found it necessary to make any radical changes in truck practice, except that it has decided to discontinue the purchase of side-bearing type maximum traction trucks in favor of center-bearing trucks with cast-steel body bolsters. As there were about 2200 side-bearing trucks on hand, the cost of immediate replacement of all would have been prohibitive. The present practice of the company, therefore, is gradually to introduce the new designs, like the Brill 39-E and Standard 0-45, under the all-year (semi-convertible) cars and to dismantle the displaced trucks as a source of supply for those retained in service. During the first year of this policy eighty-two side-bearing trucks have been displaced, and as this displacement must continue in an even faster ratio, it is likely that at the end of five years every high-mileage car will be equipped with center-bearing trucks on this economical basis.

JOURNAL BRASSES

The great reduction in the number of hot journals in elevated service, to which reference was made in the article on

wedges not to gage are machined to the standard dimensions. Brasses are kept with their journals, the number of the corresponding axle being stamped on each brass. In the case of motor axles the letter "G" indicates that the brass belongs at the gear end of the journal, while the figures "1" and "2" are used in stamping trailer axle journal brasses.

In the 4 1/4-in. x 8-in. motor journal bearings, shown in an accompanying drawing and halftone, it will be seen that the babbitt is held in place by means of six holes which are drilled through the sides of the brass and counterbored on both sides. These anchor holes give the necessary adherence for the tin-base metal. In the case of the journal bearings for the Pullman, Wason and Gilbert elevated trailing trucks, however, the illustrations show only four holes instead of six. Furthermore, the brass is so light that the holes are not allowed to pierce it, but a good grip for the



B. R. T. Running Gear—Drum Casting for Alignment of Bearings in Rebored Motor Shell—Press Used to Take Out and Install Armature Bearings

lubrication, was due in large part to a radical change in the bearing metal of the brasses and to various alterations in the style of the brasses. The original bearing metal was a soft-lead-base babbitt which frequently squashed out of the brasses. Since February, 1910, this source of trouble has been eliminated, however, by a new composition which consists of 83 1/3 per cent tin, 8 1/3 per cent antimony and 8 1/3 per cent copper. In ordering this alloy the company permits a variation of 10 per cent in the amounts specified for antimony and copper, but it will not accept the babbitt if the impurities exceed 0.75 per cent of the whole.

It was not found necessary to change the patterns of the two sizes of elevated motor journal brasses, but the journal brasses for elevated trailing axles were lengthened 7/16 in. at the sides to take the brakeshoe thrust, and the three patterns were reduced to one. All new wedges are now being crowned, and even old wedges when taken out are crowned in a milling machine. Gages are provided to check the inside measurements of the wedges so that they will not bind in the side of the brasses. All brasses and

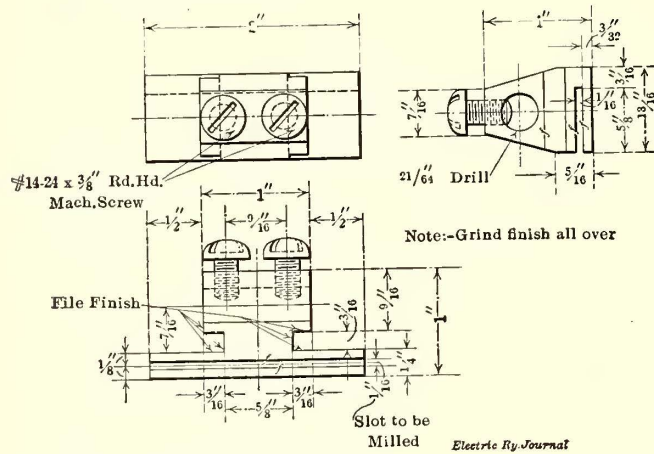
babbitt is secured by boring each hole to a smaller diameter at the bottom than at the top.

After the brasses have been drilled they are taken to the blacksmith shop for tinning and babbitting. One of the illustrations on page 103 shows how two brasses are babbitted simultaneously. First the operator dips the brasses in the babbitt crucible to heat them for tinning, after which he sets them up on the mandrel and clamps them into position by means of the pedal-actuated tongs. He then pours the babbitt rapidly before it can cool. Owing to the sluggish flow of tin-base metal, believed to be due to the cooling influence of the copper, it is necessary to pour the babbitt to a thickness of 1/2 in. at the center, although the actual service thickness is 1/4 in. This characteristic of tin-base metal also makes it necessary for the operator to shift his ladle from one brass to the other instead of pouring the babbitt through a common funnel. As soon as the babbitted brasses have cooled off they are sounded for looseness. If the proper ring or sonority is obtained, the bearing is ready to be bored out to the standard journal diameter. As shown

in an illustration, on page 103, a special jig is used whereby two bearings are bored out at one time to an absolutely smooth finish. The edges are beveled to avoid interference with the lubrication of the journal. Old journal brasses are not rebabbitted, but are scrapped as soon as they have worn to a thickness of $\frac{3}{8}$ in.

MANGANESE BRONZE AXLE CHECK PLATES

An example of increased reliability as applied to the

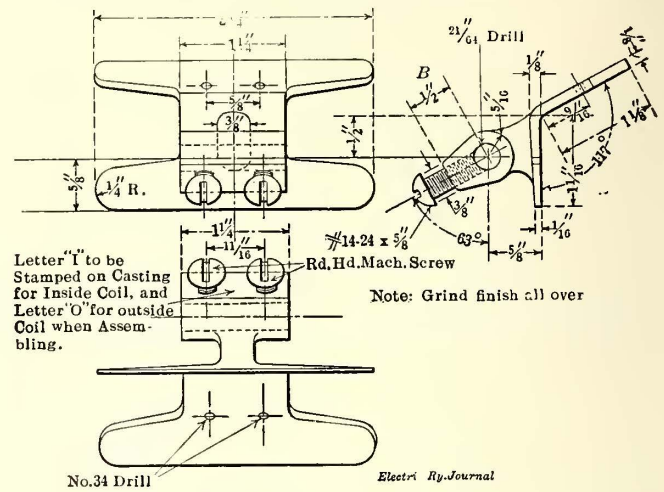


8-Per Motor

B. R. T. Running Gear—Details of Field Terminal for Westinghouse No. 101 Motor

smaller things is offered by the change in axle check plates. The original bronze composition used for these plates gave much trouble from breakage. After the matter had been discussed by all interested parties during the winter of 1911-1912 it was decided to install Johns-Manville manganese bronze forked check plates for all surface equipments, except on the maximum traction pony axles, where a solid check plate is used. More than 1000 of the new plates are now in service with Westinghouse 68 and 81 equipments, and so far not one has broken. These plates cost 4 cents per pound more than the old type, but the manufacturers agree to replace any that break within one year after installation. In order to check this guarantee, the foremen

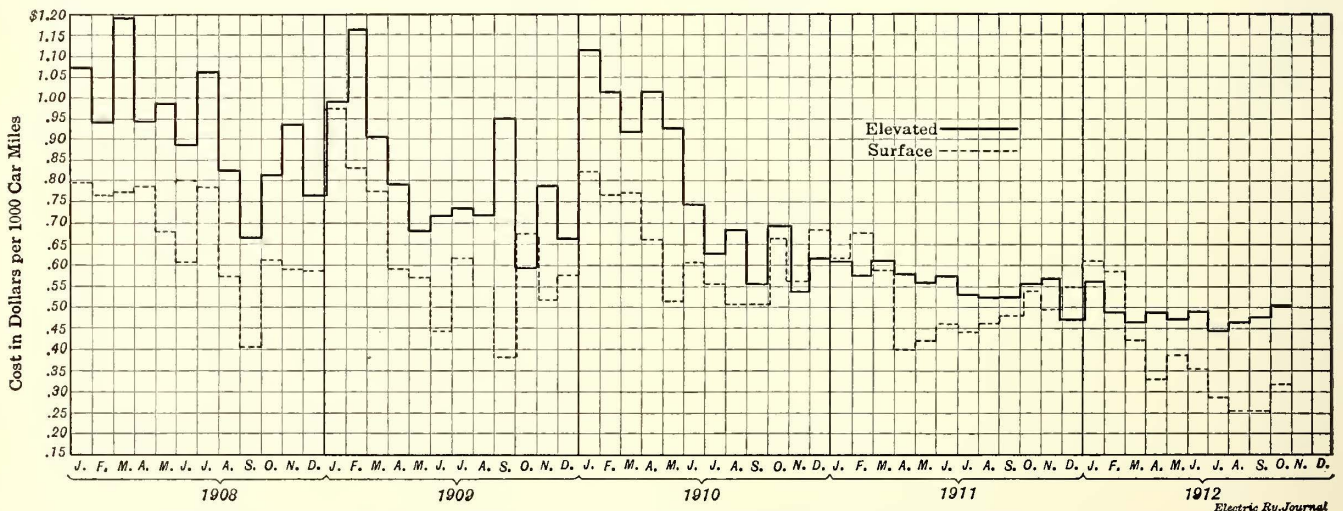
under the elevated and two, namely, for driving and pony wheels, under the surface cars. The designs of the company and some of the earlier economies effected were described in the *ELECTRIC RAILWAY JOURNAL* for Oct. 24, 1908, and July 10, 1909. Since these articles were published the cost of brakeshoes, which are bought on a mileage basis, has continued to decrease. The early reduction in cost was



8-Per Motor

B. R. T. Running Gear—Details of Field Terminal for GE-80 Motor

largely due, of course, to standardization itself, so that the continuance of the decrease can to some extent be laid to the use of steel wheels and to the means adopted to secure the maximum wear consistent with safety. This end has been obtained by transferring partly worn shoes from driving to trailing wheels in accordance with a specified standard practice. The success of this scheme is reflected in percentages of wear, which are believed to be unequaled by any other large city railway operated under like conditions. For example, the average wear of brakeshoes throughout the entire system was 80.25 per cent for June, 1912. The highest surface record during that month was 84.05 per cent and the lowest was 75.54 per cent; the corresponding records



B. R. T. Running Gear—Graphical Record of Brakeshoe Costs from January, 1908, to October, 1912

are instructed to stamp the top of each plate with the date, month and year of installation. Thus "3-8-12" means March 8, 1912.

BRAKESHOE COSTS

The Brooklyn Rapid Transit system was a pioneer in the movement to standardize brakeshoes, its work in that field having been undertaken as early as 1903, when there were twenty-seven surface and thirteen elevated patterns in use. To-day there are just three styles of brakeshoe patterns, one

for the elevated lines, which include surface running over suburban extensions, ranged from 78.91 per cent to 83.27 per cent. The accompanying curve sheet shows that the costs per 1000 car miles have gone down as follows for like-named months of 1908 and 1912: Surface—January, 1908, 80 cents, and January, 1912, 61 cents; June, 1908, 61 cents, and June, 1912, 35½ cents; elevated—January, 1908, \$1.07, and January, 1912, 56 cents; June, 1908, 88½ cents, and June, 1912, 49 cents.

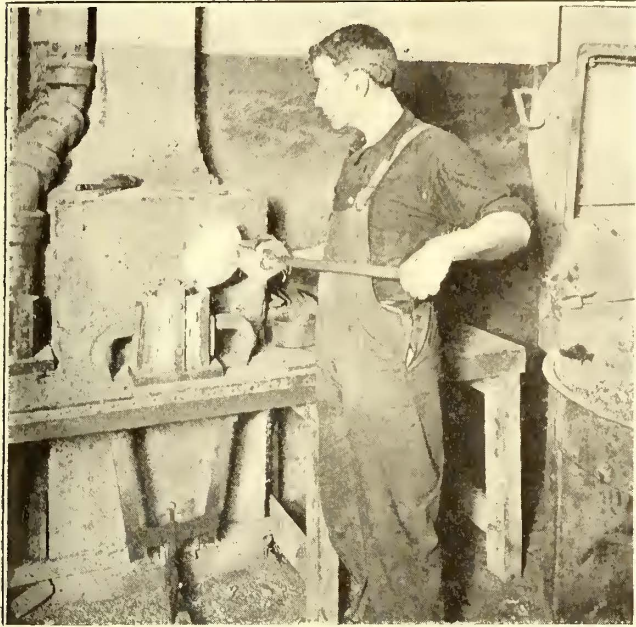
In this chart the cost of the shoes from Jan. 1, 1908, to Nov. 1, 1909, is figured at the actual price paid, which varied with different types of shoes. From Nov. 1, 1909, to Nov. 1, 1910, the cost was figured at a fixed invoice price per net ton for all shoes. From Nov. 1, 1910, to date, the cost was figured in the same way, except that the contract price was \$5 less per net ton than during the previous period.

The costs shown upon the chart illustrated in this article, which are figured upon a mileage basis, and the net ton

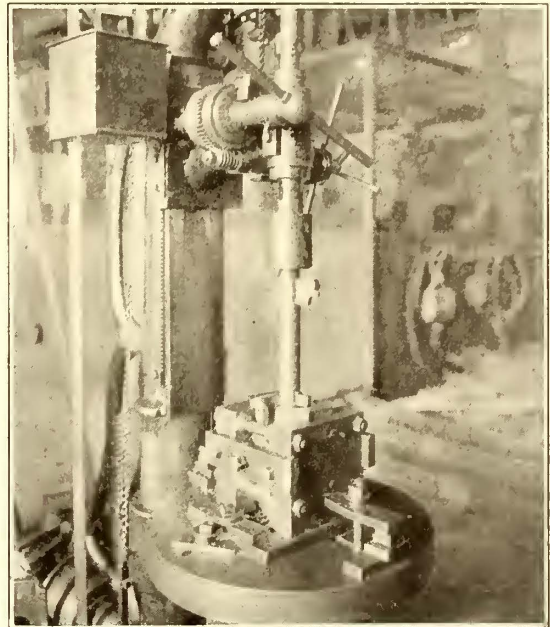
roads with narrow gage the side clearance may be 30 in.

The following are rules for power lines other than trolley wires and trolley feeders:

“(a) Power lines, other than trolley wires and trolley feeders, of not exceeding 600 volts shall have a minimum clearance above rails at crossings with railroads and street railroads of 25 ft.; above streets and public highways, 20 ft.; above telegraph, telephone and signal lines, 2 ft.; above or below other power lines of not exceeding 600 volts,



B. R. T. Running Gear—Babbitting Two Bearings at One Time



B. R. T. Running Gear—Boring Out Two Bearings at One Time

costs are also in direct relation to the set guaranteed car-mile costs. The contracts as carried along for the past three or four years upon the system, being of a somewhat co-operative nature, have resulted in bringing actual costs and guaranteed costs closer and in a further attainment of the benefit of savings thus made to the Brooklyn Rapid Transit system in succeeding contracts.

RULES ON CLEARANCES IN CALIFORNIA

The Railroad Commission of California has issued rules specifying the character of construction required for crossings of railroads, street railroads, telegraph, telephone and other lines with each other and on the highways.

When railroads, street railways or streets cross above railroads which transport standard freight cars, the minimum overhead clearance above the top of rails must be 22 ft.; when the crossings are above street railways which do not transport standard freight cars, the minimum clearance is 19 ft., except when the street railways are on streets or highways, when it is to be 14 ft. Telegraph, telephone or signal lines, or all lines not exceeding 600 volts, except trolley wires and feeders, which cross above railroads or electric railways must allow a minimum clearance of 25 ft. When power lines other than trolley wires and trolley feeders transmitting power at from 600 volts to 15,000 volts cross above railroads or street railways, the clearance must be 28 ft. When the power is transmitted at a higher voltage than 15,000 the clearance must be 34 ft. Trolley wires and trolley feeders may cross railroads and street railways at 22 ft.

The minimum side clearance on each side of the center line of railroads and street railways for tunnels and bridges is 7½ ft. and for pole lines and other side structures it is 8 ft., except that double-track electric roads with center-pole construction may have a clearance of 7½ ft., and on

unless suitably supported to prevent contact, 2 ft.; above all trolley wires and trolley feeders, 4 ft.; above or below power lines of from 600 volts to 6600 volts, 4 ft.; below other power lines of from 6600 volts to 15,000 volts, 4 ft.; below other power lines of exceeding 15,000 volts, 8 ft., and above all buildings and structures, 4 ft.

“(b) Power lines, other than trolley wires and trolley feeders, of from 600 to 15,000 volts shall have a minimum clearance above rails at crossings with railroads and street railroads of 28 ft.; above streets and public highways, 24 ft.; above telegraph, telephone and signal lines, for power lines of from 600 to 6600 volts, 4 ft., and for power lines of from 6600 to 15,000 volts, 6 ft.; above or below other power lines of not exceeding 600 volts, 4 ft.; above or below other power lines of from 600 to 15,000 volts, 6 ft.; below other power lines of exceeding 15,000 volts, 8 ft., and above all buildings and structures, 6 ft.

“(c) Power lines of exceeding 15,000 volts shall have a minimum clearance above rails at crossings with railroads and street railroads of 34 ft.; above streets and public highways, 30 ft.; above telegraph, telephone and signal lines, 8 ft.; above other power lines of not exceeding 15,000 volts, 8 ft.; above or below other power lines of exceeding 15,000 volts, 8 ft., and above all buildings and structures, 8 ft.”

All of the provisions of these paragraphs are subject to the condition that no line carrying 15,000 volts, should breakage occur, shall come in contact with lines carrying less than 15,000 volts or within 10 ft. of the ground.

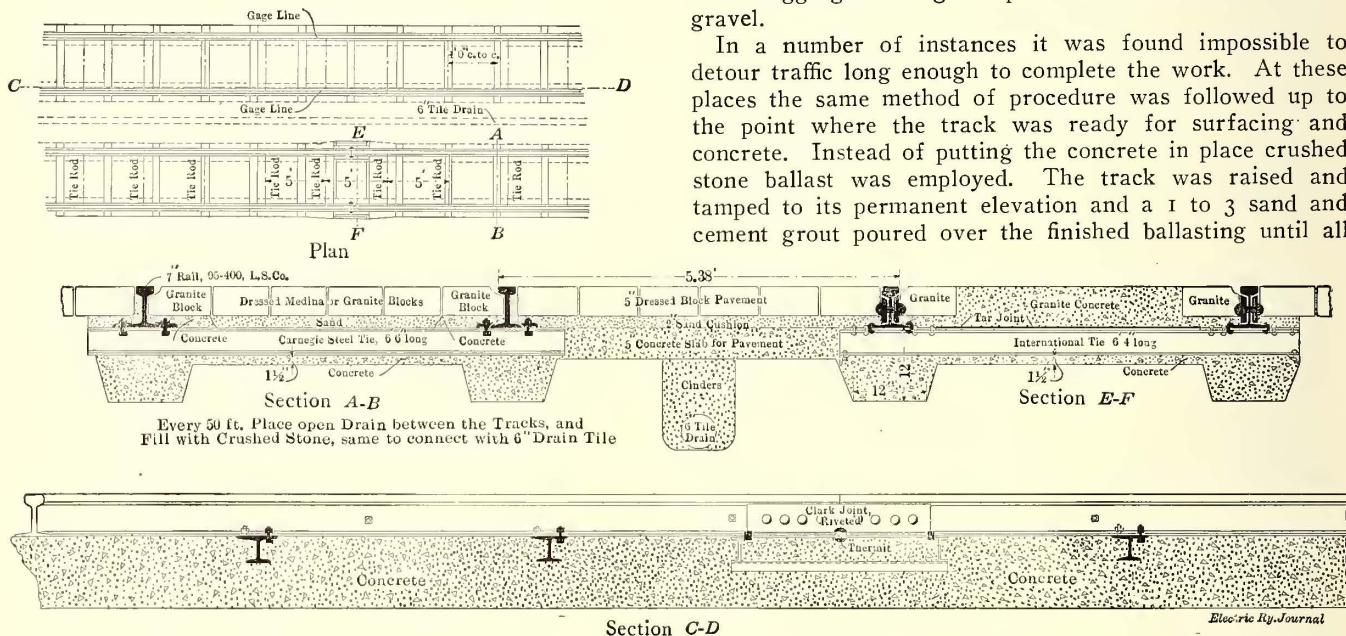
The rules also contain a clause on the construction of wire lines, referring to the length of span permitted with lines carrying less than 15,000 volts when they cross railroads and street railways. The report also refers to the specifications for overhead crossings adopted by the joint committee of the American Electric Railway Association and other bodies. These specifications are adopted as at present issued.

TRACK CONSTRUCTION IN CLEVELAND, OHIO,
DURING 1912

The maintenance of way department of the Cleveland Railway Company has just closed up its quota of track rehabilitation for 1912. The work completed during the year comprised about 6 miles of track laid with a 7-in., 95-lb., Sec. 400, Lorain Steel T-rail and 10 miles of 103-lb. Cleveland section. The T-rail construction is the first to be used in Cleveland in recent years, and the construction details embody a number of original features which have been planned in detail by Charles H. Clark, engineer maintenance of way. The immediate results obtained from the

In a general way the construction methods consisted first in abandoning a section of track to traffic, removing the old track and excavating a sub-grade to the level of the base of the ties. After this had been completed the new track was laid in the trench with the steel ties connected and the joints riveted in place. It was then surfaced on wooden blocks and wedges, and trenches were dug under the ties and rail for the concrete. Each tie was incased in a 12-in. square block of concrete and the rail between the ties was carried on a concrete stringer 12 in. wide on top, 18 in. on the bottom and 12 in. deep. The remaining section of sub-grade formed a base for the paving foundation, which was between 5 in. and 6 in. thick. The concrete quantities ran about 0.16 cu. yd. per running foot of track, the proportions of the aggregate being one part of cement to six of clean gravel.

In a number of instances it was found impossible to detour traffic long enough to complete the work. At these places the same method of procedure was followed up to the point where the track was ready for surfacing and concrete. Instead of putting the concrete in place crushed stone ballast was employed. The track was raised and tamped to its permanent elevation and a 1 to 3 sand and cement grout poured over the finished ballasting until all



Longitudinal and Cross-Sections of Track in Cleveland, Showing Standard Riveted-Welded Joint

new track have been so satisfactory that it has become a standard on this property.

Essentially these details include a 6-ft. 6-in. x 4 1/4-in. Carnegie steel tie, spaced on 4-ft. centers with an International steel tie at the rail joint. The two 4-in. channels forming the joint tie are riveted together by a 36-in x 14-in. x 5/16-in. steel plate, and the base of the T-rail is welded by the Goldschmidt Thermit process. A Clark joint 30 in. long, requiring eight 1 1/16-in. x 5 1/4-in. rivets spaced at 3-in. intervals and giving a grip of from 2 7/8 in. to 2 3/4 in., is employed. Compressed air is supplied through a 100-cu. ft. National electric air compressor to a Pittsburgh riveting machine for riveting the rail joints.

In purchasing the rails Mr. Clark, who is a member of the American Electric Railway Engineering Association committee on way matters, used the specifications requiring 0.75 to 0.90 per cent carbon adopted as recommended practice by the association, and went one step further by adding to the composition 0.10 per cent titanium. In order to insure a joint which would conform to the rail, the same composition was required for the joint plates. Specifications were also drawn up for rivets. These were of Mayari steel purchased from the Pennsylvania Steel Company at a price above that of ordinary rivets. Besides the special requirements in the specifications for composition of the rail, joints and rivets, it was very rigidly specified that the rivet holes should be drilled so that a driving fit could be obtained. By adhesion to this type of connection all the advantages of both the Thermit and the Continuous rail joints were obtained. After the track was surfaced the ball of the rail at all joints was ground to a true surface with a Kerwin head rail grinder, of which the company has two.

voids were filled. This method had been employed before and found to result in a first quality concrete foundation. The same procedure was followed around all special work, and wooden ties were used at these points exclusively. In order to make it possible to remove the wooden ties easily in case repairs are necessary, they were coated with coal tar before they were installed in the track. This prevents the concrete from adhering to the wood and also fills in depressions in the surface of the tie which might offer a hold for the concrete.

Granite blocks laid on a sand cushion form the surface of the pavement, the blocks which form the flangeway being nosed. The space between the ball, web and base of the rail was filled with a sand and cement mixture which was also used for a filler between the blocks in the pavement. In all cases where the T-rail was used a course of granite block headers has been laid along the rail forming the flangeway and the space between them filled with 1 in. to 2 in. of crushed granite and pure silica gravel mixed to 1:2:4 proportions. This makes a pavement of a solid and substantial kind which has been found very satisfactory by the company.

Although the pavement surface is apparently impervious to water, seepage was anticipated from the lawns and parkways along the edges of the pavement. This water is drained to the city sewer system by means of a 6-in. vitrified tile. The bells of this drain are not sealed, but to prevent silt from collecting in the pipe, each bell is surrounded with cinders to serve as a filter. The top of the drain is 24 in. below the surface, and it is between the two tracks. Outlets are provided at all manholes and catch-basins.

CHRISTMAS TRAFFIC ADVERTISING IN LONDON

Several illustrated articles have appeared in these columns from time to time with reference to the great variety of striking posters and other advertising matter which is issued by the Underground Electric Railways of London to exploit timely excursions to places of public interest, amusement resorts, quaint country villages near London, etc. For Christmas, 1912, the company issued a poster which is probably the most elaborate ever printed for any electric railway.

Although the accompanying reproduction shows the general design of this poster, it cannot convey the rich appearance of the original. The lettering and principal decorative effects, for instance, were printed in gold. The views on the poster are those usually associated with the great festival, but particular attention may be directed to the Christmas "waits" or aubades, as these are a traditional feature of an English Yuletide. It will be observed also

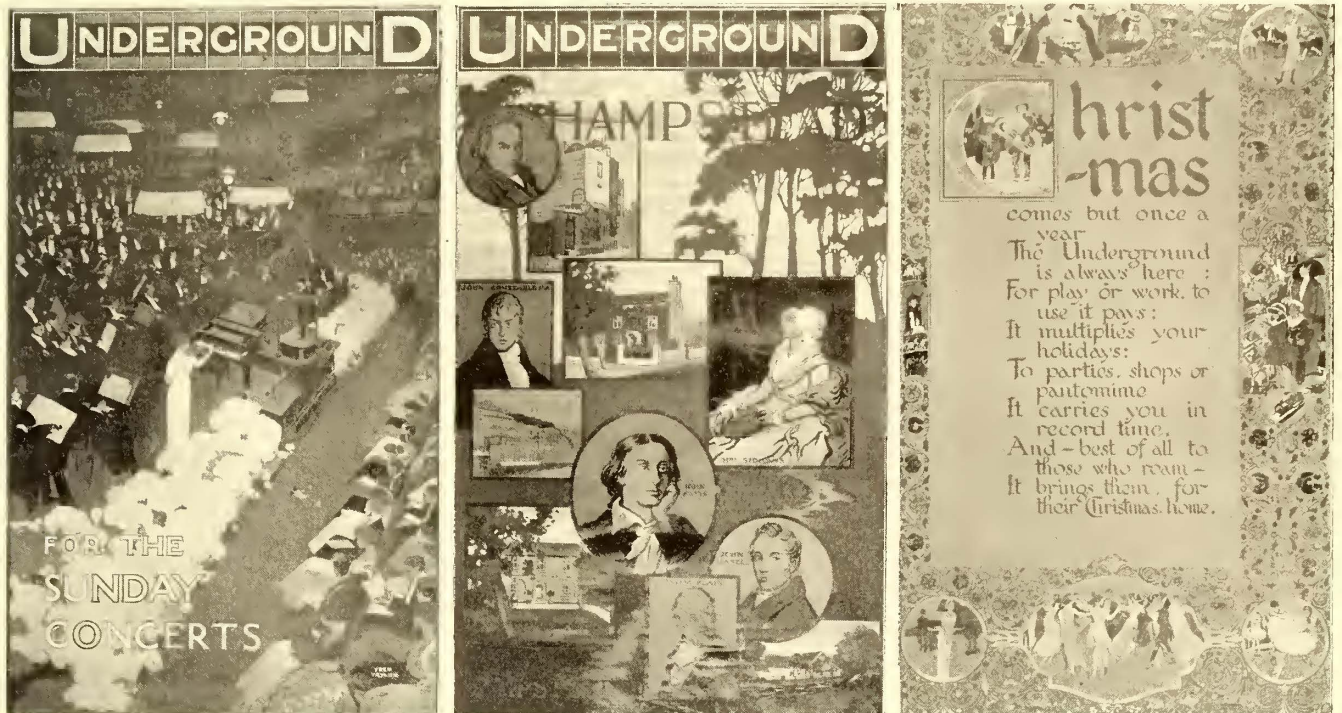
power only 2 per cent larger than the most recently determined value of the boiler-horse-power, and a paper setting forth its advantages in dealing with the performance of steam boilers and various prime movers was read by Messrs. Stott and Haylett O'Neill before the American Institute of Electrical Engineers in June, 1912.

The joint committees at this meeting unanimously adopted the following resolutions and have submitted them to the governing bodies of the two societies:

"(1) That the two committees in joint session recommend to their respective societies the use of the 'myriawatt' as the unit of thermal or mechanical power, as indicated in the above-mentioned paper.

"(2) That the two committees also jointly recommend to their respective societies the exclusive use of the 'myriawatt' in connection with boilers, producers, turbines and engines and to discontinue the use of the term 'boiler-horsepower.'

"(3) That C. O. Mailloux, as representing H. G. Stott



Three Recent Posters of the London Underground System, Appealing Respectively to Lovers of Music, of Places of Historical Interest and of the Christmas Spirit

that the official poet of the company has contributed a few lines to emphasize the part which the Underground system plays in adding to the joys of the holiday season.

Two other recent posters are reproduced. One shows some historic places at Hampstead Heath and includes the portraits of artists, poets and others who have been associated with them; the second calls attention effectively to the desirability of traveling to concerts via the "Underground." On account of their attractiveness, many of these posters have found the same place in homes and offices as pictures of other kinds.

THE MYRIAWATT RECOMMENDED AS A POWER UNIT

At a joint meeting of the standards committee of the American Institute of Electrical Engineers and of a committee specially appointed for the conference by the American Society of Mechanical Engineers, on Dec. 13, 1912, at the Engineering Societies Building, New York, the use of the "myriawatt" as a standard in place of the boiler-horse-power was taken under consideration. The "myriawatt" was originally suggested by H. G. Stott as a convenient unit of

on the special committee on prime movers recently appointed by the International Electrotechnical Commission, which committee is scheduled to meet at Zurich, Switzerland, on Jan. 18, 1913, shall be requested to bring these joint resolutions formally to the notice of that body in Zurich.

"(4) That the two committees jointly recommend that in writings and publications the 'myriawatt' and 'myriawatt-hour' be abbreviated to 'mw' and 'mw-hr.' in conformity with the existing abbreviations 'kv' and 'kw-hr.' for 'kilowatt' and 'kilowatt-hour' respectively."

The adoption of the myriawatt provides a simple and satisfactory method of rating the input and output of turbo-generators in terms of the same unit—the international watt. Instead of rating the output of a turbo-generator in kilowatts and the input in boiler-horse-power or other heat units as at present, it becomes very convenient to rate the electro output in kilowatts and the steam input in myriawatts, because the myriawatt is approximately the same as the boiler-horse-power, while it is also exactly 10 kw. By this means the long existing incongruity of stating the input and output in different and disconnected units of power will be eliminated.

The Annual Meeting of the Wisconsin Electrical Association

An Account of the Proceedings of the Milwaukee Meeting—Abstracts of the Papers Relating to Electric Railways Which Were Presented Before the Association Are Included

The annual meeting of the Wisconsin Electrical Association was called to order at the Hotel Pfister, Milwaukee, Wis., on Jan. 15 at 9:35 a. m. by the president, Irving P. Lord, president and general manager of the Waupaca Electric Light & Railway Company.

The secretary and treasurer, George Allison, of Milwaukee, comptroller of the Clement C. Smith properties, read his annual report, showing that the membership had been increased during the year by four active and fourteen associate members. The membership committee had been active during the year. The report was adopted and placed on file. At the request of Mr. Allison the chair announced that he would appoint an auditing committee to go over the books. This committee was appointed later. It consisted of E. H. Hoaglin, Wild Rose, Wis.; W. E. Haseltine, Ripon, Wis., and P. H. Jorst, Janesville, Wis.

PRESIDENT'S ADDRESS

President Lord did not make a formal address, but spoke informally about the work of the association during the last year. He said that the year 1912 was a fairly prosperous one for all of the companies and that the trend was forward if not upward. The central stations were improving their service and business and getting a little better balance sheets. Very much had been done by the Railroad Commission of Wisconsin toward raising standards of service and owners were beginning to appreciate what had been accomplished. Even municipal plants were beginning to concede that the Railroad Commission knew something. The association was well represented in its membership of public utilities. It had the largest as well as the smallest plants.

REPORTS

M. A. Gurnee, a member of the committee on membership, spoke about the work done to bring additional members to the association. The chairman of this committee was Roger N. Kimball, of Kenosha, Wis., who had resigned as second vice-president of the association.

T. A. Pamperin, chairman of the committee on taxation, in reporting for that committee said that a meeting did not take place until just before the annual convention was called to order. He felt that either the old committee should be continued or a new committee should be appointed, in order that the members might be kept in close touch with any action that might be taken affecting taxation matters.

The following nominating committee was appointed: Clement C. Smith, Milwaukee, Wis.; George D. Wheeler, Eau Claire, Wis., and J. S. Allen, Lake Geneva, Wis.

L. H. Lathrop, general superintendent Menominee & Marinette Light & Traction Company, then read a paper on the "Proper Operation and Maintenance of Arc Lamps." He said that more light was used and more was demanded constantly by business men who realized the advantage of it. An extended discussion took place on the paper.

STANDARDS OF ELECTRICAL SERVICE

J. N. Cadby, member of the engineering staff of the Railroad Commission of Wisconsin, then read a paper on the proposed revision of standards of electric service, which is now under consideration by the Railroad Commission. He said in his introductory remarks that improvements in service of every kind were being seen continually. Not only was service being measured more accurately, but safety precautions were taken more than ever before. In the factory, the public building, the street and upon the street cars and railway trains, life, limb and health were

receiving more consideration than heretofore. The slogan of "safety first," which the railway men had advocated, should be adopted by the public utility men.

The Wisconsin public utilities law required, Mr. Cadby said, that all public utilities report fatal accidents to the Railroad Commission whenever these accidents occurred through the construction or operation of the utilities or upon the premises used by them. Thus far there had been a few cases where high-tension transmission line construction had been passed upon by the commission and cases where the Railroad Commission and Industrial Commission investigated jointly matters of this kind. The fact that three fatal accidents in different parts of the State were caused by contact with live guy wires may lead to the adoption of further standards by the State commission.

Mr. Cadby said that adequate electric lighting and power service necessitated a practically uninterrupted supply of energy at a constant voltage, safety, ability to secure convenient and efficient utilizing devices and an accurate metering of the energy supplied. He presented the proposed standards, which will be considered at a meeting to be held in the near future and to which the commission will invite interested persons.

The association then adjourned for lunch.

WEDNESDAY AFTERNOON SESSION

The first order of business in the afternoon was a discussion on the decision in the Milwaukee fare case by Edwin S. Mack, of Miller, Mack & Fairchild, Milwaukee. This paper appears in abstract on another page.

The report of the insurance committee was then presented by Ernest Gonzenbach, of Sheboygan, chairman. This report appears elsewhere in this issue. Supplementing the report, Mr. Gonzenbach said that since it was prepared the committee had received a proposition from the concern at Wausau providing that the companies go in as a separate class. As representatives of various insurance interests were present and desired to discuss the matter with the committee, action on the report was delayed until later in order to give the committee an opportunity to confer with representatives of the companies.

George W. Kalweit, auditor of the Milwaukee Electric Railway & Light Company, then read a paper on "A Work Order System Adaptable to Public Utilities; Its Purposes and Method of Application." An abstract of this paper is published elsewhere in this issue.

Edward Hammett, superintendent railway department Sheboygan Railway & Electric Company, then read a paper on "Dispatching and Handling Street Cars and Train Crews." An abstract is published on another page.

HANDLING OF TRAIN MEN

In answer to a question raised in the discussion Mr. Hammett said that so far the relief fund had been large enough to meet requirements. He said the company followed the practice of promoting trackmen to the position of trainmen.

J. C. Justesen, superintendent of transportation Wausau Street Railroad, said that the most difficult thing that a transportation official had to do was to select men for car service. In Wausau an electric club had been formed, and the trainmen were encouraged to attend the meetings and to suggest any subject they wanted to bring up.

George Allison, Milwaukee, suggested the appointment of a committee to consider the subject of dispatching trains

and to report at the next meeting. The appointment of a committee was deferred until the following session. The association then adjourned to meet on the following day.

THURSDAY MORNING'S SESSION.

The session on Thursday of the Wisconsin Electrical Association was called to order by President Lord, who announced that the first paper would be one on the Standardizing Laboratory of the University of Wisconsin by F. A. Kartak, electrical engineer of the university. Mr. Kartak explained that the laboratory is to be reorganized on a commercial basis and that any public utility can have its instruments taken there for calibration and inspection. The schedule of fees for this work and a description of the laboratory will be mailed to all public utility companies in the state. Mr. Kartak added that the laboratory will be open at all times to visitors, who will be welcome.

President Lord said that the change in method of conducting the laboratory would be especially welcome to the small companies in the State which have not had the facilities for doing this work themselves possessed by the large companies.

In answer to a question, Mr. Kartak said that the university would probably issue regular certificates of the accuracy of instruments. He thought that the instruments would probably not be sealed, but that the certificate would be an indication of the test which the laboratory had conducted.

Mr. Hoaglin, reporting for the auditing committee of the association, said that the books of the secretary and treasurer had been inspected and had been found correct.

President Lord said that many requests had been received by the secretary in relation to the subject of an electrical show. He said that he would take the responsibility of appointing a special committee to consider all matters relating to this topic. The committee, as appointed by the president, consists of O. M. Rau, C. N. Duffy and H. P. Andre.

W. M. Bradshaw, Westinghouse Electric & Manufacturing Company, suggested that central stations prepare a packing box for shipping meters to the university laboratory.

DAY LOAD FOR SMALL CENTRAL STATIONS

W. E. Hazeltine, secretary Ripon (Wis.) Light & Water Company, then presented a paper entitled "Building Up a Day Load for a Small Central Station." He described the methods used in Ripon, a city of approximately 3800 inhabitants. The first step was to change the electrical system used, which was a 133-cycle single-phase system for commercial use and a direct-current series arc system for street lighting, to a sixty-cycle system. The company then established a rate of 10 cents gross or 9 cents net per kw-hr for the first sixty hours per month of active connected load and half of this amount per kw-hr for the excess. The management then approached the power users in the district and after some difficulty succeeded in securing their adoption of electric power instead of steam or gasoline engines. The speaker described a number of the uses to which the motors were put, and the methods of developing the fan, electric iron and other small appliance business. The effect of one year's active work was that the day-peak had become considerably higher. Although the peak-load had increased but 4 per cent the station output in kilowatt-hours had increased 57 per cent. There had also been an increase in the lighting load.

REPORT ON LIABILITY INSURANCE

The report of the committee on liability insurance presented on Wednesday was then taken up for discussion. Chairman Gozenbach also presented a supplementary report. It recommended that the members of the association, including those engaged in electric lighting, the operation

of street and interurban railways and in the gas and water supply business, should form a separate class of employers, as explained in a proposition which he submitted, and should carry their liability insurance both to the public and to their employees in the Employers' Mutual Liability Insurance Company of Wausau, Wis. He added that the committee had investigated a number of propositions and had given a great deal of time to a consideration of the matter and it was the unanimous belief of its members that better results and better protection at lower rates could be secured by accepting the proposition of this company than by any other methods suggested.

In considering this subject the committee heard from W. A. Fricke, president Employers' Mutual Liability Insurance Company, and from Lynton T. Block, president Utilities Service Company, St. Louis, Mo.

In discussing further the supplementary report, Mr. Gozenbach said he understood that the old line casualty companies intended to increase their rates still further and that these rates would go into effect soon after Feb. 1. An extended discussion of the committee's report then took place. It was finally decided that the report with the discussion would be printed for distribution to the members for their further consideration. The report of the committee was then adopted. This discussion concluded the morning session.

THURSDAY AFTERNOON SESSION

RESUSCITATION FROM ELECTRIC SHOCK

At the beginning of the afternoon session about twenty-five applications for membership were accepted. Dr. Charles H. Lemon, chief surgeon Milwaukee Electric Railway & Light Company, then discussed the subject of resuscitation from electric shock and first aid to the injured. He began by complimenting the National Electric Light Association upon the work which it had done in initiating an investigation by medical authorities into the causes of death following electric shock and to suggest means for resuscitation after the shock. He then described the method of producing artificial respiration as recommended by the National Electric Light Association committee and, with the aid of an assistant, illustrated the method recommended. He also exhibited a Draeger pulmotor, and illustrated its use in case of shock. He gave details of a case in which a man had received a shock of 13,200 volts. Apparently the man was dead, but his fellow workers maintained respiration artificially for five minutes until the pulmotor could be used. In this case consciousness was restored, and the only result of the shock was the severe burns left by the current. Dr. Lemon said that it was very important that everyone in electrical companies should be familiar with the simple movements recommended by the committee. In every case where resuscitation had been begun within ten minutes of shock, it was necessary to persist, however, not less than one hour and in some cases over an hour. The committee's method was simple, practical of application and efficient.

ELECTION OF OFFICERS

George B. Wheeler, Eau Claire, chairman of the nominating committee, then presented the report of that committee and the secretary was instructed to cast one ballot. The names of the elected officers follow: President, William H. Winslow, Superior; first vice-president, William Wallen, Oshkosh; second vice-president, P. H. Korst, Janesville; third vice-president, M. C. Ewing, Wausau; secretary-treasurer, George Allison, comptroller Clement C. Smith properties, Milwaukee.

It was decided, on motion of M. C. Ewing, to hold a three-day session in 1914 if in judgment of the executive committee it could be made successful.

The association then voted to have an advisory committee consisting of five members, including the presi-

dent to have charge of any legislative matters which might be required by the association.

C. R. Phenicie, general superintendent Wisconsin Public Service Company, then read a paper on construction and maintenance problems of overhead distribution systems of electric utilities. In accordance with Mr. Phenicie's recommendation, a committee of three will be appointed to draft standards of inspection. It was decided on motion of Mr. Pamperin to discharge the committee and to refer its duties to the new advisory committee.

President Lord, in conclusion, thanked the members for the assistance and co-operation he had received in the last year. The association then adjourned.

EXHIBITORS' ASSOCIATION

At the annual meeting of the Wisconsin Electrical Exhibitors' Association the following officers were elected: President, Clarence E. Searles, Allis-Chalmers Company; vice-president, H. E. Andrae, of Julius Andrae & Son's Company; secretary and treasurer, H. F. Bogus, of C. J. Litscher Electric Company.

DISPATCHING AND HANDLING STREET CARS AND TRAIN CREWS

BY EDWARD HAMMETT, SUPERINTENDENT SHEBOYGAN (WIS.) RAILWAY & ELECTRIC COMPANY

In connection with inspection and maintenance of your cars, the failure of cars in service is most annoying, and our company is making a vigorous campaign to reduce these failures to a minimum. We are working along the lines of bonuses to inspectors and carhouse employees, and while we are not able to make definite reports at this time, we are well pleased and feel satisfied that we are encouraging the men to do more efficient work with consequent results in the service.

The next problem in connection with the cars is to dispose of them in such a manner that they are convenient to the greatest possible number of people. This involves a complete study and analysis of the traffic which is being handled and then further study and search for improvement which will make the cars convenient for a greater number of people without increased cost of service to the company.

ANALYSIS OF TRAFFIC

Taking up first the study of city traffic, we find that the usual fare is 5 cents with transfers and possibly strip tickets of six for 25 cents. This fare system will permit one to arrive at a very accurate average cash value per passenger carried, so that a curve may be drawn showing the number of passengers carried each hour on each division, which represents also the revenue in cash. Against this curve a line is drawn which represents the operating cost transposed into number of passengers at the average cash value. We now have a diagram showing expenses and revenue during each hour of the day on each division. At a glance one may learn the hours of each day when the cars earn a profit on operation for the company, and naturally one may also learn that there are periods during each day when the cars show a most distressing loss. With these facts determined, we are ready to take up all possible suggestions for improving the figures shown in the analysis of traffic. Our greatest difficulty lies in knowing exactly where the trouble is located; when that is determined, the solution is half accomplished.

The analysis of traffic on interurban lines is more complicated than it is on city lines, but the general scheme is the same. To learn the cash revenue of different divisions, we divided the line into three sections and instructed conductors to issue cash fare receipts to all passengers who paid cash on the cars. Ordinarily a large number of these cash fares would have been registered on the Ohmer fare register, and accurate tabulation would be impossible. However, with cash fare receipts and mileage and usual card

tickets, we were able to determine exactly how many passengers we carried and between which stations.

For purposes of tabulation, we divided the line into three sections, each section ending at a point where there is a natural terminal. Each section received full credit for all traffic which was wholly within its own limits and proportionate credit for all traffic which originated or ended only within its limits.

The interurban schedules, at that time, consisted of one car every hour throughout the operating period so that the cost of operation was uniform in each division. Analysis of receipts and number of passengers carried in each division showed that the first section of road furnished more than 60 per cent of the entire interurban revenue; the second section furnished a little less than 30 per cent, while the third section was contributing only about 10 per cent. The schedule was immediately revised so that one car was used exclusively in the first section, which gave more frequent service and better accommodations in every way. This change made it necessary to cut down the service a little in the second section and very materially in the third section.

EMPLOYMENT AND HANDLING OF TRAINMEN

The train crews represent possibly the most important link in the handling of traffic, and no operating official can afford to overlook any one little thing which has to do with the improvement of the service in this respect. The original selection of men, of course, is very important, but many of the most promising men—men who seem to be promising when they were employed—have turned out worthless. On the other hand, a great many motormen and conductors who do not appeal to one particularly at the time of employment develop, through hard work and faithfulness, into what we may easily call the ideal trainman. The employment of trainmen is a phase of the business which depends entirely upon the superintendent of transportation or other official who has to do with the hiring of men, and his success as a superintendent of operation will depend in a large measure upon his ability to select or reject without hesitation such men as make application for positions. When a man is once hired and is on the company pay-roll, he must be taken care of properly. The most approved method for initial training seems to be a regularly equipped school of instruction, where the candidate is obliged to put in a specific number of hours and accomplish specific results. At the expiration of this period, he must be ready to pass a certain examination as to his fitness for the position which he expects to take. Small roads, however, do not find themselves in a position to maintain schools of this sort, and many times trainmen are allowed to act as motormen or conductors without having specific training of any continued duration. On roads such as these, it is customary to have the applicant work without compensation, either as motorman or conductor, under the direction of some employee in a similar position who can be thoroughly trusted.

One of the most important things to impress upon a new man seems to be the fact that he is subject to the rules and discipline which will be enforced by the officers of the company, and this particular phase of the business seems to cause considerable disturbance among the new men. A man, for instance, who receives 16 or 17 or 18 cents per hour for his services as a motorman or conductor finds himself in a position which he can duplicate almost any place any time. In other words, day labor is worth as much money these days as we can afford to pay for the earliest service of a new man, and so considerable difficulty is experienced in successfully disciplining men during the first year of service. The older men in the service are always more amenable to discipline and criticism than the new men, and this in many cases has the effect of steadying the new man. With all of us the real incentive for work lies in the hope of reward, and if a new trainman sees that the older trainmen are well taken care of and are prosperous,

there will be a powerful incentive for sticking to the job and becoming, in the natural course of events, one of the old men.

The problem of handling men is individual with each operating official. A man must feel right toward his employers in any line of work if his services are to give the best results, and this is without a doubt the ultimate goal of the operating man, for the reason that the company's revenue passes through the hands of its conductors and the passengers' safety is in the hands of the motormen. Hence, the attitude of these men toward the company is reflected very accurately in the attitude of the patrons of the road toward the management. The problem is to keep all of our trainmen in a state of mind which is distinctly friendly toward the management of the company. This friendliness must be aggressive and will not produce the best results until every man believes firmly in the integrity and impartiality and fair-mindedness of his superior officers. The question therefore is, how shall we bring about this state of affairs? Possibly the first thing would be to study the payroll and determine whether the men are receiving enough money for their work to make them think rather well of their jobs as compared with other available jobs in the community. Then, when you are satisfied that your men have just as good a job with you as they would have in any other place, all things considered, it seems to me advisable to go still further and offer some additional remuneration. In one case this additional remuneration was offered in the form of a bonus to be paid under a merit system which was based largely on the experience of other roads and was also re-designed to cover local conditions. The distribution of bonuses under this merit system was as follows:

BONUSES AND MERIT MARKS

Every man in the regular service on Jan. 1 was listed to receive a bonus on the following Jan. 1: \$30 for one-year men, \$45 for two-year men, \$60 for five-year men and \$75 for men who had been in the service ten years or more.

Each man received 100 merits on Jan. 1. For a perfect record during any one calendar month, each man received ten merits. For other meritorious service, a trainman might earn additional merits and in the same way demerits were assessed for all infractions of the rules and for any carelessness or other defect in the actions or performance of duty of the men. At the end of the year, each man's account was balanced and awards made to all men who had 100 merits or more. This merit system was freely criticised by the men throughout the first year, but when Jan. 1 came around and they lined up one after another and received from \$30 to \$75 each, the attitude changed considerably, and now, in the third year that this system has been in operation, we find the men unusually interested.

The next step in the welfare of the men was in the form of a sick benefit relief association. This was organized on a basis that included all employees of the company, and membership in the association is compulsory. An assessment of 25 cents per month is levied against every employee, and the governing board and officers are elected from the rank and file of employees. Sick benefits amount to \$7 per week for total disability, with the usual conditions and by-laws which are included in relief associations. Death benefits consist of \$75, which has been found in several cases to pay actual funeral expenses and at least furnish a little ready money for the emergency of death, when expenses are necessarily urgent. This relief association has made a fair number of settlements, both in regard to sickness and death, and the present status of the association among all employees is unusually satisfactory. In addition to this assessment of 25 cents for each employee, the company donates an amount equal to 50 per cent of the assessment collections each month.

It has also been found beneficial and pleasant to have some social functions during the year for the exclusive

benefit and enjoyment of employees and their families. A number of very successful picnics have been given, and recently a very successful dance was held. The experience along these lines leads me to say without hesitation that the general welfare of your men should receive a great deal of attention, because it brings the men close to you and makes them feel friendly toward you and your efforts to give the best possible service. The best service is not possible without their active interest and co-operation.

DISPATCHING

We now come to the discussion of dispatching, which was formerly a very crude affair on electric roads. The first step in introducing a modern system of dispatching is to establish rigid discipline among the men. The basis of this discipline should be the rule book adopted by our national association. The committee which compiled this book of rules had many conferences with steam railroad officials; therefore, we find a distinct tendency to follow steam railroad practice, which means the best there is. After the rule book and general discipline are in full force, you must issue a regular working timetable for the use of employees only. This timetable will show only sidings, switches and terminals, and will show plainly trains of all classes on the regular schedule, also where and what each train meets. Each train has a number and is known only by this number. Each siding has a name or a number and is known only by such designation.

Great care is required in making up this working timetable to avoid confusion and error, but the chances of error may be entirely eliminated by the use of a board and threads to lay out the complete schedules. Across the top of the board the hours of the entire operating period are placed consecutively. On the left edge of the board all switches and sidings are entered consecutively and spaced with regard to the actual mileage. When this board is prepared it is a simple matter to lay in the trains, and, of course, wherever the threads cross, a meet must show on the timetable.

Modern dispatching permits no verbal orders affecting the movement of trains. We use, therefore, a written order designated in the rule book as Form No. 31. This form of order is issued by the dispatcher directly to the conductor of each train. The issuing of written train orders undoubtedly consumes more time than verbal orders, but there is no comparison in the matter of safety. Hence written orders are used. Supplementing written train orders we have Stromberg selective semaphores, which are controlled in the dispatcher's office and may be dropped at will against any siding.

Working timetables, written train orders and discipline constitute the three outstanding requirements for modern dispatching, but there are, of course, many auxiliary aids in dispatching which each man works out for his own department when he gets to studying the particular proposition. One such aid has been adopted on our line which we find very helpful. It is a printed sheet which provides space for entering all the meets of any train. Space is also provided for making notes of train orders issued. This trip record is filled out and signed by the conductor and the dispatcher and is then placed in plain view of the motorman so that he can learn at a glance whether his train is supposed to meet some opposing train at each siding which he reaches. The advantage of this sheet is that it leaves nothing to the memory of the motorman.

One other device we employ for additional safety is requiring motormen to blow four short blasts of the whistle when approaching any siding. This constitutes a call for signals from the conductor and must be answered by one bell from the conductor if a meet is to be made and by two bells if no meet is to be made. This device serves to insure that both motorman and conductor put their mind on the question of meets at each siding and has proved entirely satisfactory.

A DISCUSSION ON THE MILWAUKEE FARE DECISION

Edwin S. Mack, of Miller, Mark & Fairchild, who presented a paper on this subject, spoke, in his introduction, of the exhaustive character of the decision and said that while it was impossible to discuss all the details he would take up the leading principles which were of practical importance to operators of public utility companies in Wisconsin. In taking up the question of intrinsic reasonableness of the rates, the commission found that commutation rates were in force in a number of cities and it was therefore proper to require them. The same principles enunciated in this respect were carried out also in the Superior case, where the commission ordered the sale of six tickets for 25 cents.

Until 1900, Mr. Mack said, the rate of fare in Milwaukee had been 5 cents. Then an extension ordinance was passed, providing that for five years the company should sell six tickets for 25 cents or twenty-five tickets for \$1, good during certain hours. After Jan. 1, 1905, these tickets were good throughout the day. The decision of the commission providing for the sale of thirteen tickets for 50 cents also involved suburbs and extended the fare limits in some cases.

The commission reached its determination from a consideration of the investment or the value of the property, discussion of the operating expenses and allowance for depreciation, a calculation of probable future items of expense not yet realized and, finally, the rate of return to be earned by the company.

Continuing, Mr. Mack said that the first point was the most important one. That was, on what basis of capitalization or on what principle should the rate of return be computed? Originally the city of Milwaukee granted franchises to three horse railways, then to one so-called dummy railway and, finally, to a cable road which was really constructed as an electric railway. About 1890 a movement was made to consolidate the properties. These railways controlled between them practically every down-town street and every bridge crossing the river near the down-town district. It was impossible to have a complete system of lines except by consolidation of the existing properties. The companies were brought together as the Milwaukee Street Railway. This was then consolidated with the lighting companies in the city. The consolidation naturally involved considerable expense above the physical value, perhaps above even the "going" value. The owners of the properties held had franchises with a number of years to run and were making profits. Payment for the properties was made in bonds and stock, but reduced to a monetary basis for the bonds, excluding the stock and plus expenditures for electrification, the cost was \$8,885,000. The commission allowed for this value only about \$5,000,000. The facts regarding this consolidation were brought out in a suit in 1896. Judge Seaman found in his decision at that time that the appraisal of the property made by W. J. Clark was to be preferred above the city valuation. The court held that the reproduction cost new of \$5,000,000 represented fairly the physical property of an investment that might fairly be called \$8,885,000, and that the company was entitled in a rate case to a valuation of at least \$7,000,000. Judge Seaman held that it was not necessary to decide in that case, and he did not decide, whether the company was entitled to earn a return on \$8,885,000.

In the case before the commission the company presented figures of value, taking the \$8,885,000 as a basis and adding the various additions made to the capital account subsequently.

The Railroad Commission, Mr. Mack said, took up the matter historically and then appraised the property. It first revised the Clark figures of 1896 and found that they were \$600,000 too high in reproduction value. The next step was an examination of the propriety of the invest-

ment. The commission held that excessive prices had been paid for this combination of street railways. The net result reached by the Railroad Commission was a figure of \$5,000,000. That was determined by a revision of the costs and a revision of the Clark inventory. The changes in the inventory figures were in the overhead allowances and in certain unit prices.

The commission also went into the question of going value. That was computed in two ways.

Under the first plan the cost was based on the losses incurred in building up the plant. Under the second plan, it was assumed that a new company started in business to build up its property to a point of profit corresponding with the position which an existing profitably established company would occupy. The commission computed the going value at \$450,000. As of Jan. 1, 1897, the commission found the value of the property as \$3,500,000 plus \$400,000 for going value and \$1,000,000 for loss in property during conversion to electricity. That was the basis taken by the commission as the initial point in its computation.

Mr. Mack said that in making the subsequent additions to the capital investment, the commission made an analysis of division of charges between the railway and lighting departments. For years the company had used the bases of 80 per cent for the railway and 20 per cent for the lighting. As a result of its analysis the commission made a difference of approximately \$1,200,000 from the results shown by the books of the company. The railway books showed an addition of \$5,400,000 and the commission made the total addition \$4,200,000. The net result was that instead of showing a value of \$14,000,000 for the railway, as was indicated by the testimony for the company, the commission found the figure of \$8,700,000 in 1907. Continued to 1911, this became \$10,300,000. The main difference in the figures was due to the fact that the commission allowed less for the original property than the actual expenditure and, second, made a different apportionment of the subsequent additions. In connection with the disallowance of items of cost, the commission seemed to doubt whether the cash costs were as large as were found by Judge Seaman.

JUSTIFICATION FOR PURCHASE PRICE

It was natural, Mr. Mack said, that counsel should differ from a finding and therefore the question whether the decision was right or wrong was not one that he cared to discuss. The point which he wished to emphasize, however, was that if operators of public utility properties were to make an investment of any size in order to buy or consolidate plants, they must do so with their eyes open. They might be placed in the position in a rate case ten or fifteen years after the purchase or consolidation of being required to establish the reasonableness of the price paid and the value of the property. Transactions must be conducted with the understanding that they would have to be justified afterward.

In view of the fact that the commission made an analysis of cost and that most companies conducted two or more kinds of business with one organization, the officials must bear in mind the fact that the commission may review the division of capital expenditures. For instance, a power plant may generate current for commercial and railway purposes. The ordinary method of dividing the investment in property used in common is to divide it according to the proportionate use. If a company finds that this proportionate use gives one result in one year, and at the end of two subsequent years the lighting business has been developed largely and is twice its former volume, the proportions of investment change. While this method of apportionment was perhaps the only practical one to adopt, operators must bear in mind the fact that as the volume of use for one purpose may change, the apportioned capitalization, which changes also in accordance with this plan, may be subject to review for rate-making purposes.

Taking the mass of cases as they had been decided before the commission, it was found, Mr. Mack added, that the sum of all elements considered in making a decision as to value usually became the same as the reproduction value new, and this is about the result reached in the Milwaukee fare case. Overhead charges had been allowed by the commission ranging from as low as 10 per cent in some cases to as high as 15 per cent in other cases. In the Milwaukee street railway case the allowance was 12 per cent.

In connection with the appraisal of the physical property, the commission also had to make an appraisal of suburban and interurban property. The outlying and city lines were operated in common and the same cars were used for much of the business.

There was also a question regarding the value to be allowed for paving. The commission followed the rule which it had used in a number of cases and allowed only the actual expenditures of the company. In some cases the railway had laid track at a time when the city was paving, and the commission did not allow anything for paving in these instances, although if the railway had to be reproduced the company would have to pay for this element of cost.

In taking up the question of earnings where a company conducted several kinds of business, it was necessary first to divide between the railway and light departments, and second to segregate the city, suburban and interurban expenses. The company had divided the railway and light on the basis of the actual current consumed. The commission did not interfere with the division made by the company. A more important question was that of the division between the city and the interurban branches. The analysis of the commission was exhaustive and each item was considered by itself. The result, Mr. Mack thought, was as logical as it could be made. It would be difficult, however, for a smaller property to carry out so detailed a method of accounting as that described in the decision of the commission. The wise thing to do would be to make a study at a particular time on the basis used by the commission and to come as nearly as possible to that, or else to make a computation and use that until the management felt that it should be revised. It was not practicable for a small company to make an annual, a monthly or a day-to-day apportionment in as much detail as the commission used.

Continuing, Mr. Mack said that the net result of the consideration of the subject of depreciation was an annual reservation of a little less than $4\frac{1}{2}$ per cent. On the question of the rate of return the commission commented on the excellent credit of the company and therefore determined on interest of 5 per cent to 6 per cent plus profit of $1\frac{1}{2}$ per cent to 2 per cent, making finally a return of $7\frac{1}{2}$ per cent on the value. The value as of Jan. 1, 1911, \$10,300,000, to represent the reproduction value of the physical property, was determined to be the actual justifiable investment in the property on a cash basis. The commission also made allowances for probable future increases in expenditure, such as additional municipal burdens, extensions of fare limits, repaving of streets, improvements in service, etc. After making these allowances and computing a return of $7\frac{1}{2}$ per cent, the commission found that it could make a reduction in the rate of fare to provide for the sale of thirteen tickets for 50 cents. It was figured that this would cause a reduction of \$170,000 a year.

One other element that involved a new investigation was a careful consideration of what the commission called a maximum paying haul. It divided cost between movement and terminal cost. The company made an investigation of this subject at about the same time that the commission made its study, and the results were very close. The difference was less than 0.2 mile, and showed an average haul of about 2.7 miles. Mr. Mack felt that this study of the commission was one of the most valuable features of the

decision, and that it would be well worth the while of every man interested in electric railways to read this portion.

Mr. Mack said that the results in his opinion would be that so low a rate of return as that indicated would probably be a serious deterrent on extensions on interurban lines or any others. He thought the present cessation in construction of public utility properties was due largely to the fact that people felt that they could not have a sufficient return. It was the opinion of Prof. M. E. Cooley, expressed as a witness, that the reproduction value of public utility property ordinarily approximated two-thirds of the investment. The commission felt that when properties were financed on a cash basis the method which it had followed in its regulation of the companies would provide for an ample return. The principal funds in its opinion could be provided by the sale of bonds. However, as John I. Beggs had testified in the Milwaukee case, it was necessary, in order to secure development, to provide for a speculative profit on the deal. No man went into an enterprise for the construction of a public utility plant without feeling that he had found an opportunity that someone else had not seen, and in order to make an investment, there had to be some chance of a profit with development. Mr. Mack believed that the northern part of the State of Wisconsin would have its settlement retarded until higher returns could be offered. He thought that the commission would allow larger returns in smaller cities than it provided in Milwaukee.

Mr. Mack said that the commission did not say that the company could not earn over $7\frac{1}{2}$ per cent, but it did say that it reduced the rate of fare because it figured that the company could establish a lower rate, provide for probable future increases in expenditure and still pay $7\frac{1}{2}$ per cent.

REPORT OF LIABILITY INSURANCE COMMITTEE

BY ERNEST GONZENBACH, CHAIRMAN; M. C. EWING AND T. A. PAMPERIN.

The subject of insurance is of the greatest importance to central station and public utility operators, and particularly so at this moment in the State of Wisconsin, where a workmen's compensation law became effective on Sept. 1, 1911. The provisions of this law have not as yet been fully tried and tested, nor are they universally understood.

Prior to the introduction of the workmen's compensation law it was customary for companies in the electric lighting business to carry two forms of liability policies, namely:

(1) Insuring the company against claims and verdicts for damages sustained by employees in the performance of their duties.

(2) Insuring the company against claims and verdicts for damages sustained by the public through coming in contact with electric light wires and fixtures.

In addition to these two forms of insurance, public-service companies engaged in the electric railway business were also in the habit of carrying employers' liability insurance:

(3) Insuring the company against claims and verdicts for damages sustained by railway employees in the performance of their duties.

Up to about five years ago the limit of liability on this insurance was \$5,000 for any one single individual claim and \$10,000 limit for claims or verdicts resulting from any single accident, no matter how many were injured. About that time a change in the laws necessitated a higher insurance limit, and thereafter liability policies, as a rule, were written with \$10,000 and \$20,000 limitations.

The carrying of liability insurance was considered a necessary part of the public utility business and was supposed to be a great protection to stockholders and bondholders; in fact, it was often looked upon as affording as much protection to the company as fire insurance. This impression, however, was entirely erroneous, and the liability insurance which was carried by practically every

public service company in the State up to the passage of the workmen's compensation law was more or less a delusion and a snare. In the first place, it was impossible to insure up to the limit of accident liability, whereas in fire insurance one can insure to the limit of possible damage. Every small company was liable to have an accident resulting in damages and verdicts against the company amounting to considerably more than its limit of liability insurance, and therefore the company was by no means insured against ruin from that source. It may, of course, be argued that the majority of accidents are not catastrophes and are covered by the limits of liability which are in force and generally accepted by policy holders. On the other hand, the absence of liability on the part of the companies and the shifting of the burden upon the insurance companies introduced a personal or moral hazard in the form of temptation to the insured to get as much as possible for the injured employee and work together with him to get as big an adjustment as possible from the insurance company. In this way injured and insured were working together against the insurer. The natural result of this state of affairs was that the insurance companies in one form or another fought practically every claim that was brought against them, and they did not discriminate between legitimate injury claims and those which were strictly "strikes" or "hold-ups." Under the provision of the liability policies it was practically impossible for a company to settle an injury with an employee without losing his good will and services. It was a case of give and take, adjusting and haggling until a sum was finally agreed upon which was satisfactory to neither side and which may have made a permanent enemy of the man who up to that time had been a valuable and loyal employee. Not only did it make an enemy of him, but of all his relatives, friends and acquaintances—a consideration which increases in proportion as the size of the community in which one does business diminishes.

The rates which were paid for this liability insurance were based entirely on the total amount of the payroll and consisted of a certain percentage of it. This again was a fruitful subject of dissension between the insured and the insurer. The policies as a rule stipulated certain exemptions from the payroll, such as the office force, and the policy did not cover construction, but stipulated "ordinary extensions and construction." The interpretation of this "ordinary extensions and construction" was one of the fruitful sources of dispute. Again, companies doing a combination electric light and street railway business had one rate insuring street railway employees, the premium for which usually amounted to less than 1 per cent of the payroll, whereas the premium payable for insuring employees in the lighting department usually ranged from 2 to 3 per cent. The division of the power station payroll in a combination power station also was pregnant with possible friction—all of which was aggravated by the fact that the various insurance companies were active competitors with each other and were in the habit of making private treaties apart from and outside of the stipulations provided in policies, which treaties were in force privately, although at variance with the provisions of the contract and in direct opposition to the statement on the face of the contract that all agreements other than those on the face of the policy were "null and void." As a matter of fact, numerous agreements were lived up to outside of those written on the face of the policy, and the only value that clause of the contract had was that it acted as a club for the insurer and prevented the insured from having any redress at law for private bargains made with company agents in the way of special discounts or rates.

On the whole, the committee feels that it can consistently state that the old form of liability insurance was not satisfactory to the insured, that it gave a minimum of protection at a maximum of expense, and it left the settlement of

claims in the hands of a third party wholly regardless of the interests of the injured and insured. The situation even before the enforcement of the workmen's compensation law became intolerable and was ripe for remedy in some form or other.

ADVANCES IN INSURANCE RATES

About the time that the workmen's compensation law went into effect in the State of Wisconsin the various liability insurance companies seemed suddenly to have discovered the scientific principles underlying their business, and the rates of every one of them on the same day became exactly the same as the rates of every other company. We assume, of course, that the gentlemen of the insurance companies are not violating the Sherman anti-trust law and that they are not a trust, but the uniformity of rates and policies is a coincidence which is at least remarkable. The liability companies seemed to have a violent grudge against the workmen's compensation law and by means of pamphlets and other more or less legitimate means they sought to induce public service companies not to avail themselves of the provisions of this law and at the same time keep in force the liability policies which had heretofore been used—at an advance in premiums as high as 570 per cent. To be insured against losses under the workmen's compensation law the rates in one case went up 1100 per cent, as may be seen in the table herewith submitted. This shows a list of premiums in force before and after the establishment of uniform liability rates and the enforcement of the workmen's compensation law. The figures marked "old rate" are the premiums actually paid by one of your member companies. A little study of these premiums is interesting, although somewhat expensive for the man behind the cash ledger.

	RATES OF LIABILITY INSURANCE			Under Workmen's Compensation Law	
	Old Rate	New Rate	Per Cent Increase	Per Cent Increase	Per Cent Increase
Employees of electric lighting companies . . .	3.75	4.80	28	8.40	124
Employees of street railways, city service	0.93½	3.75	301	7.00	650
Employees of street railways, interurban service	0.93½	6.25	570	11.20	1100

It, of course, goes without saying that no sensible public service company in the State was willing to pay the rates demanded by the liability companies when it could avail itself of the provisions of the workmen's compensation law, with its stipulated amounts to be paid for accidents and with a more or less open knowledge of what the risk would be, and in view of the further fact that by taking advantage of the workmen's compensation law all of the money which would be paid by the company would be given to the injured employee instead of having one-half or two-thirds of it absorbed by attorneys' fees, as was usually the case under the old insurance plan. Settlement with an injured employee under the workmen's compensation law was very apt to leave the employee a good friend of the company; hence his friends, acquaintances and relations also remained friends, and in some cases that means the whole of a small town. Naturally, almost every company in the State surrendered its employers' liability insurance and accepted the provisions of the workmen's compensation law.

Thereupon the stock companies writing liability insurance in Wisconsin played their trump card. They demanded that any company surrendering its employers' liability insurance should also surrender its public liability policy, and they refused absolutely to write any public liability policies in the case of companies that were not carrying employers' liability insurance. Through sheer force of intimidation and the fear of serious accidents on their lines, many of the smaller companies were "bluffed" into continuing the carrying of employers' liability policies at

the exorbitant new rates demanded. In the case of combined lighting and railway companies, the additional risk assumed by the company in carrying its own public liability risk in the lighting department was only a small fraction of the risk which is already carried for public liability from accidents in its railway department, a risk which no insurance company in existence to-day will assume. Therefore the "bluff" was not successful in the case of companies operating both classes of service, but many a lighting plant that can ill afford it is to-day carrying employers' liability simply on the strength of the threat that the public liability policy will be canceled.

SUGGESTED PLANS OF ACTION

Your committee was appointed for the purpose of finding some escape from the exactions of the liability insurance companies. Let it be stated here that this committee is in no way hostile to the insurance companies, whether stock or mutual; the companies, *per se*, have rendered and in many cases are still rendering valuable services to the insured. We do not protest against companies of any kind or nature, but against the rates which it has been attempted to force upon us in a manner which could not possibly be used were insurance companies subject to the same restrictions and regulations which apply by law and commissions to the companies engaged in the public service business in Wisconsin. In order to overcome the present situation, there would seem to be three possible methods.

Plan 1—To form a mutual insurance or co-operative insurance corporation, constituting practically all of the membership of the Wisconsin Electrical Association.

Under this plan the membership of a mutual or co-operative insurance corporation would be carried by the Wisconsin Electrical Association itself, and the amount of premium which has heretofore been paid to the liability companies would be paid into the treasury of the association, and the association would write employers' and public liability insurance for its members only. The objection to this plan is that it would necessitate a complete organization for the purpose of carrying on the business. There would necessarily have to be an expert insurance man, an adjuster and an auditor, whether combined in one person or in several.

Plan 2—Joining of several members in some of the mutual or co-operative liability insurance concerns of good standing which make a business of writing liability insurance of lighting and street railway companies, telephone and other public service companies.

Your committee has listened to a proposition made by such a concern located in St. Louis, and in many ways the proposition is to be recommended. But there are a few objections to this plan also, the principal one being that the concern charges an initial premium equal to the premium to be paid to the stock companies under the "new rates," and charges 30 per cent of that premium to "administration," paying losses and claims out of the remaining 70 per cent. While 30 per cent of the premium is not a high amount to pay for administration, provided the premium is reasonable, at the same time this 30 per cent payable under the premium as now demanded would be in many cases several times the amount of insurance heretofore paid to the liability companies, and to this first 30 per cent must be added the actual losses incurred and paid. While this plan produces a lower net rate than that which can be obtained from stock companies, we do not believe that it is of sufficient advantage to be recommended for adoption by the association.

Plan 3—Insurance in a mutual company such as has been organized at Wausau for the purpose of carrying the liability insurance of Wisconsin manufacturers under the provisions of the workmen's compensation law.

The company located at Wausau is still quite young and in some quarters, which are open to suspicion, however, it has been much criticised. However, this concern offers an opportunity which our association cannot afford to

ignore and which may give us reliable liability insurance at reasonable rates. This company is ready to write our employers' liability insurance, but it is not prepared at this time to take up the writing of our public liability insurance. If this concern were prepared to accept public liability insurance risks, your committee would feel inclined to recommend unanimously that we insure with this concern. Until provision can be made, however, whereby both employers' liability and public liability risks can be accepted we shall suspend recommendation.

There is a fourth plan which possibly might be worked out, and that consists in having the member companies organize a mutual insurance association among themselves and pay the usual premiums and then make some arrangements with some old-line company or with an agent representing several old-line companies to handle all of its business and to reinsure all risks above a certain amount, say above \$500 or \$1,000. In this way companies composing the mutual association would carry their own risks up to say \$500 or \$1,000, thereby eliminating a very large share of the fixed charges charged by stock companies against insurance premiums and reinsuring only the larger risks.

Your committee feels that it would be inadvisable at this time and in view of the importance of the subject to formulate definite conclusions and submit them as recommendations, especially since no really acceptable plan has been submitted so far. A much better plan, in our opinion, is to have this report thoroughly digested by the member companies and have ample time set aside for its discussion. After due consideration of the subject, we earnestly request that the association take some positive action having for its purpose the betterment of the liability insurance conditions of the members of this association.

WORK ORDER SYSTEM ADAPTABLE TO PUBLIC UTILITIES

BY GEORGE W. KALWEIT, AUDITOR THE MILWAUKEE ELECTRIC RAILWAY & LIGHT COMPANY

The "work order system" of The Milwaukee Electric Railway & Light Company has proven practicable in its application and satisfactory in accomplishing the purposes previously outlined. The company has made it a practice to issue "specific work orders" for each piece of work undertaken covering charges to capital expenditure accounts or reserve fund expenditure accounts, or special charges in operating expense accounts (work order charges), unless such charges would be covered by "general work orders."

The company's classification of accounts prescribes:

Capital expenditure accounts (work order charges) should include charges constituting expenditures for construction and equipment, additions and betterments, including intangible capital expenditures properly chargeable to "property and plant." These charges are to be carried on work orders either through a "specific work order," or a "general work order," issued to cover charges properly chargeable to capital expenditure accounts. Charges and credits to capital expenditure accounts must be in accordance with the classification of capital expenditure accounts (work order charges).

Reserve fund expenditure accounts (work order charges) should include charges constituting expenditures for reconstruction, re-equipment, betterments, or uncurrent and extraordinary expenditures, properly chargeable against "maintenance and depreciation reserve fund," as distinct from construction and equipment, additions and betterments, or intangible capital expenditures, properly chargeable to "capital expenditure accounts" or current ordinary maintenance charges, properly chargeable to "operating expense accounts." These charges are to be carried on work orders either through a "specific work order" or a "general work order" issued to cover charges properly

chargeable against "maintenance and depreciation reserve funds." Charges and credits to reserve fund expenditure accounts must be in accordance with the classification of reserve fund expenditure accounts (work order charges). Operating expense accounts (work order charges) should include work order charges properly chargeable to operating expenses, separated from regular charges to operating expenses, for the purpose of ascertaining the cost of a specific job, the cost of the job to be transferred monthly to the appropriate operating expense accounts.

CLASSIFICATION OF WORK ORDERS

Work orders are divided into two classes: (1) Specific work orders. (2) General work orders.

A "specific work order" should carry the charges for a specific job, for example:

Construction of 1.00 mile of double track in Twenty-seventh Street from North Avenue to Burleigh Street, 7-in. 95-lb. T-rail; 350 cast welded joints, 205 splice joints; necessary special work; brick and granite paving; necessary electric line construction work.

A "general work order" should carry the charges for certain general work during a current year, for example:

Extensions in 1912 of the overhead electric light and power system in Milwaukee.

WORK ORDER REQUISITIONS

For the guidance of departmental heads, the accounting department issues the following instructions regarding work order requisitions covering capital expenditures or reserve fund expenditures:

All work properly classified as a "capital expenditure," or a "reserve fund expenditure," as distinct from a "maintenance charge" (properly chargeable in "operating expense accounts"), must be authorized through "work order requisitions."

"Work order requisitions" should describe the work to be done, the reason for doing it and the estimated cost of same in detail. "Work order requisitions" should be sent to the accounting department for the proper distribution and charge, to be in turn passed to the properly authorized official for approval, and then returned to the accounting department for the issuing of the "work order notification."

"Distribution of estimated cost" must be drawn up to conform with the distribution prescribed by the classification of accounts. This distribution is carried by the accounting department for all "capital expenditure work orders" but not for other work orders, unless a request is embodied in the "work order requisition" to do so.

"Details of estimated cost" must be drawn up in accordance with classification of capital expenditure accounts (work order charges) or reserve fund expenditure accounts (work order charges).

WORK ORDER NOTIFICATION

When the approved "work order requisition" reaches the accounting department it is carefully scrutinized and the calculations of "details of estimated cost" checked. If found to be properly drawn, the serial number is assigned, the "work order notification" issued, and a copy of same sent to all the departmental heads.

The "work order notification," with proper identification number assigned, shows the department from which the "work order requisition" originated, the title of the work order, the description of the work and the estimated cost, as well as the distribution and charge.

WORK ORDER INDEX

The accounting department's copy of the "work order notification" is entered on the work order index, which shows the date issued, work order number, description, distribution and charge, sub-index page and date completed.

The work order index thus combines a ready reference and record.

WORK ORDER DISTRIBUTION SHEET SHOWING COST OF EACH JOB

The accounting department's copy of the "work order notification" is entered on a loose-leaf distribution sheet, to

which charges are posted from day to day as the work is in progress, the charges being carried according to the distribution and charge prescribed, separated as between "labor" and "sundries."

"Labor," according to the classification of accounts, is defined as: "Pay roll charges," covering manual labor, clerical work, engineering and superintendence."

"Sundries," according to the classification of accounts, is defined as: "Sundry charges," other than 'pay roll charges,' covering material and supplies, tools and expenses."

The charges segregated as between vouchers or journal entries, the latter including charges for material and supplies disbursed from stores, charges from special account reports, such as horse and vehicle service, cast welding, gravel pits, etc., are carried in a controlling account on the general ledger called "work orders."

RECAPITULATION OF WORK ORDER CHARGES FOR JOURNAL ENTRY

A recapitulation is made at the end of the month summarizing the total charges to each work order and a journal entry is prepared transferring the work order charges to the proper general ledger accounts.

All charges to the controlling account "work orders" on the general ledger are closed out monthly.

CLASSIFICATION OF WORK ORDER CHARGES

The charges to each work order are recapitulated in accordance with the classification of "capital expenditure accounts," "reserve fund expenditure accounts," or "other accounts," as previously described. The totals of these charges to the respective accounts affected are then transcribed on the "monthly financial report."

MONTHLY WORK ORDER STATEMENT

All work orders are scheduled monthly, showing the work order number, date issued, description, charges current month, year to date, total to date, separated as between "labor" and "sundries," estimate, company and account as between "capital expenditure account," "reserve fund expenditure accounts," etc.

The monthly work order statement is forwarded to all departmental heads, thereby giving them an opportunity to follow the work as to charges and costs.

CLOSING OF WORK ORDERS

When the work covered by a given work order is completed, the coupon attached to the "work order notification" is sent to the accounting department by the department in which the "work order requisition" originated, as a notification to close said work order.

Upon receipt of the notification the accounting department makes an investigation of the work order charges on the books, compares same with the estimate, and if found to be in order, the work order is closed. Differences between actual cost and estimated cost are sometimes accounted for by reason of balances to be paid on contracts or certain credits to be applied which have not been taken on the books and which the other departments may not know of. If the cost does not vary from the estimated more than 5 per cent, the work order is closed, otherwise the accounting department holds the work order open, notifying the department drawing the work order to investigate the charges and furnish an explanation. The accounting department sends out a notice in the form of a letter to all departments, listing the work orders that have been closed. Work orders are always closed out as of the end of the month.

OVERHEAD CHARGES

Prior to Jan. 1, 1911, it was not the practice of The Milwaukee Electric Railway & Light Company to include in its "work order system of accounts" anything for "overhead charges," other than a percentage charge added to "labor" for the use of tools.

The practice since Jan. 1, 1911, has been to add to the actual work order charges covering only "labor" and "sun-

dries," as prescribed by the classification of accounts previously explained, an apportionment of certain charges in operating expense accounts, grouped under "general" and "undistributed," respectively, as well as interest on "current capital expenditures," at the rate of 6 per cent per annum. These items usually approximate about 6 per cent of the "capital expenditure charges" for physical property, or about one-half the amount of the percentage charges used by the Railroad Commission of Wisconsin in making valuations of physical property, including engineering and superintendence 4 per cent, organization and legal expenses 2 per cent, interest 3 per cent, contingencies 3 per cent.

It is not the intention here, in explaining this "work order system of accounts," to deal with the question of overhead charges, further than to refer to it briefly and its relationship to a work order system of accounts, regardless of the question as to what schedule of percentages should be used.

GENERAL

In considering the various features of the work order system explained, it is apparent that the system can be adapted to fit any proposition. Such cost analysis should include comprehensive and practical unit costs.

These unit costs will be found of great value in estimating costs of new work to be undertaken, and also in valuation work, both of which make the keeping of a "work order system" for any business not only desirable but absolutely necessary.

ANNUAL BANQUET

The annual banquet of the Wisconsin Association was held at the Hotel Pfister on the evening of Jan. 13 and was a very successful affair. The number of attendants was 185. C. N. Duffy, vice-president The Milwaukee Electric Railway & Light Company, acted as toastmaster. An address of welcome was made by the Mayor. Irving P. Lord, president of the association, responded to the toast of "Public Utilities and the Public." He said that he preferred the term "public service companies" to "public utility companies," because these companies were formed primarily to serve the public.

Humphrey J. Desmond, editor *Catholic Citizen*, of Milwaukee, responded to the toast "Public Utilities and Sociability." His remarks were received with favor. Charles L. Benjamin, advertising manager Cutler-Hammer Company, in replying to the toast of "Public Utilities and Publicity," said that the reason why public utility corporations should advertise was that they might overcome ignorance. They ought to tell their stories to the public.

Herbert N. Laffin, assistant counselor Northwestern Mutual Life Insurance Company, in discussing "Public Relations and the Citizen," showed the importance of a right attitude toward public questions. August E. Stadelbauer, of Julius Andrae & Son's Company, responded for the supplymen in a witty speech. Sam A. Hobson, Western manager *Electrical World*, spoke on the subject of co-operation.

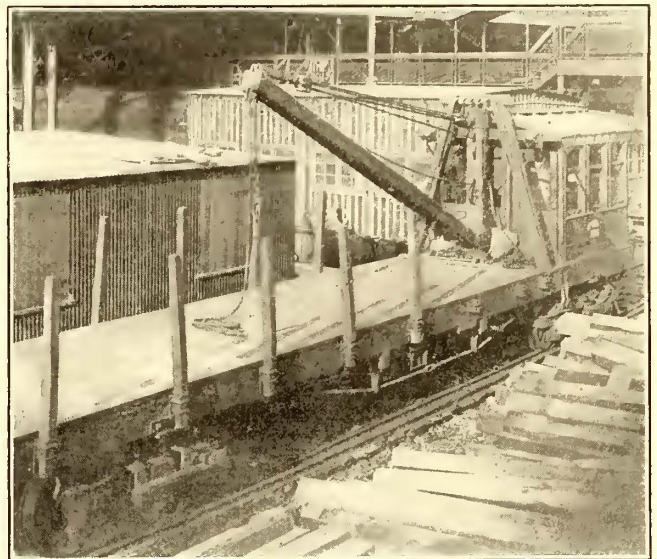
CHICAGO ELEVATED RAILWAY NEW TRACK AND ROADWAY DERRICK CAR

A new derrick car for service in the track and roadway department of the Northwestern Elevated Railroad, Chicago, has been placed in service. It was designed and built by the mechanical department of this company and embodies a number of novel features. In general the car is 46 ft. in over-all length and 8 ft. 6 in. wide, with a cab of the same width as the body and 9 ft. in length at one end. The underframe is of heavy timber construction, well trussed with six 1¼-in. truss rods, giving a maximum capacity of 60,000 lb. The motor equipment is exactly

similar to that used on standard passenger cars, namely, two 75-hp GE type 55 motors with type L-2 controller. These large motors under the derrick car permit it to run at speeds in excess of the standard passenger train. The high speed was considered essential so that this equipment could operate between regular trains running on the Northwestern Elevated system, it being necessary to resort to the permanent cross-overs at passing sidings. Most of the track and roadway work on the elevated structures is done during the day, but there are times during heavy maintenance periods when it is necessary to handle this class of work during twenty-four hours of the day.

The car is wired throughout in conduit and is equipped with automatic air brakes, headlights and markers. Third-rail shoes and overhead trolley pole are provided, so that the car may be used on the surface lines or on the elevated structure. The car is also provided with standard drawbar equipment, to permit its use in switching or handling cars of material. A full set of stakes and stake pockets is provided in the car body, so that timber may be piled for transportation.

The derrick proper has been installed as near the cab as operating conditions will allow, leaving a maximum amount



Chicago Derrick Car for Track and Roadway Department

of car floor space for loading material. The boom is 20 ft. in length and of timber construction reinforced with steel. In order to reduce the space occupied by the cab to a minimum, a single-drum Lidgerwood hoist was installed with a capacity for lifting at a speed of 175 ft. per minute with 1 ton weight on the end of the boom. A 12-hp motor operates the hoist through a set of reduction gears. This arrangement makes it necessary to elevate the boom and swing the load manually, but usually it is kept at a permanent angle with the car floor and may be raised with a load if necessary by attaching a line to the niggerhead which extends beyond the sides of the cab. This niggerhead is also used for snaking loads to a point where they can be handled readily by the line connected to the boom. A hand-operated brake is also included in the hoisting equipment to control the drum in lowering a load.

The motor-control equipment is arranged so that the motorman faces the derrick end of the car in moving it over the road. Windows are provided on all four sides of the cab, however, and permit operation in either direction. The regular derrick crew consists of a motorman and men enough to load and unload material. The motorman not only runs the car over the road, but operates the hoist. Two of these cars are now in service on the Chicago elevated lines.

NOTES ON THE MIDYEAR MEETING

The annual banquet extended by the American Electric Railway Manufacturers' Association to the American Electric Railway Association will be held in the large ballroom of the Astor Hotel, Friday, Jan. 31, at 7 p. m. There will be addresses by General Harries, president American Electric Railway Association, on "The New Partnership;" by Hon. Charles A. Bookwalter, ex-Mayor of Indianapolis, who will consider the treatment which should be accorded to public-utility companies by municipalities, and by Colonel H. P. Bope, first vice-president Carnegie Steel Company, who will discuss the requirements of modern manufacturing. The association expects also to have present a prominent government official, who will speak on the political conditions confronting the new administration at Washington. President Heulings of the Manufacturers' Association will preside as toastmaster, and will make a brief address regarding the outlook for the Manufacturers' Association during the new year, commenting also on the events during 1912, the most successful year in the history of the association.

The dinner committee has had so many requests to permit the wives and daughters of the representatives and guests attending the dinner to occupy boxes in the ballroom during the addresses that it has decided to grant this request. In consequence the Manufacturers' Association has extended an invitation to all representatives of the member companies, as well as their guests, to have their wives and daughters present at this time. The boxes will be open at 9 o'clock, and special tickets for ladies who wish to take advantage of this opportunity to hear the speeches will be furnished upon request by the secretary of the Manufacturers' Association.

The advance sale of tickets for the banquet itself to members of the Manufacturers' Association has been unusually heavy, and applications for dinner tickets as well as for box seats for ladies are still being received in large numbers. Thus far 300 dinner tickets have been purchased by companies and individuals.

During the dinner special music is to be furnished, and this will no doubt add very materially to the many enjoyable features of the banquet. The dinner will, of course, be up to the high standard which has been set at the previous banquets of the association, and it goes without saying that all of those in attendance will have an unusually enjoyable evening. Several special features are to be introduced by the dinner committee, but as these are in the nature of surprises they will not be made public prior to the banquet.

It is absolutely necessary that the Manufacturers' Association shall have the names of all representatives and guests who will attend the dinner, as well as requests for reservation space in the boxes for ladies, on or before Jan. 25, and applications for dinner tickets and box seats should be sent to the American Electric Railway Manufacturers' Association at Suite 1002, 165 Broadway, New York, as soon as possible.

COMMITTEE MEETINGS

A large number of committees of the American Electric Railway Association and its affiliated associations will hold sessions at about the time of the midyear meeting. The sessions begin on Wednesday, when there will be a meeting of the classification committee of the Accountants' Association and the executive committee of the Claim Agents' Association. The executive committee of the American Association will meet Thursday afternoon, Jan. 30, and the executive committee of the Transportation & Traffic Association on the same afternoon, but later in the day. The following is a list of the committees which will meet some time during the midyear period:

American Association: Committees on subjects, insurance, education, welfare of employees, federal relations,

compensation for carrying United States mail, public relations, determining proper basis for rates and fares, relations with sectional associations, *Aera* advisory and company sections.

Accountants' Association: Executive, classification, education and all joint committees.

Engineering Association: Power generation, equipment, heavy electric traction, buildings and structures, and all joint committees.

Transportation & Traffic Association: Rules, passenger traffic, express and freight traffic, construction of schedules and timetables, fares and transfers, training of transportation employees, train operation, uniform definitions and all joint committees.

Claims Association: Executive, subjects.

C. L. Henry, chairman of the committee to consider relations with sectional associations, has extended an invitation to the presidents of all of the sectional associations and other national associations on this continent to be present at the meeting of that committee or to send a representative to discuss matters within the scope of the work of the committee.

HEARING ON HEATING ORDER IN NEW YORK

A hearing was held on Jan. 13, 1913, before the Public Service Commission of the First District of New York on the application of the New York (N. Y.) Railways for an extension until April 1 of the time within which the order adopted by the commission on April 26, 1912, for the adequate heating and ventilation of vestibuled cars should become effective. J. S. Doyle, superintendent of car equipment of the company, testified that the pay-as-you-enter cars had furnished a most difficult problem, and that if an unlimited amount of fresh air were provided it was doubtful if the present power houses could supply enough power to maintain a minimum temperature of 40 deg. Fahr. Many devices had been tried. The devices which the management considers best have been installed on the stepless cars now in service and will be used in the 175 stepless cars that have been ordered. Clifton W. Wilder, electrical engineer to the commission, said that it would be physically impossible to install the new apparatus on all of the cars of the company this winter without crippling the service. The commission took the matter under advisement.

INSPECTION OF GOVERNMENT FUEL PURCHASES

The inspection of coal purchased for the government is conducted from the headquarters of the Bureau of Mines in Washington, where the engineer in charge of inspection is stationed and the laboratory for analyzing samples of deliveries is situated. On coal contracts the bidders guarantee the quality of the coal they offer, and the quality guaranteed by the successful bidder becomes the standard of his contract. A large part of the coal used by the government for its power plants, public buildings and naval stations is purchased under contracts that specify the ash and moisture content, the heating value, the limits of the volatile matter, and the sulphur content. The analyses of samples of deliveries determine whether the quality of the coal is up to the standards guaranteed by the contractor. If it is not, the price to be paid is decreased in proportion to the lower value of the coal. If the coal is of higher quality the price is increased proportionately.

In the fiscal year 1912 the purchases of coal by the government, under specifications providing for payment according to the quality of the coal delivered, amounted to approximately 1,500,000 tons, costing \$4,750,000. The purchases of 1912 show an increase over those of 1911 of approximately 408,600 tons, costing about \$1,666,000, the increase in tonnage being 37 per cent.

A SUGGESTED LIGHT SIGNAL SYSTEM

GREAT NORTHERN RAILWAY ELECTRIFICATION IN MONTANA

BY EDWARD P. BURCH, MINNEAPOLIS

A novel light signal system has suggested itself to Gaylord Thompson, chief engineer of the Ohio Electric Railway. As Mr. Thompson has no idea of patenting this system, he is anxious to obtain criticisms and suggestions from different engineers interested in it, and a description is presented herewith.

If two trolley wires were arranged as shown in the diagram and insulated by means of line section insulators, one wire being fed through a tap containing a solenoid and the other containing a broken circuit which is closed by the de-energized solenoid, it will be seen that when current is being taken from trolley *A*, shown in the diagram, the solenoid will open the feeder tap of trolley *B*, and consequently *B* will be dead. If a series of lights was "floated" between trolley *A* and trolley *B*, the instant that the two cars came into the block these lamps would light, thus warning each car of the approach of the other.

APPLICATION

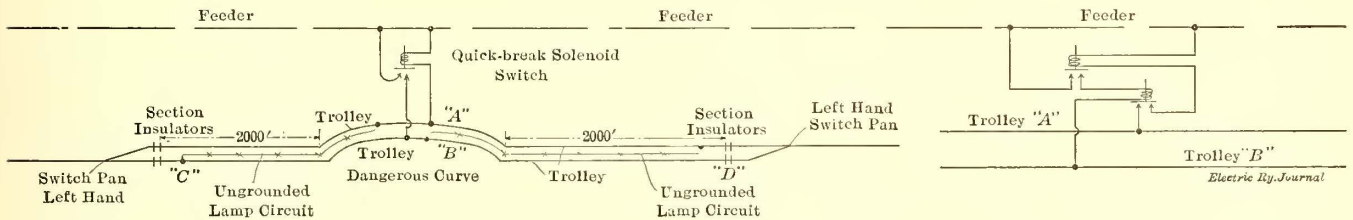
While the system could be made continuous over any mileage, its special use would be in the prevention of head-on collisions at dangerous curves. With such protection, the device would, in effect, make the operating division where it will be employed the equivalent of a straight line from one end to the other.

Cars overrunning their orders, or for any reason trespassing on this section of track, would be advised of the approach of other cars in time to stop. The circuit-breakers should be installed, each at a distance of about 2000 ft. from the curve to be protected. This would make 2000 ft. the

The recent news item in Eastern papers that the Great Northern Railway is to electrify its proposed Montana Eastern Railway, a prairie road between New Rockford, N. D., and Lewistown, Mont., a distance of 530 miles, is not based, so far as known, on any real decision of the railroad directors. The roadbed, tunnel and other construction contracts have been awarded, but it may be two years before the road is completed. The reasons why this new competitive road could be electrified to its financial advantage are not apparent, but it is surmised by those in touch with the general situation that some definite and controlling situation or opportunity may be involved.

In the case of the Denver, Rio Grande & Western Railroad, which has recently decided to electrify two complete engine divisions, one 115 miles long and one 85 miles long, the reasons were clear. A mountain range had to be crossed, grades were severe, traffic was heavy, capacity was limited and fuel was expensive. The directors appropriated funds for the electrification, and Vice-president Brown has stated: "Our plans are in the interest of economy in operating expenses." It is evident that capacity would be increased, and the use of water power for electric traction would provide a cheaper motive power.

These reasons do not seem to apply to the case of the proposed Great Northern electrification of the Montana



Proposed Method of Protecting Dangerous Curve

Double Switch Scheme

minimum distance apart at which the approaching cars could see each other. Ordinarily *C* and *D* should be placed about 1 mile apart, or the system could be made to embrace a 3-mile section between passing points in which the view is obstructed. In either case the feeder tap should be located at about the middle of the protected section so as to reduce the drop in voltage to a minimum.

It is obvious that to make the system effective, both cars must draw current or have their controllers on at the same time. To insure this result on a continuous block system the live wire should be placed for the car ascending the grade and for isolated installations. In addition special instructions should be issued to the motormen. In actual practice, however, with points *C* and *D* 1 mile or 1½ miles apart, the condition of the controllers that could give the warning flash of the lights would be certain to occur before a dangerous condition was reached by the two cars in their approach toward each other.

As the light circuit is not a grounded circuit it would not be subject to derangement or the troubles of ordinary grounded light wires. The maintenance cost would be practically nothing, and the cost of installation for two No. 000 trolley wires and fixtures would be between \$1,200 and \$1,500 per mile.

One question which arises is whether the energy should be taken from one trolley wire only, or whether a double switch should be used. This would take the current away from the transgressing car at the entrance to a protected section. A sketch showing the arrangement of the feeder taps and solenoids with a double switch is also included.

Eastern. There are, however, at least two economic reasons why the proposed electrification might prove advantageous:

The fuel which is now used in Dakota and Montana has increased greatly in price during recent years. However, vast beds of brown lignite are found in Dakota and Montana, and the development of this great natural resource now requires a greater demand for the fuel as well as the backing of a strong corporation. Brown lignite crops out at many points along the proposed right-of-way. This lignite cannot be burned in locomotive boilers, but it is easily handled in stationary boiler plants equipped with mechanical stokers. This lignite can be used also by gas producers and gas engines with great economy. The energy from lignite heat can be converted into electrical energy and sent 100 miles east and west from many central power stations without great loss and in a most reliable manner.

The railroads which operate the most extensive electric systems in America claim that in the electrical operation of main-line traffic 50 per cent of the fuel bill is saved, and in switching operations or for classification yards 60 per cent is saved. Based on the relative cost of the steam fuel now used and brown Dakota lignite, the use of electric power on the Great Northern might reduce the fuel expense even more than 50 per cent.

In Europe it was the matter of economy of fuel which stimulated the great interest in railroad electrification, especially in Prussia, France, Switzerland and Italy.

One of the heaviest railroad operating expenses in the Dakotas and in Montana is that incident to the high cost

of boiler flue repairs. These repairs are occasioned by the water, which is detrimental. The alkali and also acid waters, and combinations of the two, found within a single engine stage cause a great amount of pitting and also incrustation of fire boxes and flues. The efficiency of the boilers is lowered, and the cost of fuel is thus considerably increased. Then, in the boiler repair shops the maintenance and repair account is excessive because of the deterioration of the boiler from the bad water and also because of the high wages paid to locomotive repair men.

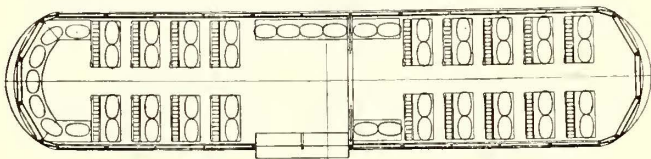
With electric power water for boilers can be obtained at the best sites or can be treated at a single point and then used over and over again in the condensing operation of steam turbines or as cooling water for gas engines.

The Great Northern Railway at the present time owns or controls many important electric railroads, including the Spokane & Inland Empire Railroad, which uses electric power on 248 miles of track; the Oregon Electric Railway, from Portland to Eugene, 121 miles; the United Railway system at Portland and other electric railways. The Cascade Tunnel track, which was electrified several years ago, handles heavy traffic under severe conditions. Electrification of main lines for heavy freight and passenger service is not a new matter with the directors.

It is surmised that the proposed road from Lewistown, Mont., to Rockford, N. D., is but the beginning of electrical operations, and that when the traffic density has increased the road from Lewistown to Great Falls, Mont., may be electrified to utilize the water powers already developed along the Missouri River.

NEW DENVER TRAIL CAR

The Denver City Tramway, one of the pioneer operators of side-entrance cars, has placed in service a new type of one-way trailer which follows closely the design of the company's standard side-entrance car. As shown in the accompanying plan, a partition now incloses the forward section of the trailer, leaving the rear compartment open for the passengers who prefer fresh air, with the usual reservations for smokers. On former trailers the opening



Seating Plan of Denver Side-Entrance Trailer

was 100 in. wide. On the new type, however, the opening for entrance and exit has been reduced to 67 in., which distance has proved ample. The lower step is only 13½ in. above the rail without allowing a further ½ in. for settlement. The double sliding doors which open into the closed compartment afford a passage of 36 in. in the clear.

The seating capacity has been increased from forty-six to fifty-one, partly by the addition of a circular seat at the rear. Greater riding comfort has been assured by using as many transverse seats as practicable and by furnishing the closed compartment with thermostat-controlled electric heaters.

With the exception of Brazilian government roads, the principal railway enterprises in Brazil have been built with English money and are controlled and operated by English companies and managers. However, many railways recently constructed and now under construction by companies controlled by American and Canadian syndicates are being financed in France, where \$100,000,000 was invested during the past three years in Brazilian railways. Most of the equipment, rolling stock and rails for these roads has been purchased in Great Britain, Germany, the United States and Belgium.

COMPARATIVE EARNINGS OF PUBLIC UTILITIES

White, Weld & Company, New York, have recently compiled and issued a chart comparing the increase of gross and net earnings during the past ten years of ten steam railroads, ten gas companies, ten electric light and power companies and ten electric railway companies which might be considered as fairly representative of the industry and, with the possible exception of the gas companies, fairly well distributed throughout the country. In the gas group of public utilities, owing to the lack of generally published statistics covering the ten-year term, a larger number of companies had to be selected from Massachusetts, where these figures are available, than would otherwise have been the case. The chart is reproduced herewith. The names of the companies selected for this comparison follow:

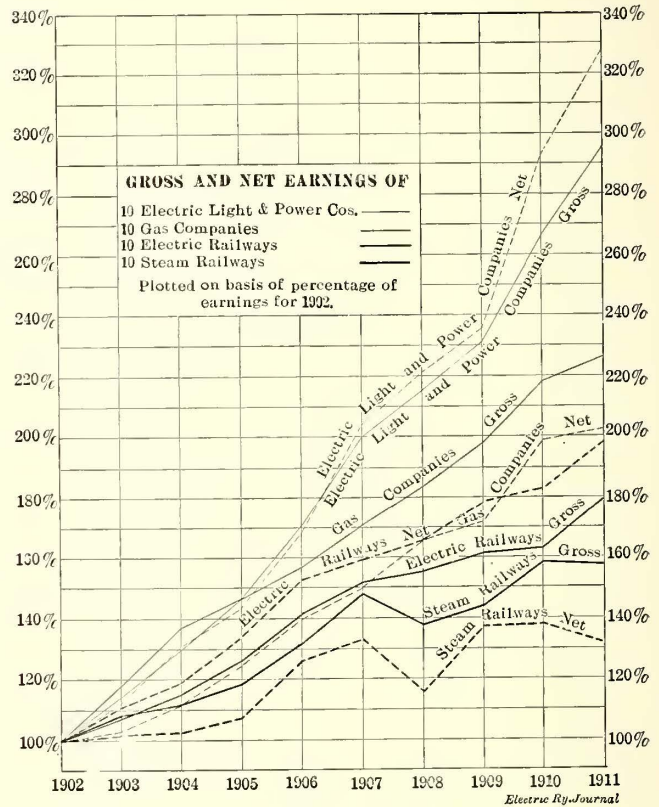


Chart Showing Statistics of Forty Public Utility Companies

Steam railroads: Atchison, Topeka & Santa Fé; Chicago, Milwaukee & St. Paul; Chicago & Northwestern; Erie; Northern Pacific; Pennsylvania; Union Pacific; Southern Pacific; Norfolk & Western; New York Central & Hudson River.

Gas companies: Consumers' Gas, Toronto; Hartford City Gas, Hartford, Conn.; Portland Gas & Coke, Portland, Ore.; Laclede Gas, St. Louis, Mo.; Aberdeen (S. D.) Gas; Worcester (Mass.) Gas; Springfield (Mass.) Gas; Haverhill (Mass.) Gas; Cambridge (Mass.) Gas; Peekskill Lighting & Railway (gas department).

Electric light and power companies: Cleveland Electric Illuminating; Washington Water Power, Spokane, Wash.; Minneapolis General Electric; Lowell Electric Light; Edison Electric Illuminating, Brockton, Mass.; Kings County & Edison Companies, Brooklyn; United Electric Light, Springfield, Mass.; Edison Electric, Los Angeles; Duluth Edison Electric; Edison Electric Illuminating, Boston.

Electric railway companies: Brooklyn Rapid Transit; Twin City Rapid Transit; Denver City Tramway; Capital Traction, Washington, D. C.; Indiana Union Traction; Louisville Railway; Detroit United Railway; Lake Shore Electric Railway; Memphis Street Railway; Boston Elevated Railway.

It is interesting to note the relative direction of the lines for gross and net for the different classes of properties, especially their direction during the past years as illustrative of general conditions. The steam railway group shows the least percentage of increase, both in gross and net, and during the past two years the line showing the net increase has been falling rapidly below the gross increase.

In the electric railway division, which shows the next higher increase for both gross and net during the past ten years, the net earnings have grown more rapidly during the past five years than the gross earnings, but most of this gain was in 1908 and 1909, and since that time the lines have kept at about the same distance apart, showing that there has been no improvement in the operating ratio.

The two lines representing the earnings of the gas companies come next and for the past six years show a fairly constant ratio between the two classes of earnings.

The electric light and power figures are especially notable because of the increase of the gross earnings shown of 294 per cent since 1902, while the net earnings increase is 328 per cent. The net earnings began to increase more rapidly than the gross earnings about 1907, and since that time have grown very much more rapidly, especially during the past two years, as the divergence between the two lines shows. Their position in relation to each other and to the other classes of public utilities is good evidence of the reason for the popularity which this class of securities possesses.

SOCIETY FOR ELECTRICAL DEVELOPMENT

At a meeting held in New York, Jan. 14, the following officers were elected by the Society for Electrical Development: President, Henry L. Doherty; vice-presidents, Ernest Freeman, A. W. Burchard, W. H. Johnson, J. R. Crouse and W. E. Robertson. The above, with L. A. Osborne, Gerard Swope and J. R. Strong, compose the executive committee. The complete board also includes the following: A. C. Einstein, W. W. Low, J. E. Montague, F. S. Price, J. F. Gilchrist, Roger Scudder, A. W. Burchard, E. McCleary, P. N. Thorpe, B. M. Downs, W. A. Lyman and G. M. Sanborn. J. M. Wakeman was appointed general manager and Philip S. Dodd, secretary and treasurer. Both Mr. Wakeman and Mr. Dodd are well known in the electrical industry and have a very intimate acquaintance with publicity problems of the kind involved in the present propaganda on behalf of electrical development.

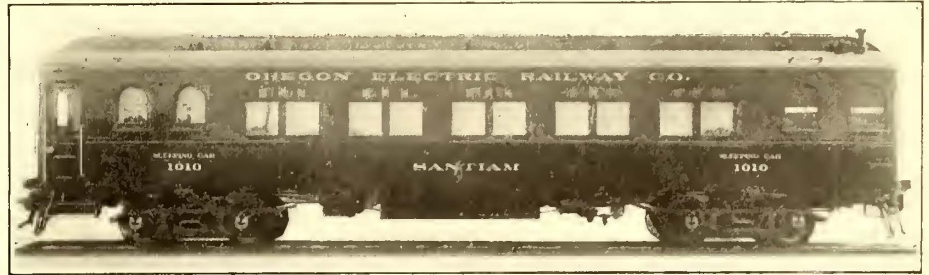
The work of the society will be devoted to various lines of effort for the greater development of the electrical industry at large, and will be carried out along broad-gauge lines aiming to increase in every way the uses of electricity, especially for lighting, heating and motor service.

The membership of the society, as stated in the by-laws, is open to every interest in the electrical industry, and the subscriptions, based upon a small percentage of the gross business, are so small individually that it is believed that the full co-operation of every concern in the electrical industry can be secured.

The society has the indorsement of the executive committee of the National Electrical Contractors' Association, the National Electrical Supply Jobbers' Association, the executive and public-policy committees of the National Electric Light Association, together with the support of a large number of manufacturers, both large and small. With such indorsement there can be very little question of its practicability and value to the industry at large.

SLEEPING CARS FOR OREGON ELECTRIC RAILWAY

The Oregon Electric Railway Company, which is developing an extensive electric railway system in the Willamette Valley in Oregon, has recently added to its passenger equipment two very handsome new trailer sleeping cars, which were built at the works of the Barney & Smith Car Company, Dayton, Ohio. The new cars are 57 ft. long over buffers and 9 ft. 4¾ in. wide over side sills. They have composite wood and steel underframes, with wood superstructure, and are mounted on all-metal four-wheel trucks with rolled-steel wheels. The sleeping com-



Sleeping Car of Oregon Electric Railway

partment contains ten standard sleeping-car sections.

The general layout is similar to that of regular steam railway sleeping cars. Adjoining the sleeping compartment at one end of car is the men's lavatory and smoking room and at the other end of the car is the women's toilet, both having ample toilet facilities, including dental bowls. The floors of the lavatories are covered with inlaid rubber, and in the smoking room is a large sofa upholstered in Spanish leather. The cars have a Smith hot-water heater and are electrically lighted by means of storage batteries, the lighting fixtures being of a very attractive pattern. For ventilation they are supplied with ten automatic ventilators per car. They will be operated as trailers.

The cars are finished inside in handsomely figured mahogany with inlaid lines and marquetry figures in neat design. The floor covering in the main compartment is Wilton carpet, the seats are upholstered in figured frieze plush and the trimmings throughout the car are statuary bronze. The ceilings are decorated in green and gold.

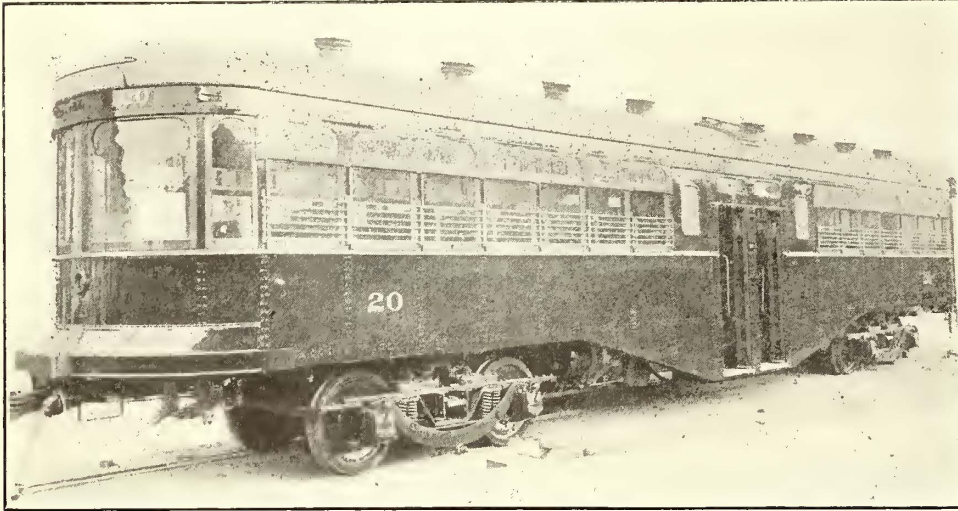
These cars are equipped with Westinghouse schedule A.T.R. air brakes, Railway Company's type of radial draft rigging, steel trap doors—in short, they are well supplied with modern special equipment and possess every convenience and comfort of a high-class steam railway sleeping car. The accompanying photo-engraving serves to give a good general idea of the appearance of these cars.

The pioneer electric railway to put sleeping cars in service was the Illinois Traction System, whose sleeping cars are of a special type with windows for the upper berths. The sleepers of the Oregon Electric Railway, as described, are not different in design from those used on steam roads but are of interest because of their use in electric service.

The second annual report of the director of the Bureau of Mines states that the results of the bureau's investigations show that peat, if properly prepared and well dried, has a greater heating value than wood, and that if its freedom from ash, clinkers and sulphur is considered, as well as its giving off little smoke and burning up completely, it compares favorably with anthracite. In addition, it is stated to be possible in many places to put peat on the market near the point of preparation at less than half the present prices of the better-known fuels. However, many attempts at peat utilization in this country during the past decade have proved impracticable.

CENTER-ENTRANCE INTERURBAN CARS FOR THE KANSAS CITY, CLAY COUNTY & ST. JOSEPH RAILWAY

By March, 1913, the most important electric railway project in the Central West will be completed and in operation, namely, the Kansas City, Clay County & St. Joseph Railway.



Center-Entrance Interurban Car—View Showing Open Doors and Interior Steps

This line was designed and is being built for high-speed passenger and freight service between Kansas City and St. Joseph, Mo., a distance of 53.7 miles, and between Kansas City and Excelsior Springs by way of a branch 26.2 miles in length, leaving the main line just outside of Kansas City. By constructing along the bluffs bordering the Missouri River, instead of following the river valley, as did the steam roads, both the main and branch lines are more than 10 miles shorter than the steam road routes. Excelsior Springs is a popular health resort of about 12,000 population. St. Joseph is a city of 100,000 people, and it is touched by a number of steam road trunk lines which do not have their own connections into Kansas City. The two cities are the objective points of the enterprise, together with the fact that the road taps a rich farming district not served by steam roads. When complete the line will be one of the best built and equipped electric railways in the Central West.

The cars with which the new line will be equipped are of the center-entrance, drop-side type, similar in many respects

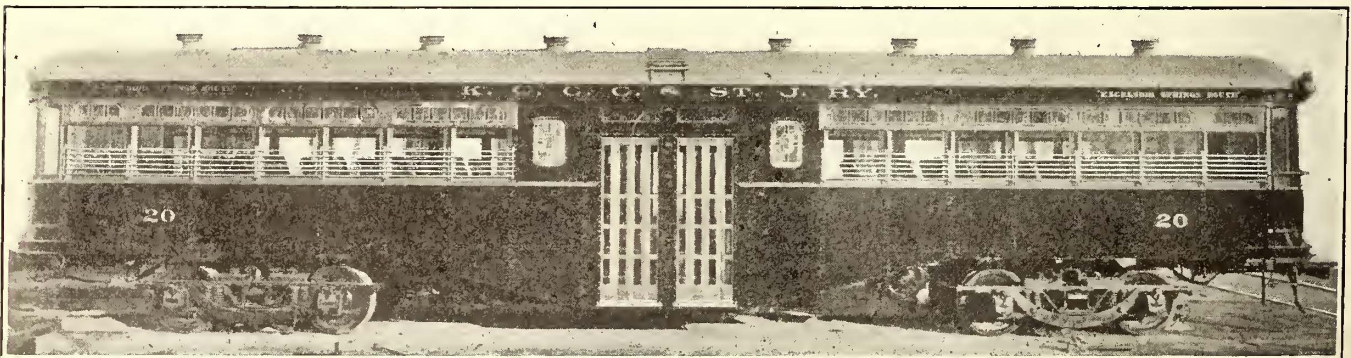
the inside face of the couplers. The extreme width over the eaves is 9 ft. and over the sills it is 8 ft. 10 in. At the center portion of the car is a vestibule or well 7 ft. long which is used for an entrance space and is furnished with interior steps so that no obstruction at any time extends beyond the side of the car.

In general the car is designed for single-end operation and a permanent motorman's compartment is located at the front end. However, in case of an emergency it is planned to use the cars for double-end operation, and at the rear a removable section of the semicircular end seat is provided. Under this are located a controller and brake valve so that by removing the seat the car can be satisfactorily operated from the rear end. The car is also provided with two trolley poles in order to facilitate regular double-end operation in case it should become necessary.

The entrance space at the center of the car is separated from the two ends by bulkheads with swinging doors. The front portion of the car is used as a standard coach compartment and in this section is a saloon about 3 ft. square, in one corner of which is a water cooler. The rear end of the car is used as a smoking compartment and includes a semicircular space at the extreme rear end surrounded by a seat and affording an unusually desirable arrangement as an observation space. At one of the front corners of the smoking compartment a Peter Smith hot-water heater is installed during cold weather. It takes the place of one of the seats, which is replaced in the summer time when the heater is removed.

The seating capacity of the car is sixty-six, all of the seats being transverse except the four longitudinal seats which are part of the semicircular seat at the rear end. Contrary to the arrangement originally developed by the builders for this type of car, no folding seats are provided in the entrance compartment for use on the side of the car opposite to the entrance door. In this case both of the entrance doors are always available.

The car is built of steel practically throughout. The frame is of T-bar construction similar to that used with the car exhibited at Chicago. The new car has, however, a dif-



Center-Entrance Interurban Car—Side View Showing General Appearance of Exterior

ferently shaped roof and ends, and it is of considerably heavier construction. The roof and siding are made of steel plate, the underside of the roof being finished in white enamel. The car is insulated throughout with sheets of cork, 1 in. thick, which are cemented to the steel plating which forms the sides and roof.

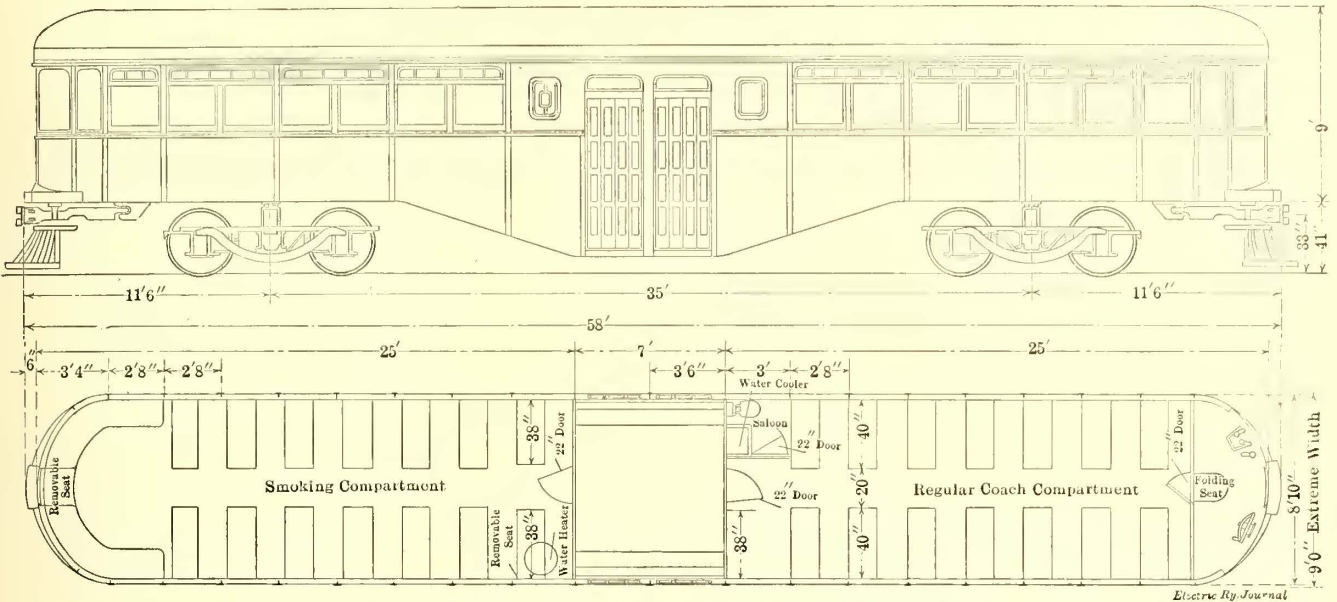
The over-all length of the car is 58 ft. measured from

to the car of this type which was exhibited by the Cincinnati Car Company at the Chicago convention and created much favorable comment. The initial equipment will consist of sixteen cars and these are now in process of construction by the Cincinnati Car Company.

The windows slide in pressed-brass grooves which are riveted to the side posts, the latter being made up of T-shaped sections. The sash fittings are constructed so that they can be removed by withdrawing two bolts located at the upper end of each sash, permitting the car to be completely stripped for overhauling without removing any of the woodwork, the interior finish used throughout the car including

plugs without leaving the car. The rear end has permanent plate-glass windows with a narrow one at the center corresponding to the arrangement at the front end. This center window is, however, fitted with a stationary lower sash, the top sash being arranged to drop in order that the conductor may be able to handle the trolley pole.

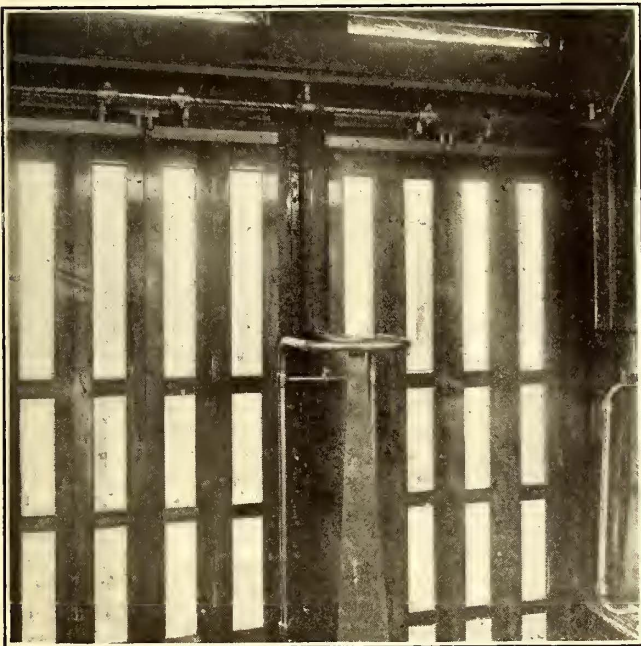
As previously mentioned, an entrance space is provided at



Center-Entrance Interurban Car—Plan and Elevation

the covering of the side posts consisting of mahogany. The ends of the car are inclosed by semicircular plate-glass windows. The narrow window in the center at the front end, shown in the accompanying halftone, is double-sashed and arranged so that the upper sash drops and the lower one can be raised. In consequence, the motorman

the center of the car. No other doors of any description are installed, the motorman having access to his cab only through the body of the car and handling signal lights and markers through open windows. The entrance space has a floor depressed 9 in. from that of the two main compartments at each end of the car, the main floor being 41 in.



Center-Entrance Interurban Car—Door and Door Operating Mechanism



Center-Entrance Interurban Car—Interior View Looking Toward Rear

when standing can drop the top sash, or when seated he can raise the lower one in order to give an unobstructed vision with a minimum of exposure to the weather.

Two narrow windows are located at the corners of the car and these are mounted on hinges and open inwardly to permit the motorman to handle signal lights and telephone

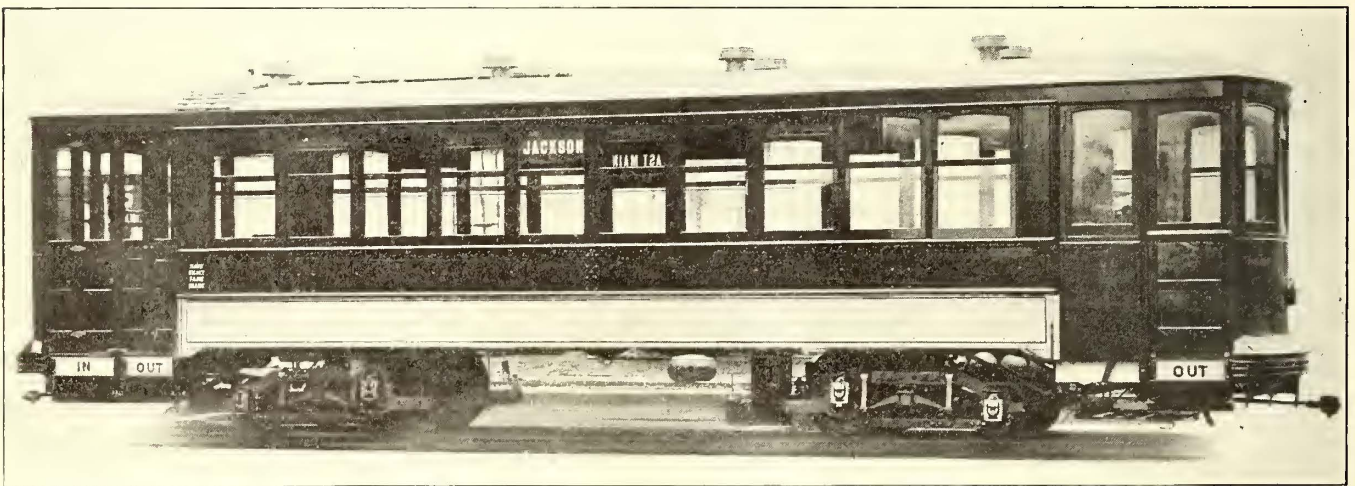
from the top of the rail. This total rise is divided into four steps, including the 9-in. rise from the drop platform to the main floor level. From the rail to the first step the rise is 17 in. and the second and third steps each have a rise of 12 in. The steps are interior and are carried by the drop siding which is provided at the center of the car.

Access to the car is effected through folding doors which when closed are practically flush with the car siding. Two Edwards steel double doors are provided on each side of the car, the pair of double doors on each side being separated by a permanent post, which divides the doorway into two parts each about 3 ft. wide. Each half of the double door which extends across this 3-ft. doorway is hinged in the middle so that the door is divided into four sections, each of which is about 9 in. wide. This subdivision into narrow sections permits the doors to be folded up over the first step and against the sides of each doorway so that the full width is available for entrance. While the separation of the doorway into two 3-ft. passages permits the use of a separate entrance and exit if desired, the cars are to be operated for the present on the "exit first" principle.

The operation is manual, the doors being folded up by means of pull rods actuated by a screw with a very high pitch. The screw is revolved by a chain which is led back to the operating handles near the center of the entrance space. This arrangement, which is patented by the Cincinnati Car Company, is exactly similar to that which was installed on

A NEW PAY-WITHIN CAR FOR THE MICHIGAN UNITED TRACTION COMPANY

The Michigan United Traction Company has recently had built by the G. C. Kuhlman Car Company twenty pay-within cars with a novel arrangement of platforms and seats. The cars are intended strictly for single-end operation, and the front platform, 6 ft. 4 in. in length, is occupied by a glass-enclosed motorman's compartment, a space for the heater and an exit passenger way. The front platform is, however, not separated from the body of the car by the customary partition, the space normally occupied by the bulkhead being open for practically the entire width of the car, except for two vertical posts used as hand-holds. The motorman's compartment, which has a clear length longitudinally of approximately 3 ft., contains, in addition to the controller and brake, boxes for sand and coal. The glass partition does not completely inclose the compartment, and on one side, that next to the entrance door, isolation of the motorman is effected by a removable rail. This feature permits the motorman to have an unobstructed view of the



Michigan United Traction—Single-End Pay-Within Car

the car exhibited in Chicago, except that no folding seats are provided to be extended along the unused door.

EQUIPMENT AND FITTINGS

The road is to be operated on a 1500-volt overhead-trolley system, and each car is equipped with four GE-225 1500-volt motors, which are rated at 125 hp. Air brakes of the General Electric type are provided. The trucks are of the Baldwin M. C. B. type and are spaced on 35-ft. centers, the car being carried at a considerable elevation to obtain easy-riding qualities.

The interior fittings of the car consist of Hale & Kilburn "walk-over" seats which are covered with upholstered leather in the smoking compartment and with plush in the regular passenger compartment. The mahogany used in the interior is finished in the natural wood and the metallic fittings are made of light statuary bronze, so that the interior appearance of the car is unusually luxurious. Each car is ventilated by sixteen of the Cincinnati Car Company's "Utility" ventilators of improved Globe type. These are adjusted by hand through dampers set in the ceiling.

The record of passenger train performances on the steam railroads of New York State for October shows that during the month the number of trains run was 66,929. Of the number of trains run 81 per cent were on time at the division terminal. The average delay for each late train was 26.4 minutes, and the average delay for each train run was 5 minutes. In November the average delay for each late train was 25.9 minutes and for each train run 4.6 minutes, 82 per cent of all trains being on time.

front exit door and permits him in case of emergency to reach the doorway promptly.

The whole rear platform is available as floor space for entering and leaving passengers, the space for the latter being reduced to a minimum. This platform is 7 ft. long as measured from the posts to the extreme end of the bumper, and with a 26-in. exit door this permits the entrance to be 32 in. wide. The position of the conductor is in the center of the car body just inside the rear bulkhead. He stands facing toward the rear end, and when in this position he can operate the doors and an International cash register, the latter being worked by two foot pedals, one of which is provided for cash fares and the other for transfers.

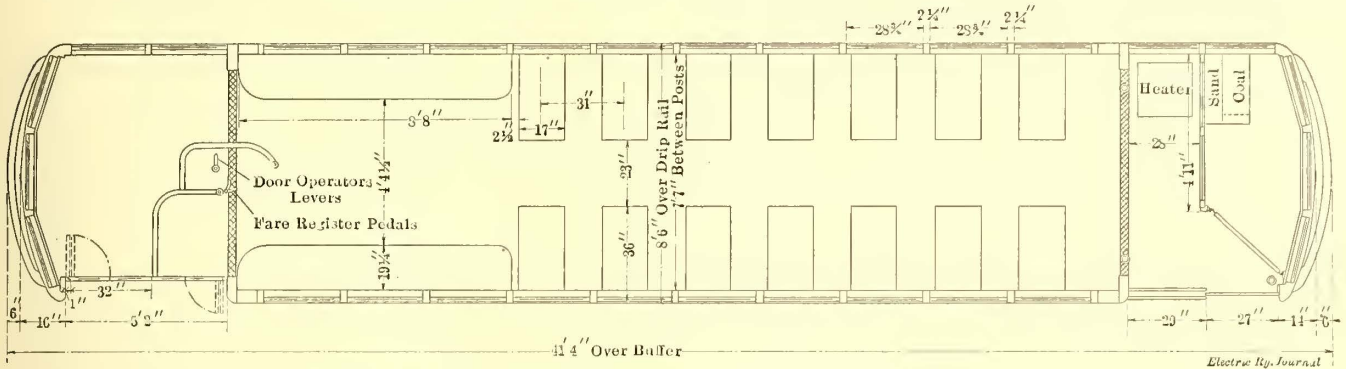
As shown by the accompanying plan of the car, the arrangement of the railings on the rear platform is unusual. The shorter section inclosing the standard for the door-operating levers is so arranged in order that in the future a fare box may be installed. The cars, however, are not at present equipped with fare boxes. The extension of this railing into the body of the car is for the purpose of separating the entering passengers from the conductor when he is standing in his normal position. As is the case at the front end of the car, no partition is provided between the rear platform and the car body and the opening is made practically the full width of the platform. The step is, however, set in from the edge of the side sill about 10 in.

Folding doors are provided at the rear end, the exit door folding up outside of the step line and the entrance door folding inside over the floor of the platform. These two doors are operated independently by hand levers carried

up in a standard just back of the normal position for the conductor and readily accessible for him. The exit door on the front platform is of the sliding type 27 in. wide and is operated by the motorman.

A combination of longitudinal and cross seats is provided, the longitudinal seats being at the rear end in order to provide additional standing space at that point. They are 8 ft. 8 in. long and 19¼ in. wide, seating, on both sides,

made up of 5-in. x 4-in. x ¾-in. angles riveted to the bottom edges of the side plates, which are of ¼-in. steel 36 in. high. The latter are made in two pieces with splices at the center of the car. Along the top edge of each plate is riveted a 2-in. x 1-in. x ¼-in. angle. The center sill consists of one 8-in. channel weighing 11¼ lb. per foot laid flat with the flanges downward. This is framed into the end sills, which are made of 10-in. channels weighing



Michigan United Traction—Plan of New Pay-Within Car

twelve passengers. The cross seats, which are 32 in. in length and give a 23-in. aisle in the center of the car, are spaced on 31-in. centers, each seat being 17 in. wide. These give a seating capacity of twenty-eight, so that the total number of seated passengers for which the car provides is forty. No seats are provided on the front platform, as the available space there not occupied by the heater or the motorman's compartment is intended to provide an easy and convenient exit.

The principal dimensions are as follows:

Length of car body.....	28 ft. 0 in.
Length of front platform.....	5 ft. 10 in.
Length of rear platform.....	6 ft. 6 in.
Length of car over vestibule sheathing.....	40 ft. 4 in.
Length of car over bumpers.....	41 ft. 4 in.
Seating capacity.....	40
Bolster centers.....	19 ft. 0 in.

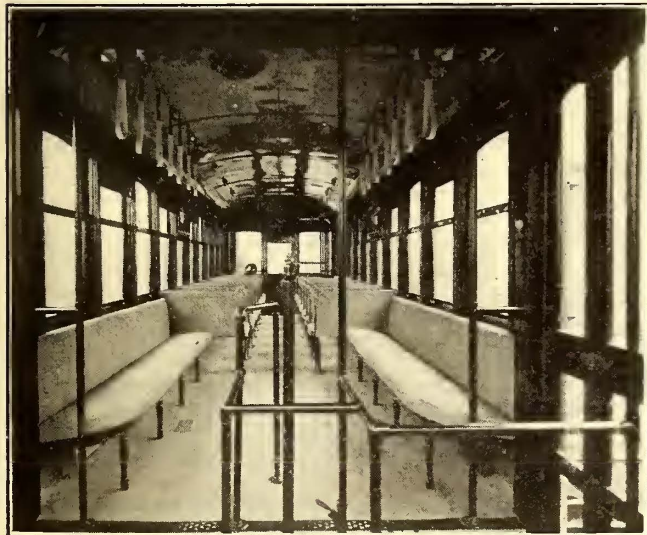
15 lb. per ft. and are set with the flanges extending outward.

The roof is of the plain-arch type supported on wood purlins and finished on the inside with the customary head-lining. Globe ventilators are installed in the roof along the extreme outside edges. The floor is made of composition, ⅝ in. thick at the thinnest point, and supported with Keystone corrugated galvanized iron of No. 20 gage. No trap doors are installed. The body bolsters are of built-up design, consisting of 1-in. x 8-in. steel plates, and are riveted to the angles which form the side sills. The bumpers are 7-in., 10¼-lb. Hedley anti-climbers installed so that they come flush with the top of the platform floor. The platform flooring is made of 1-in. hard maple with V notches at the joints.

The weights of the car and its equipment are as follows:

Car body, including seats, heater and cables.....	18,000 lb.
Electrical equipment.....	6,752 lb.
Trucks.....	10,520 lb.
Air brakes.....	1,235 lb.
Total weight.....	36,507 lb.

The heater is of the Peter Smith 2-P type, which furnishes hot air to the car by a fan blast. Coal is used for fuel. Standard Motor Truck Company's 036 trucks are installed with Griffin cast wheels and Midvale heat-treated axles designed in accordance with the A. E. R. A. standard. The trucks are equipped with Baltimore ball-bearing center plates. Other items included in the equipment are National air compressors and engineers' valves, Electric Service Supply Company's air gong and sanders and Consolidated Car Heating Company's buzzers. Hunter illuminated ear signs are installed at the front and sides of the car. The motor equipments, which were installed by the railway company, are of the four-motor type with GE-210 motors, the controllers being of the K-36-F type. All wire for power circuits was laid in conduit.



Michigan United Traction—Interior of Pay-Within Car from Rear End

Centers of side posts.....	2 ft. 7 in.
Width of body over sill plates.....	8 ft. 2 in.
Width over side posts above belt rail.....	8 ft. 2 in.
Extreme width of car over belt rails.....	8 ft. 6 in.
Height from rail to under side trolley base.....	11 ft. 2¼ in.
Height bottom of sill to top of roof.....	8 ft. 5¼ in.
Height from floor to under side of ceiling.....	7 ft. 6 in.
Height of vestibule door openings.....	6 ft. 11 in.

The cars are constructed with steel underframes and steel sides up to the belt rail, the sides being straight between the eaves and the sills. The steel underframe is

A coal company which, according to the monthly vehicle publication of the Denver Gas & Electric Company, has had exceptional opportunity for studying its electric delivery service employs a car which hauled 435 tons of coal in one month. It covered 63 miles in a day and the record number of trips was seven. The truck was in service 229 hours, but it was engaged in hauling only 126 hours, 103 hours being required to load and unload it. The total mileage for the machine for the whole month was 1005 miles. It took 119 trips, averaging 8½ miles each, to accomplish that distance.

News of Electric Railways

Subway and Other Questions in Cleveland

J. J. Stanley, president of the Cleveland (Ohio) Railway, stated recently that the company would be willing to build a subway and begin the work at once if the city so desires and is willing to grant a franchise that will enable it to finance the proposition. Mr. Stanley said that underground terminals for the surface cars are badly needed. He favors beginning work under the Public Square and extending the line east and west.

In the dispute between the company and the street railway men's union in regard to punishing men for not making schedule time and for running past people at the regular stops, the arbitrators decided in favor of the company on Jan. 9. The union had already withdrawn its complaints in three cases.

A voluntary organization known as the "Mufs" has come into existence in Cleveland through the requests made by conductors to move up forward when cars are crowded. A badge is placed on all persons who agree to affiliate with the "Mufs," and it is hoped that taking positions as far up in the cars as possible will come to be a habit. Mr. Stanley approved the idea and had posters reading "Please move up forward" printed and placed in all the cars. The *Cleveland News* started the movement. The labor organizations have taken it up and Peter Hasenpflug, organizer for the Cleveland Federation of Labor, is acting as organizer for the "Mufs."

In his semi-annual report to the City Council Street Railway Commissioner Peter Witt said that he had proposed to the Chamber of Commerce a plan to relieve the rush in the evenings. He asks that organization to take the matter up with the manufacturers and have them dismiss their employees at various times between 5.15 p. m. and 5.45 p. m., so that the rush traffic would be distributed over a greater period.

E. B. Haserodt, chairman of the street railway committee of the City Council, is at work on a plan to give better service for the manufacturing district near the Union Station, where thousands of women and girls are employed.

Report of the New York Public Service Commission, First District

The New York Public Service Commission, First District, presented its sixth annual report to the Legislature of Jan. 13. A considerable part is devoted to the new dual subway system in New York, the total cost of which is estimated at \$325,000,000. The commission reports that the Fourth Avenue subway in Brooklyn, a four-track line about 4 miles long, and the Centre Street Loop line in Manhattan, a four-track subway about 1½ miles long, are about completed; that construction work is well advanced upon the Lexington Avenue subway, to be operated by the Interborough Rapid Transit Company, and that work has been well started on the Broadway subway, to be operated by the New York Consolidated Railroad Company (Brooklyn Rapid Transit).

For the year ended June 30, 1912, the public in New York City paid for street railway transportation \$83,684,799. This is equivalent to about \$16 per capita. For gas and electricity for the year the public paid \$60,581,760—equal to about \$12 per capita. This makes a grand total of \$144,266,539 paid in the city of New York in one year for local transportation, gas and electricity.

The total number of passengers carried on the street and electric railroads in New York City (including subways and elevated lines) was 1,680,914,025, an increase of 77,000,000 passengers over the preceding year and an increase of 365,000,000 over the year 1907-8, the first year of the commission. These railroads used 1666 miles of track and operated 11,688 passenger cars. The total capitalization, including capital stock and funded debts outstanding, of all companies subject to the jurisdiction of the commission amounts to \$1,104,993,683, of which \$691,373,872 applies to street and electric railways, \$210,952,600 to gas companies and \$136,968,751 to electric light and power com-

panies. The commission calls attention to the present law in regard to bus lines and recommends that it be changed so as to permit the organization of additional bus lines in New York City.

Decision in Milwaukee Paving Case

The Supreme Court of Wisconsin on Jan. 7, 1913, held that The Milwaukee Electric Railway & Light Company, Milwaukee, Wis., must pave the space between its outside tracks and 1 ft. beyond on Walnut Street with asphalt, the same material that the city laid on the rest of that street recently. The case was that of the State of Wisconsin on relation of the city of Milwaukee against The Milwaukee Electric Railway & Light Company, and involved the question of whether the city could compel the company to pave the space between the tracks with the same material as the city used on the rest of the street.

The first tracks were laid on Walnut Street in 1887 by the Milwaukee Railway under an ordinance which required the company to keep and maintain in good and thorough repair all that portion of the street between the outside rails of its tracks "of the same material as that of which said street shall be composed at any time when such repairs shall be necessary." The company claimed that under the original ordinance of 1887 it was required only to repair the old pavement, and that by the consolidated street railway ordinance passed by the Common Council in 1900 the company was relieved of any duty to repave the street. The Supreme Court holds against both of these contentions. The Walnut Street case was taken to the Supreme Court as a test case to determine the relative positions of the city and company in regard to the other streets on which the city had put in paving different from the material between the tracks of the company, on those streets.

Special Message in Regard to Water Power Development

In a special message sent to the Legislature on Jan. 13, 1913, Governor Sulzer of New York urged the repeal of the charter granted to the Long Sault Development Company in 1907, and bills to carry out the recommendations in the message have been introduced by Senator Wagner and Assemblyman Levy. In his message the Governor says in part:

"Investigations made by the engineers of the State Conservation Commission demonstrate, among other things, that a full economic development at the Long Sault Rapids will produce 1,000,000 hp, of which, by treaty arrangement with Canada, it is to be expected that New York will receive no less than one-half. This immense power, so valuable to our people, is at a transmission distance of 340 miles from New York City, or about 40 miles nearer than Niagara Falls. In order that we secure for all our citizens the many and the lasting beneficial results of the proper development of our natural resources, particularly of our unused water powers, in accordance with our constructive policy in these matters, to which our State now stands committed, I respectfully recommend that Chapter 355 of the Laws of 1907—the Long Sault Development Company's charter—be immediately repealed."

Mayor Praises Philadelphia Rapid Transit Management

Rudolph Blankenburg, Mayor of Philadelphia, Pa., referred in part as follows to the improvement of transit conditions in Philadelphia, in his review of his first year at the head of the city government:

"The improvement of rapid transit and transportation facilities between the heart of the city and outlying districts, so necessary to the comfort of all, was one of the problems referred to in my inaugural message. It is a matter of common knowledge that, through the efficient and businesslike management of the Philadelphia Rapid Transit Company, under Messrs. Stotesbury and Mitten, the city is to-day better served than ever before in its history. All this has been accomplished in the face of handicaps

that would have appalled most men. Improvident management and overcapitalization are being overcome in this effort at rehabilitation, and it has been a pleasure for me, as a city director and member of the executive board, to help in every way at my command to bring about this remarkable improvement. Among the most gratifying results of sensible and sincere co-operation, are the pleasant relations now established between the company and its employees. The wage increase, much earlier than expected, and the prospect of the carmen being, in the near future, the best paid in the country, is most satisfactory."

Referring to the high cost of living the Mayor said: "Investigations of the high cost of living have been made. It is our purpose to follow up the data gathered with arrangements of such relief as are possible under our laws and with the co-operation of the Philadelphia Rapid Transit Company and other agencies."

Report of New York Public Service Commission, Second District

The report of the New York Public Service Commission, Second District, was submitted to the Legislature on Jan. 16. The commission reports that the total capitalization of the corporations under its jurisdiction is \$4,822,228,727. Of the corporations reporting to the commission, 125 are electric railways, with 1009 miles of track.

The operating reports of the electric railways show that from the fiscal year ended June 30, 1907, to the fiscal year ended June 30, 1912, there has been an increase in operating revenues from \$19,293,052 to \$28,305,720, or 47 per cent. For the same period the increase in operating expenses has been from \$12,471,755 to \$17,974,813, or 44 per cent. The net revenues have increased from \$6,821,197 to \$10,330,907, or 52 per cent. The passengers carried have increased from 418,622,000 to 575,430,381, or 37 per cent. Comparing 1912 with 1911, there has been an increase of 4.90 per cent in operating revenues, of 7.70 per cent in operating expenses, of 0.40 per cent in net revenues and of 6 per cent in the number of passengers carried.

The report states that during the year the commission has made extensive investigations into street railway service in the cities of Buffalo, Rochester, Yonkers and Newburgh, and important and substantial improvements are to follow each of these investigations.

The recommendations to the Legislature include, among other things, the re-passage of the law vetoed by the Governor last year empowering the commission to suspend increases in railroad rates pending investigation as to the reasonableness of such advances. The Interstate Commerce Commission now has such power. As the law now stands no investigation of increased railroad rates in New York State can be undertaken until those rates have become effective.

Report of Public Utilities Commission of Connecticut

The Public Utilities Commission of Connecticut has submitted to Governor Baldwin its first annual report for the fiscal year ended June 30, 1912. From Sept. 9, 1911, to the latter date, fifty-six petitions were presented and heard by the commission and 2312 accidents were reported, of which 192 were investigated. In thirty-six of these cases recommendations were made. Forty-three informal complaints were made. The commission says in part:

"The public service companies have shown a commendable spirit of co-operation, have promptly complied with all orders of the commission and have expressed a willingness to carry out any suggestion or recommendation that the commission may make, and we are of opinion that much more good has been accomplished this first year in a quiet and semi-official way than was ever hoped for by the advocates of the law creating the commission.

"Safe and efficient service at reasonable rates is the essential requirement from public service companies, and it is the purpose of this commission to insist upon such proper service as may be necessary. At the same time it may be found in some instances that a readjustment of rates is required. To give such service requires the vigilant attention of the officers and employees of the companies in handling the increased volume of business. The plant

and equipment of any public service company should be maintained at a standard in keeping with modern improvements as far as the financial condition of the company will permit.

"We believe that the net income and profits of any public service company, after the payment of reasonable dividends, should be used for the improvement of the plant and equipment of such company, rather than in unwarranted expansion, or the acquisition, management and control of business and property more or less foreign to the chartered purposes of the parent company."

In 2312 accidents reported 168 persons were killed and 2144 injured, distributed as follows:

	Killed.	Injured.
Electric light, gas, water and other companies.....	17	142
Bristol & Plainville Tramway.....	1	1
Central New England Railway.....	1	51
Central Vermont Railway.....	6	6
Connecticut Company.....	37	876
Danbury & Bethel Street Railway.....	1	5
Hartford & Springfield Street Railway.....	2	13
New York & Stamford Railway.....	1	1
New York, New Haven & Hartford Railroad.....	105	1000
Shore Line Electric Railway.....	1	48
South Manchester Railroad.....	1	1

Among the recommendations made by the commission are the following:

"That every corporation, company, association, joint-stock association, partnership or person, or lessee thereof, hereafter organized, formed or appointed, which by the provisions of Chapter 128 of the Public Acts of 1911 is designated as a public service company, shall forthwith, upon such organization, formation or appointment, give notice thereof to the Public Utility Commission. This provision should be made that the commission may have due notice of new companies coming under its jurisdiction and of the companies ceasing to come within the jurisdiction of said act.

"That a law should be passed which will effectively prohibit the merger or consolidation of public service companies without first obtaining the approval of the Public Utility Commission."

Theodore P. Shonts on the Signs of the Times

Theodore P. Shonts, president of the Interborough Rapid Transit Company, New York, N. Y., contributed to the *New York American* of Sunday, Jan. 12, 1913, an article more than two columns long at the request of the editor for an expression of his views in regard to the cause of the changing relations in this country between employer and employee. Mr. Shonts said that the change is a natural result of evolution. Every age has had its economic problems. Ours may seem more difficult than those of preceding periods, but history refutes such an inference. Readjustment periods are simply an effort to reconcile the actual with the ideal. The necessity will always exist for recurring readjustment periods. In the end they make for good. Those who think they have found a remedy for the prevention of these periods have not viewed the past with sufficient reflection to enable them to look forward with proper perspective. The spread of superficial education has been one of the prime causes of the prevailing dissatisfaction. In this connection Mr. Shonts said:

"Misunderstandings have been allowed to accrue without correction, and as one misunderstanding more frequently than otherwise begets another, the resultant confusion and misconception of things have steadily multiplied until nothing short of a general readjustment period, such as we are now experiencing, will afford an adequate remedy, which remedy simply means a more perfect understanding of each other and of conditions generally. Our national life is continually becoming more involved. The activities of this growing country are becoming so numerous and so vast that few, if any, of us have the time to study and understand our relations with all other classes of citizens. Owing to the diversification of activities we encounter diversification of views on matters pertaining to the general welfare of the community, even among the most thorough students of sociology."

Mr. Shonts concluded the article in part as follows: "The captains employed by capital to conduct its business were slow in recognizing and informing their em-

ployer of the needs and rights of labor. Consequently we are now reaping the harvest of this past misunderstanding. Will the captains of labor organizations profit from this experience and fully recognize the principle that true justice rests on a willingness to do justice to all, whether it concerns unionized or non-unionized labor or capital? Or will they, through the newly found power of organized labor, commit moral suicide in attempting to evade drawing a distinct line between justice and injustice? Organization involves certain obligations upon itself as well as certain rights to others. There are instances in the past where the rights of others have been ignored. This constitutes one of the chief reasons for whatever opposition capital may to-day advance against the unionization of labor. Capital, by its very organization and incorporation, legally covenants itself to the fulfillment of all contracts. Organized labor, unincorporated, enters into an agreement with capital, and sometimes observes its provisions and stipulations only to the extent that they work to its advantage. And there are no means of legally restraining repudiation of its covenant. This constitutes an unequal advantage to which capital feels it should not be obliged to submit. It is not a business proposition, because there is too great a difference between simply a 'moral' obligation and a 'legal' obligation, and in all fairness labor should direct its energies toward wiping out this undue advantage which it now persistently seeks.

"Labor is entitled to the full value of its hire. But the time is at hand when it would seem well for business ability at the head of capital organization to slow down, accepting the inequalities and limitations now imposed by various wage schedules as a cautionary signal, prepared, however, when labor assumes the same responsibility as capital, to proceed at once under full control.

"The encouraging indications of the time are not only the adoption of voluntary relief insurance by individual corporations, but also the creation of welfare committees whose function is to get in close personal contact with the men in their business, home and social life, and devise ways and means looking toward their betterment. Through these committees the directors of big business to-day will eventually be kept as well posted on the social conditions of the employees as was the employer of small business of days gone by through his daily personal contact with the men. This step on the part of corporations also goes to show that they are taking a look 'within' for causes contributing to present disturbances, which is a most encouraging phase of the situation. Labor must also take a look 'within' for the same causes. After adjusting their internal selves, both capital and labor can take a look 'without' for external causes; and then by getting together, after reaching a thorough understanding of themselves, they can, with much less trouble, iron out the difficulties as they exist between each other, and in the attainment of this much desired end no other medium can command quite as great influence for good as the press. In all matters of public interest it should stand firm in the maintenance of a position of neutrality, which policy necessarily must rest upon a foundation of truth and justice."

Service Resumed in Yonkers

On Jan. 16, 1913, the employees of the Yonkers (N. Y.) Railroad accepted the concessions recommended by the Public Service Commission of the Second District, to which Frederick W. Whitridge, president of the company, had agreed. As a result service was resumed at 2.15 p. m. The men met at 10.30 o'clock in the morning to consider the proposal for a settlement as brought about by the Public Service Commission. The agreement, as drawn up by Chairman Frank W. Stevens of the board, was read, and the men discussed the minutes of the meeting of the previous afternoon at the hearing before the commission. When the matter was put to vote the men decided unanimously to return to work at once.

The meeting at which the understanding was reached under which the men returned to work was held in the office of the Public Service Commission of the Second District of New York in the Metropolitan Life Insurance Building in New York. Among those who attended the

meeting were Mr. Whitridge, Leslie Sutherland, general manager of the Yonkers Railroad; Mayor Lennon, of Yonkers; Corporation Counsel Thomas P. Curran and Alderman John S. Lavis, of Yonkers, and the representatives of the men. Chairman Stevens, of the commission, expressed the attitude of that body as follows:

"I want to assure you that this commission is not here to exercise any power, to make any order or any appeal, except an appeal to you, as men and citizens who want to see the right thing done. We are not here to discuss the controversy, or to enter upon the right or wrong of the things involved. We want to see the wheels start and that rests with the company and the men. We put the responsibility squarely up to you.

"In December work was going on, and the only way to solve this problem is to restore the status existing at that time. Every man should be at his post to-morrow morning. There is no reason why a man who has not been in the service before should be hired. When the cars are running, then differences can be thrashed out. Once resume operation and there is no reason why all differences should not be settled with honor to all concerned."

The following statement given to the men for their consideration and signed by Mr. Stevens is the one upon which they voted to return to work:

"At a meeting of the Public Service Commission of the Second District of the State of New York, held on Jan. 15, 1913, for the purpose of endeavoring to secure an immediate resumption of service upon the lines of the Yonkers Railroad, the commission made several proposals which it asked both the employees and Mr. Whitridge, the president of the company, to assent to. Such propositions and the response of all parties thereto were taken down verbatim by the official stenographer of the commission and are a public record accessible to every one, and a copy of which will, as soon as the minutes are transcribed, be furnished to the person designated by the employees to receive the same.

"Such minutes show clearly what Mr. Whitridge agreed to on behalf of the company. The following is a correct statement of the propositions of the commission:

"1. The operation of the road shall be restored immediately under the employment conditions prevailing on Dec. 31, 1912, with all men then employed restored to duty without prejudice to them.

"2. That the company and the men shall consider all matters in difference, and that any matters upon which they shall be unable to agree shall be submitted to arbitration by arbitrators selected in the usual manner.

"3. If any matters are claimed by either party not to be arbitrable, the question whether such matters are properly the subject of arbitration shall be arbitrated.

"Mr. Whitridge clearly assented to the first and second propositions, but as to the third made the statement that some questions are not arbitrable. He finally said that he would abide by the decision of the chairman of the commission as to what questions are arbitrable, and after some further colloquy stated that the position of the chairman that the question of what questions are arbitrable should be submitted to arbitration was correct. The commission understands, therefore, that Mr. Whitridge assents to the third proposition, which was read in his presence."

The Tendency of the Times

J. H. Pardee, vice-president of J. G. White & Company, Inc., and president of The J. G. White Management Corporation, New York, N. Y., has contributed to *Public Service* for January an article, "The Tendency of the Times," in which he reviews public utility conditions in the United States briefly. Mr. Pardee concludes his article in part as follows:

"I am a strong believer in State regulation and the protection of the public and public utility companies by commissions, and I am of the opinion that the present drastic laws will be so modified in the future that proper growth, expansion and operation can be had and the companies protected by the right of appeal to the courts on any unfair decisions.

"There are two important problems in the public utility situation to be solved by the companies and the people, viz., 'valuation' and 'rate of return.' It is not my intention to enter into a discussion of what is a proper method of valuing properties or determining the rate of return, for those questions have been discussed at much length by able men and no two commissions agree. One thing, however, is certain and that is that the rate of return should vary with the hazard of the undertaking and should be sufficiently high to attract private capital. The power of some commissions through their control of valuation and rate of return is stupendous. What we suffer from now more than anything else is uncertainty, and I believe the tendency is toward some fixed basis.

"The labor situation is a trying one and has a more important bearing on industry in general than ever before. The better the times the higher the wages and the more strikes. The Railway Arbitration Board has suggested compulsory arbitration, but neither employees nor employers are entirely favorable and the future is not very bright. Possibly we have all been too intent on making things go, and then on making things go cheaply, and have lost sight of tendencies which are unimportant at first but which, unless checked, acquire a momentum almost irresistible. We must all be efficiency engineers, but I believe our greatest service to our companies is in being publicity engineers. The most effective publicity engineers are the men who can, not by set and brilliant speeches, but by persistent everyday conversations, so present the facts and arguments on all our questions as to impart real information to thoughtful citizens. Such efforts must necessarily create a fair and just public opinion and build up a civic force for justice that will overwhelm the vicious forces of demagogism."

New Lamps in Albany-Schenectady Cars.—Mazda lamps are to be installed by the Schenectady (N. Y.) Railway in the cars which it uses in the service between Albany and Schenectady.

Three-Cent Fare Ordinance in Toledo.—Councilman Starnor of Toledo, Ohio, has introduced a resolution in the City Council providing that the fare on all cars at all hours of the day shall be 3 cents. The matter has been referred to the committee on railroads and telegraphs.

Improvements in Cincinnati.—Walter A. Draper, secretary of the Cincinnati (Ohio) Traction Company, has announced that the company has arranged to spend \$1,000,000 in improvements during the coming year. Of this sum \$450,000 will be spent in laying new tracks and the remainder in developing the re-routing plan in accordance with the suggestions contained in the Harris report.

Recommendations of the Railroad Commission of Indiana.—In its annual report the Railroad Commission of Indiana recommends that a law be passed to prevent trespassing on railroads, to provide for the elimination of grade crossings, especially all obstructed crossings, and to make it a misdemeanor punishable by fine and imprisonment for persons to pass under or over railway gates at highway crossings when the gates are down.

Action Against Duluth Street Railway.—Declaring that the Duluth (Minn.) Street Railway has forfeited its franchise by failure to comply with the provisions of the grant, a delegation of Duluth citizens appeared before Attorney-General Smith of Minnesota at St. Paul recently and prayed for the privilege of instituting a forfeiture suit in the name of the State. The Attorney-General's department takes the stand that it is necessary for the Duluth citizens to prove they have a *prima facie* case before the State will lend its name to the proposed suit.

New Elevated Station in Rapidly Growing Business Section of New York.—The Interborough Rapid Transit Company, New York, N. Y., has informally expressed its willingness to build a station on the Sixth Avenue line of the Manhattan Elevated Railroad in the vicinity of Thirty-ninth Street and has intimated that it will be influenced more or less by the attitude of property owners in agreeing to give their consents and in waiving the matter of damages. There is no station on the line now between Thirty-third Street and Forty-second Street. The station is demanded by the movement toward uptown New York which

has been going on for some time among the department stores and lately among other business establishments.

Report on Rails of American Railway Engineering Association.—The American Railway Engineering Association has recently published the report of its committee on rails. It contains the results of the study on the revision of the specifications for carbon steel rails made during committee meetings in 1912 on April 10, July 24, Sept. 20 and Nov. 18. The report is contained in the November *Bulletin* of the association and is upon the following subjects: specifications for carbon steel rails, transverse or internal fissures, method of producing sound ingots, on a new method of revealing segregation in steel ingots, the testing of rails, influence of silicon on open-hearth ingots and rails, stremmatograph tests of track under service conditions.

Construction Figures of the Geary Street Municipal Railroad.—Some total figures on the cost of construction of the Geary Street Municipal Railroad in San Francisco, as compiled by the Board of Works of San Francisco, were published in the *ELECTRIC RAILWAY JOURNAL* of Jan. 11, 1913, page 80. Figures worked out on the basis of each mile of double track are as follows: Trolley poles and overhead wires, labor and material, \$5,100; track construction, \$48,100; track materials, \$27,100; paving right-of-way, \$29,100; underground conduit and conductors, \$17,500; engineering and inspection, \$6,500; total, \$133,400. The 2.15 miles of track construction done by day labor cost \$45,400 per mile, while the 3.35 miles built by contract cost nearly \$50,000 per mile, but it included tearing out the old cable structures on Geary Street.

Plan to Resume Franchise Negotiations in Kansas City.—Ford F. Harvey, one of the receivers of the Metropolitan Street Railway, Kansas City, Mo., and Clyde Taylor, an attorney for the receivers of that company, called on Mayor Jost of Kansas City on Jan. 8, 1913, and were informed by the Mayor that the city would be ready on Jan. 27 to resume the franchise negotiations. The Mayor is reported to have said: "The details as to the physical valuation of the company's property and its financial condition have not advanced sufficiently to make them public, but by Jan. 27 they will be sufficiently developed for me to know what kind of an arrangement I will be willing to make with the receivers. I told Mr. Harvey and Mr. Taylor that no procrastination would be tolerated, that in ten days after we meet we ought to know whether we can come to terms."

Scope of National Employment Exchange Widened.—The National Employment Exchange, which was founded a few years ago by a group of well-known business men in New York to act as a clearing house between employers and employees, has decided to establish a technical department devoted solely to the needs of men with technical training. This department has been placed in charge of H. C. Spaulding, who was graduated from the Massachusetts Institute of Technology in 1887 and has been connected with the Thomson-Houston Company, the Siemens & Halske Electric Company, the Blake & Knowles Pump Company and the Yale & Towne Manufacturing Company. The commercial and technical departments are located at 30 Church Street, New York, and the manual branch for skilled and unskilled labor at 56 and 58 Cooper Square, New York.

Signal Situation in Indiana.—On Jan. 6 proposals covering the quota of block signals to be installed on the inter-urban lines in Indiana in 1913 were received by M. H. Hovey, consulting engineer for a number of the companies affected. Owing to changes in the original plans it was found necessary to request revised proposals, which will be due about Jan. 22. All the contracts will probably be let about the same time in order that the construction work may be handled by the same forces and all installations completed at about the same time. Some of the roads have shown preference for the positive block signaling, while others will use the permissive signal system. There has been no definite decision as to the design of signal to be used by the different roads, but each is selecting one which will be satisfactory for its operating conditions. It has been decided that a part of the roads will use light signals, while one or two of them prefer to use a semaphore type.

Measure Aimed at Proposed Washington Merger.—The Commissioners of the District of Columbia have sent to Congress a favorable report on the measure introduced by Senator La Follette "to make it unlawful for foreign corporations to own or control the capital stock, bonds or other indebtedness of local public utility corporations in the District of Columbia." The report of the commissioners follows in part: "There has recently been organized under the laws of the State of Virginia a holding corporation known as the Washington Utilities Company. This corporation was formerly known as the Washington, Alexandria & Mount Vernon Railway, and is now known as the Washington-Virginia Railway. It is understood that the Washington Utilities Company already has obtained a large block of stock and probably a control of the Washington Railway & Electric Company. The commissioners are of the opinion that an emergency exists which can best be met by the prompt passage of the bill under consideration. As strongly as they are able they urge the enactment of this bill during the present session of Congress."

Engineers Visit Northwest Station, Chicago.—On Jan. 8 a party of about 100 members of the Western Society of Engineers, under the guidance of employees of the Commonwealth Edison Company, paid a visit to the company's new Northwest station at California Avenue and Roscoe Street, Chicago. The party left the downtown district on the Chicago & Northwestern Railroad, proceeding to the junction with the private elevated electric railway of the central station company, near Mayfair. Here the steam locomotive was uncoupled and the cars of the special train were attached to an electric third-rail locomotive. The visitors were taken in this manner to the generating station, which was inspected in all departments, guides being provided by the electric service company. The occasion marked, perhaps, the first time a train of standard passenger coaches was drawn by an electric locomotive in Chicago, or possibly in the Middle West. W. L. Abbott, chief operating engineer; P. Junkersfeld, assistant to the vice-president, and R. F. Schuchardt, electrical engineer, were in charge of the party for the Commonwealth Edison Company.

Bids for Construction of Section of First Queens Line.—Bids for the construction of a section of the first rapid transit line to be built in Queens Borough have been called for by the Public Service Commission for the First District of New York to be opened on Jan. 28. This section is Section No. 2 of the Astoria, Woodside and Corona rapid transit route, which runs from the Queens end of the Queensboro Bridge north through Second or Debevoise Avenue to Ditmars Avenue, Astoria. Section No. 2 covers that part of the line north of Beebe Avenue. The road is to be an elevated railroad and the contractor will have eighteen months in which to complete the work. The engineers of the commission are finishing plans for the rest of this line and bids for its construction will be called for soon. Under the dual system of rapid transit this road will be operated jointly by the Interborough Rapid Transit Company and the Brooklyn Rapid Transit Company. The Interborough company will connect with it by trains from the Steinway tunnel and the Second Avenue elevated railroad, and the Brooklyn Rapid Transit Company by trains through the proposed Broadway, Seventh Avenue and Fifty-ninth Street subway.

LEGISLATION AFFECTING ELECTRIC RAILWAYS

MASSACHUSETTS

The Massachusetts Legislature convened on Jan. 1 at Boston, with the prospect of a busy session, including the discussion of many matters of interest to public utilities. In his inaugural address Governor Foss emphasized the need of a closer state control over the steam railroads serving the Commonwealth and recommended the dissolution of the Boston Railroad Holding Company, by which the New York, New Haven & Hartford Railroad Company exercises a controlling influence in the management of the Boston & Maine Railroad system. The special commission named at the last session to investigate the subject of public utility holding companies has submitted a report to the Legislature recommending the closer control of such organizations by the Commonwealth. The members of

the Railroad Commission, the Gas & Electric Light Commission and the Attorney General served on the joint board. The report recommends the passage of five bills for the further regulation of holding companies. The first provides that no business corporation shall hereafter hold, directly or indirectly, more than 10 per cent of the stock of a Massachusetts public utility corporation. The second bill would confer upon the Railroad Commission and the Gas & Electric Light Commission authority to examine the books and papers of holding companies. The other bills provide for greater publicity of holding company affairs. The commission recommends an extension of the jurisdiction of the present regulating boards in respect to the relations between the public utility companies and holding companies associated with them. The joint special committee on the transportation facilities of western Massachusetts has issued an exhaustive report favoring the development of electric railways in that section by the New York, New Haven & Hartford Railroad subject to restrictions to be imposed by the Railroad Commission, including the fixing of rates, supervision of stock issues and construction and the power to order further extensions. About 300 miles of additional electric railway are suggested for early construction in western Massachusetts. A bill has been introduced into the House providing for the electrification of all the standard-gage steam railroads within the Boston metropolitan park district.

INDIANA

Representative Keegan has introduced into the Legislature a public utilities bill which provides that the Railroad Commission of Indiana shall be abolished and the Public Utilities Commission be created in its stead, to be composed of three commissioners to serve for four years each at salaries of \$7,500 a year. All the power of the present Railroad Commission would be conferred on the new commission and the new body would have general supervision over all public utilities. The measure which has been introduced accords with the recommendation of Governor Ralston.

MISSOURI

Senator Busby, Carrollton, Mo., has introduced into the Senate a public utility bill drafted in accordance with the recommendations made to the Legislature by Governor Major. Provision is made for a commission of three members, each to draw a salary of \$5,500 a year. The Governor would have the power to make appointments to the commission, and appointments after the term of office of the original commissioners had expired would be made for six years. The commission would have authority over practically all classes of public service corporations, with supervisory power over the issuance of all stocks and bonds and other evidences of indebtedness.

OHIO

Representative Herbert S. Bigelow, of Cincinnati, has prepared a bill which he purposes to introduce in the General Assembly. It provides for the revocation of all public service franchises granted for a period of more than twenty-five years. There is no intention, however, Mr. Bigelow says, of revoking all franchises, the bill being intended to provide for the revocation only of special privilege grants given for a period of more than twenty-five years, on the principle that each generation has the right to make its own laws. The message of Governor Cox to the Legislature contained recommendations in regard to public utility legislation.

PROGRAM OF ASSOCIATION MEETING

New England Street Railway Club

The regular monthly meeting of the New England Street Railway Club will be held in the new mahogany room of the American House, Boston, Mass., on the evening of Thursday, Jan. 23, 1913. Dinner will be served at 6.30 p. m. William C. Bamburgh, advertising manager of the New England Telephone & Telegraph Company, will be the speaker. His subject will be "The Telephone: Some History and the Operation." There will be a special musical program.

Financial and Corporate

Stock and Money Markets

January 15, 1913.

There was a much better tone to the trading on the New York Stock Exchange to-day. The recovery was small compared with the recent fall in prices, but the advance was regarded generally as presaging a general recovery, particularly as the pressure of liquidation had apparently been diminished considerably. Some traders still take a very gloomy stand on the outlook, however. Rates in the money market to-day were: Call, $2\frac{3}{4}$ to 3 per cent, with the last loan at 3 per cent; sixty days, 4 to $4\frac{1}{4}$ per cent; ninety days to six months, 4 to $4\frac{1}{2}$ per cent.

Trading in Philadelphia to-day was broad and there was a goodly volume of transactions. The traction issues were quite active.

The Chicago market was narrow to-day. A feature of the market was the trading in the Chicago Railways issues. There was a good demand for bonds.

The trading in the railroad issues in Boston to-day was quite active. There was very little demand for bonds.

Trading in Baltimore to-day was narrow but active. The demand for bonds continues, the total sales for the day exceeding \$99,000.

Quotations of traction and manufacturing securities as compared with last week follow:

	Jan. 7.	Jan. 15.
American Brake Shoe & Foundry (common).....	96	92
American Brake Shoe & Foundry (preferred).....	136	131½
American Cities Company (common).....	48	47½
American Cities Company (preferred).....	78¾	78½
American Light & Traction Company (common).....	430	410
American Light & Traction Company (preferred).....	108	106½
American Railways Company.....	40¾	40½
Aurora, Elgin & Chicago Railroad (common).....	40	43¾
Aurora, Elgin & Chicago Railroad (preferred).....	86	87
Boston Elevated Railway.....	112½	112¾
Boston Suburban Electric Companies (common).....	5	5
Boston Suburban Electric Companies (preferred).....	67	67
Boston & Worcester Electric Companies (common).....	7	7
Boston & Worcester Electric Companies (preferred).....	40	40
Brooklyn Rapid Transit Company.....	91¾	89½
Capital Traction Company, Washington.....	125	121½
Chicago City Railway.....	150	150
Chicago Elevated Railways (common).....	28	30
Chicago Elevated Railways (preferred).....	89	89
Chicago Railways, pteptg., ctf. 1.....	90	91½
Chicago Railways, pteptg., ctf. 2.....	22	24½
Chicago Railways, pteptg., ctf. 3.....	6½	8
Chicago Railways, pteptg., ctf. 4.....	3¼	3½
Cincinnati Street Railway.....	122½	*122½
Cleveland, Southwestern & Columbus Ry. (common).....	5½	*5½
Cleveland, Southwestern & Columbus Ry. (preferred).....	33	*33
Cleveland Railway.....	103½	*103½
Columbus Railway & Light Company.....	60	60
Columbus Railway (common).....	80	80
Columbus Railway (preferred).....	81	81
Denver & Northwestern Railway.....	118	118
Detroit United Railway.....	76	76
General Electric Company.....	185	182
Georgia Railway & Electric Company (common).....	122	122½
Georgia Railway & Electric Company (preferred).....	83¾	82½
Interborough Metropolitan Company (common).....	18½	17½
Interborough Metropolitan Company (preferred).....	62¾	60¾
International Traction Company (common).....	38	*38
International Traction Company (preferred).....	99	*99
Kansas City Railway & Light Company (common).....	18½	18¼
Kansas City Railway & Light Company (preferred).....	40	40
Lake Shore Electric Railway (common).....	9	9
Lake Shore Electric Railway (1st preferred).....	91	91
Lake Shore Electric Railway (2d preferred).....	25½	25½
Manhattan Railway.....	129	130
Massachusetts Electric Companies (common).....	16	16½
Massachusetts Electric Companies (preferred).....	76	75
Milwaukee Electric Railway & Light Co. (preferred).....	100	100
Norfolk Railway & Light Company.....	25	25
North American Company.....	81	80½
Northern Ohio Light & Traction Company (common).....	80	80
Northern Ohio Light & Traction Company (preferred).....	100	100
Philadelphia Company, Pittsburgh (common).....	49½	49¾
Philadelphia Company, Pittsburgh (preferred).....	44½	44¼
Philadelphia Rapid Transit Company.....	27½	27½
Portland Railway, Light & Power Company.....	68½	68½
Public Service Corporation.....	117	117
Third Avenue Railway, New York.....	38¾	37½
Toledo Railway & Light Company.....	2¾	2¾
Twin City Rapid Transit Co., Minneapolis (common).....	105	105¾
Union Traction Company of Indiana (common).....	4½	4½
Union Traction Company of Indiana (1st preferred).....	81	81
Union Traction Company of Indiana (2d preferred).....	34	34
United Rys. & Electric Company (Baltimore).....	23¾	24
United Rys. Inv. Company (common).....	34	32
United Rys. Inv. Company (preferred).....	62½	60¼
Virginia Railway & Power Company (common).....	51	51
Virginia Railway & Power Company (preferred).....	90	90
Washington Ry. & Electric Company (common).....	88	85½
Washington Ry. & Electric Company (preferred).....	89½	87½
West End Street Railway, Boston (common).....	80	80½
West End Street Railway, Boston (preferred).....	98	97
Westinghouse Elec. & Mfg. Company.....	78	73¾
Westinghouse Elec. & Mfg. Company (1st preferred).....	119	115

*Last sale.

Refinancing the Hudson & Manhattan Railroad

Announcement has been made of the formation of a syndicate of bankers headed by Kuhn, Loeb & Company and Harvey Fisk & Sons, New York, N. Y., and Robert Fleming & Company, London, Eng., to readjust the debt of the Hudson & Manhattan Railroad, New York, N. Y. The plan for the readjustment is dated Jan. 14, 1913, and has been approved by the holders and the representatives of a majority of the first mortgage $4\frac{1}{2}$ per cent bonds and of the preferred and the common shares of the company. The plan provides for the surrender of the existing first mortgage $4\frac{1}{2}$ per cent bonds in exchange for one-half of the principal amount of the bonds in new 5 per cent first mortgage bonds and the other half in new 5 per cent adjustment income bonds and for the payment by stockholders of \$8.50 for each share of stock, for which payment the latter will receive new 5 per cent first mortgage bonds at the rate of \$900 for each \$1,000 paid. The bankers have further agreed to purchase from the Hudson Companies the new first mortgage bonds and adjustment income bonds which it will receive upon the consummation of the readjustment, in order that it may be in a position to take up its outstanding collateral trust notes and participate in the plan of readjustment.

A call has been issued for the deposit of Hudson & Manhattan Railroad stock and bonds with the Guaranty Trust Company, New York, N. Y., on or before Feb. 14, 1913. The announcement of the bankers to the holders of the securities of the Hudson & Manhattan Railroad is prefaced as follows: "At the request of holders and representatives of a large majority of the first mortgage $4\frac{1}{2}$ per cent bonds and the shares, the undersigned have caused an examination of the properties, earnings and financial condition of the Hudson & Manhattan Railroad to be made by independent competent experts. These reports show that the Hudson & Manhattan Railroad has not earned, and is not now earning, the full interest upon its outstanding first mortgage $4\frac{1}{2}$ per cent bonds. It, therefore, cannot market securities to provide funds to pay the cost of improvements and betterments, nor has it the funds to pay such of its car trust obligations as are approaching maturity, and, unless its fixed charges are reduced through the action of the bondholders and the needed funds are furnished by the stockholders, it will be impossible to avoid the foreclosure of the mortgage securing the first mortgage $4\frac{1}{2}$ per cent bonds."

The Hudson Companies, the holding company for the Hudson & Manhattan Railroad, has \$10,000,000 of notes which mature on Feb. 1, 1913. These notes are secured by the pledge of \$15,000,000 of Hudson & Manhattan Railroad $4\frac{1}{2}$ per cent mortgage bonds. Other notes of the company to the amount of \$9,500,000, similarly secured, mature in October and November of this year. On Feb. 1, 1914, \$1,437,000 of 5 per cent gold bonds mature. The Hudson Companies has outstanding \$5,000,000 of common stock and \$16,000,000 of 7 per cent preferred stock.

William G. McAdoo, president of the Hudson & Manhattan Railroad, made the following statement on Jan. 15 in regard to the refinancing:

"The proposed readjustment is made necessary because the traffic of the system has not developed with sufficient rapidity to meet the fixed charges. The burden of taxation has become exceedingly heavy, amounting for the last year to \$502,459. While the business has shown steady growth, it has not been enough. Almost the entire Hudson tunnel system is located below water level. This made the cost of the work exceedingly heavy and also compelled the construction of a system of much greater capacity than present needs, in order that the future might be cared for, because it is not possible to enlarge such tunnels after they have been built. For instance, the total capacity of the Hudson tunnels is something like 200,000,000 passengers per annum, whereas the present business is about 60,000,000 passengers per annum. Hence, a large part of the investment must be carried as dead capital until the traffic grows up to it. We, therefore, are confronted with the necessity of doing one of two things: first, to increase the fares again, or, second, to readjust the bonded debt so as to reduce the fixed charges and put the company's credit upon a solid foundation.

"We have decided not to ask the public to assume the burden of another increase in rates. Aside from the load that this would put upon our patrons, it might tend to arrest the development of New Jersey and to check the growth of business. Looking at the matter broadly and taking into consideration the future of New Jersey and of this company, we have decided against increasing rates. A large majority of our bondholders believe that the proposed readjustment of the debt is the best solution of the problem. The effect of the reorganization on the 4½ per cent bonds will be temporarily to reduce the interest to 3½ per cent, but after a few years this will be more than compensated for by an increase from 4½ per cent on the old bonds to 5 per cent on the new. This change will establish the credit of the company upon a permanently sound foundation, and put it in position to finance the Grand Central extension and other improvements and additions."

National Properties Company Takes Over Wilmington Property

The National Properties Company, of which Van Horn Ely, Pittsburgh, Pa., is president, has purchased the property of the Wilmington & Philadelphia Traction Company through H. B. Hollins & Company, New York, N. Y., and Newburger, Henderson & Loeb, New York and Philadelphia, in association with Scott & Company, Wilmington, Del. This gives the National Properties Company control of the electric lighting business of Wilmington, Del., and the important electric railway systems of Wilmington, Del., and Chester, Pa. The electric railway lines of the company also connect Wilmington and Chester with Philadelphia. Mr. Ely will be president of the Wilmington & Philadelphia Traction Company. T. W. Wilson, now assistant to the president, will become the vice-president and remain in active local control. William A. Heindle, manager of railways of the company, and his corps of operating assistants will remain. The new officers of the Wilmington & Philadelphia Traction Company are as follows: Van Horn Ely, president; T. W. Wilson, vice-president and general manager; W. T. Spring, secretary and treasurer; Van Horn Ely, B. N. Busch, H. P. Scott, A. C. Robinson, J. J. Henderson and T. W. Wilson, directors. The officers and directors of the National Properties Company are as follows: Van Horn Ely, president; William F. Havemeyer, vice-president; B. N. Busch, secretary and treasurer; H. D. Anderson, auditor; Van Horn Ely, H. B. Hollins, B. N. Busch, William F. Havemeyer, J. J. Henderson, Alfred Newburger, H. O. Scott, A. C. Robinson and T. W. Wilson, directors.

Application to Issue Bonds in Connection with New York Subway Work

Brief mention was made in the *ELECTRIC RAILWAY JOURNAL* of Jan. 11, 1913, in regard to the applications for the approval of mortgages made to the Public Service Commission of the First District of New York by the Brooklyn Rapid Transit Company and the Interborough Rapid Transit Company, which are to operate the dual system of rapid transit and contribute to the cost of construction of the new lines under the proposed contract with the city of New York. The Interborough Rapid Transit Company proposes to issue bonds not to exceed \$170,000,000. Its petition states that the company has made a contract with J. P. Morgan & Company for the purchase of the entire issue at 93½ and accrued interest. At this rate the company wants permission to issue bonds, under date of Jan. 1, 1913, bearing interest at 5 per cent and payable in 1966, sufficient to raise \$150,797,500. Of this amount the company will use \$74,000,000 in cash for its contribution toward the construction of new subways and subway extensions and the purchase of equipment for the same; \$16,154,000 to pay for the extension and \$10,800,000 for third-tracking of its elevated lines; \$34,668,900 to refund all outstanding bonds; \$15,000,000 to pay off outstanding short-term notes, and \$174,600 to be reserved to pay off outstanding liens on real estate.

The Brooklyn Rapid Transit Company, through the New York Municipal Railway Corporation, which was formed to enter into the proposed contract with the city, has ap-

plied to the commission for the approval of a mortgage to secure an issue of not to exceed \$100,000,000 of first mortgage 5 per cent sinking fund gold bonds, and of this amount asks for permission to issue immediately \$65,000,000. Of the proceeds the company is to apply \$13,500,000 toward the cost of construction of new subways and subway extensions. \$1,000,000 to pay for the proposed connection between the Fourth Avenue subway and the Broadway subway at Canal Street, \$26,000,000 for the purchase of equipment for the new system and the old lines to be operated in conjunction therewith, \$6,500,000 for the construction of additional tracks on its elevated railroads, \$8,000,000 for the extension of such elevated railroads and \$10,000,000 for the reconstruction of these lines. The commission will set an early date for a hearing on this application.

The New York Municipal Railway Corporation has also applied for permission to issue \$1,000,000 of its capital stock, of which \$2,000,000 is authorized but none issued. It has also applied for the approval of a contract it has made with the Brooklyn Heights Railroad for the use of a portion of the Lutheran Cemetery line needed for a connection in the new system. The New York Consolidated Railroad, which owns and operates the Brooklyn elevated railroads which are to be part of the new system, has applied for the approval of the commission to its proposed acquisition of the stock of the New York Municipal Railway Corporation.

American Light & Traction Company, New York, N. Y.—

A meeting of the stockholders of the American Light & Traction Company has been called for March 17, 1913, to vote to increase the authorized common stock of the company from \$15,000,000 to \$40,000,000. It is stated that the proposed increase in the common stock is for the purpose of providing sufficient stock to permit the company to continue its regular quarterly dividend payments of 2½ per cent in stock, or at the rate of 10 per cent per annum. The company has declared a dividend of 2 per cent on the \$14,236,200 of 6 per cent cumulative preferred stock to cover the period of four months from Sept. 30, 1912, to Jan. 31, 1913, payable on Feb. 1 to holders of record of Jan. 15. The regular quarterly dividend of 2½ per cent cash and 2½ per cent in stock has also been declared on the \$12,304,920 of common stock, both payable on Feb. 1, 1913, to holders of record of Jan. 15.

Athol & Orange Street Railway, Athol, Mass.—The Railroad Commission of Massachusetts has approved the purchase of the franchises and property of the Templeton Street Railway by the Athol & Orange Street Railway for the sum of \$435,000 as agreed upon in the contract of the two companies dated July 1, 1912.

Bay State Street Railway, Boston, Mass.—The Bay State Street Railway has petitioned the Railroad Commission of Massachusetts for authority to issue 8,000 additional shares of first preferred stock, having a par value of \$800,000, to be offered to stockholders at \$115 per share, and bonds amounting to \$429,000. The proceeds of the stock are to pay for expenditures already made and of the bond issue are to retire floating indebtedness.

Chicago & Milwaukee Electric Railroad, Chicago, Ill.—Judge Landis of the United States District Court at Chicago entered a decree on Jan. 15, 1913, setting aside the sale of the Illinois Division of the Chicago & Milwaukee Electric Railroad under foreclosure to the reorganization committee, of which George M. Reynolds is chairman. Attorneys for the committee immediately took an appeal to the United States Circuit Court of Appeals. As noted at length in the *ELECTRIC RAILWAY JOURNAL* of Jan. 11, 1913, the court recently rendered a decision to the effect that bids had been suppressed and that the purchase price of \$1,600,000 was below the value of the road.

Cleveland (Ohio) Railway.—Harris, Forbes & Company, New York, N. Y., announce that they have been authorized by the Cleveland Railway to anticipate payment on the 5 per cent gold bonds of the Cleveland Electric Railway due on March 1, 1913, and are prepared to pay par and accrued interest to the date of delivery for such bonds as may be presented for payment until March 1, 1913. As noted in the *ELECTRIC RAILWAY JOURNAL* of Sept. 21, 1912, page 465, the Public Service Commission of Ohio on Sept.

16, 1912, approved the application of the Cleveland Railway for permission to issue \$3,015,000 of common stock, the proceeds to be used for improvements and extensions, and to retire the \$1,522,000 of Cleveland Electric Railway 5 per cent bonds maturing on March 1, 1913, which are now to be paid through Harris, Forbes & Company.

Columbus (Ohio) Railway.—At the annual meeting of the Columbus Railway on Jan. 9, E. R. Sharp was elected a director to fill the vacancy caused by the resignation of George Hardy some months ago. The other directors were re-elected. C. M. Clark of E. W. Clark & Company, Philadelphia, Pa., presented the reorganization plan that has been under consideration for some time. D. Meade Massie, president of the company, opposed the plan and a deadlock finally resulted. Mr. Massie said that the Columbus Railway & Light Company, which leases the Columbus Railway, should assess its stockholders to raise the funds which it needs.

Electric Bond & Share Company, New York, N. Y.—The Electric Bond & Share Company has authorized the issuance of \$1,500,000 of additional preferred stock and \$1,500,000 of additional common stock. The directors have also voted an extra cash dividend of \$1,500,000 to common stockholders, payable to holders of record of Jan. 14. The \$1,500,000 preferred stock will be offered for subscription at par and accrued dividends to holders of preferred stock of record at the close of business Jan. 14. Common stockholders have agreed to purchase at par and accrued dividends all preferred stock not subscribed for by preferred stockholders on or before Feb. 1 next. The \$1,500,000 common stock will be offered at par and accrued dividends to holders of common stock of record at the close of business Jan. 14. With the issuance of the new stock the company will have outstanding a total of \$5,000,000 of preferred stock and \$5,000,000 of common stock.

El Paso (Tex.) Electric Company.—Henry B. Sawyer, treasurer of the El Paso Electric Company, has addressed a letter to the holders of the \$450,800 of 6 per cent convertible gold coupon notes of the company due Jan. 15, 1913, in regard to the conversion of the notes. Mr. Sawyer calls attention to the fact that the right to convert these notes ceases on Jan. 15, 1913, and that all notes not converted will be paid upon presentation at the office of the trustee. The notes are convertible at the office of the State Street Trust Company, Boston, Mass., prior to maturity, into common stock, dollar for dollar, with an adjustment of interest and dividend. Dividends are now being paid at the rate of 7 per cent per annum on the common stock of the company.

Harrisburg (Pa.) Railways.—Articles of merger of the Central Pennsylvania Traction Company and underlying companies, as the Harrisburg Railways Company, recently chartered by the Governor with a capital stock of \$10,000, were filed at the State Department on Jan. 13. The capital stock of the Harrisburg Railways Company will shortly be increased from \$10,000 to \$5,000,000. The final transfer of the property to the owners, represented by H. D. Walbridge & Company, New York, N. Y., will take place about Feb. 15. The new company will have \$2,000,000 of preferred stock and \$3,000,000 of common stock, and it is understood that the present stockholders will receive \$50 in bonds of the new company, \$50 in preferred stock and \$50 in common stock for each share of stock of the Central Pennsylvania Traction Company now held, the par value of which is \$50. The new company has authorized \$10,000,000 of bonds, of which the sum of \$2,200,000 has been issued. The subsidiary companies included in the merger are the Citizens' Passenger Railway, Harrisburg & Hummelstown Railway, East Harrisburg Passenger Railway, Linglestown & Blue Mountain Railway and the Middletown, Highspire & Steel Railway. Edward Bailey, who has been president of most of these companies; A. G. Knisely, president of the Harrisburg & Hummelstown Railway; B. F. Meyers, president of the Citizens' Passenger Railway, and F. B. Musser, president of the Central Pennsylvania Traction Company, will be succeeded by H. D. Walbridge, New York, who will be president of the new company, while Mr. Musser will be vice-president and general manager.

Highland Park & Lake Burien Railroad, Seattle, Wash.—Judge R. B. Albertson has ordered the sale under fore-

closure of the property of the Highland Park & Lake Burien Railroad, which extends south from the lines of the Puget Sound Traction, Light & Power Company at the west end of the Spokane Avenue bridge, West Seattle, to Lake Burien, a distance of 9 miles. The road was placed in operation in June, 1912.

Indianapolis, New Castle & Eastern Traction Company, Indianapolis, Ind.—The terms of the lease of the property of the Indianapolis, New Castle & Eastern Traction Company to the Union Traction Company of Indiana, of which mention was made in the *ELECTRIC RAILWAY JOURNAL* of Nov. 2, 1912, page 973, are now given as follows: The rental covers interest on the bonds, also dividends on the 5 per cent preferred stock, payable 2½ per cent semi-annually on June 1 and Dec. 1, beginning Dec. 1, 1912, and dividends on the common stock as follows: One-half of 1 per cent each on April 30 and Oct. 31, 1913 and 1914, 1 per cent on said dates in 1915 and 1916, 1½ per cent in 1917 to 1920, and 2 per cent semi-annually thereafter; also \$500 yearly for organization expenses. The lease is dated Oct. 25, 1912, is for 999 years and includes the extension under construction from New Castle to Muncie.

Ithaca (N. Y.) Street Railway.—Justice Gladding at Binghamton, N. Y., has authorized the receivers of the Ithaca Street Railway and the Ithaca, Auburn & Lansing Railroad to issue \$10,750 of receivers' certificates on account of the former company and \$15,000 of receivers' certificates on account of the latter company.

Morgantown & Dunkard Valley Railway, Morgantown, W. Va.—The Morgantown & Wheeling Railway is reported to have arranged to take over the Morgantown & Dunkard Valley Railroad and to build a line from Cassville to Wheeling, which would make its route from Morgantown to Wheeling 73 miles in length. The Morgantown & Wheeling Railway was incorporated in West Virginia in May, 1912, with an authorized capital stock of \$1,000,000, as noted in the *ELECTRIC RAILWAY JOURNAL* of June 1, 1912. Further reference to the company was made in the *ELECTRIC RAILWAY JOURNAL* of Sept. 28, 1912, in "Construction News."

Omaha, Lincoln & Beatrice Railway, Lincoln, Neb.—The Omaha, Lincoln & Beatrice Railway has applied to the Railroad Commission of Nebraska for permission to issue \$2,250,000 of bonds and \$850,000 of common stock to provide funds to complete the construction of the line from Lincoln to Omaha. In the application of the company to the commission the statement is made that the Northern Construction Company has agreed to complete the line as stated in consideration of the delivery to it of the securities previously mentioned.

South Carolina Light, Power & Railways Company, Spartanburg, S. C.—The South Carolina Light, Power & Railways Company has been incorporated in Massachusetts to acquire the properties of the Spartanburg Railway, the Gas & Electric Company and the Electric Manufacturing & Power Company. Spartanburg, the control of which passed to Ussing, Scoville & Company, Philadelphia, Pa., as noted in the *ELECTRIC RAILWAY JOURNAL* of June 1, 1912, page 945. The company has outstanding the following securities: \$500,000 out of \$1,500,000 of 6 per cent cumulative preferred stock, \$2,500,000 out of \$3,500,000 of common stock, and \$3,000,000 out of \$5,000,000 of first mortgage 5 per cent sinking fund gold bonds. A. B. Leach & Company, New York, N. Y., are placing privately \$3,000,000 of the first mortgage 5 per cent sinking fund gold bonds, dated Nov. 1, 1912, and due May 1, 1937, but redeemable at 105 and interest on any interest date. The trustee under the mortgage securing the bonds is the New York Trust Company, New York, N. Y.

Third Avenue Railway, New York, N. Y.—Negotiations are reported to have been concluded in behalf of the Third Avenue Railway for the purchase of the property of the Belt Line Railway Corporation, the successor to the Central Park, North & East River Railroad, the property of which was sold under foreclosure recently to Edward Cornell, of Davies, Auerbach, Cornell & Barry. The directors of the Third Avenue Railway have voted to pay on April 1, 1913, 1¼ per cent on the \$22,536,000 of 5 per cent adjustment income bonds for the six months ended Dec. 31, 1912. This is the initial payment on the income bonds,

no interest having been paid for the six months ended June 30, 1912. The interest became cumulative on Dec. 31, 1912.

Valley Railways, Lemoyné, Pa.—The Valley Railways has certified to the Secretary of State of Pennsylvania that \$1,950,000 of common stock and \$500,000 of preferred stock have been issued in part payment for the capital stock of the Valley Traction Company, the full purchase price being \$3,450,000, represented by \$1,000,000 of first mortgage bonds, \$500,000 of 6 per cent cumulative preferred stock and \$1,950,000 of common stock.

Dividends Declared

Brooklyn City Railroad, Brooklyn, N. Y., quarterly, 2 per cent.

Commonwealth Power, Railway & Light Company, Grand Rapids, Mich., quarterly, 1½ per cent, preferred; 1 per cent, common.

East St. Louis & Suburban Railway, East St. Louis, Ill., quarterly, 1¾ per cent, preferred.

International Traction Company, Buffalo, N. Y., 2 per cent, preferred; 4 per cent on account of accumulated dividends.

Mexico (Mex.) Tramways, quarterly, 1¾ per cent.

Milwaukee Electric Railway & Light Company, Milwaukee, Wis., quarterly, 1½ per cent, preferred.

New Hampshire Electric Railways, Haverhill, Mass., 2 per cent, preferred.

Public Service Investment Company, New York, N. Y., quarterly, \$1.50, preferred; \$2, common.

St. Joseph Railway, Light, Heat & Power Company, St. Joseph, Mo., 33 1/3 cents, common.

Tampa (Fla.) Electric Company, quarterly, 2½ per cent.

Union Railway, Gas & Electric Company, Rockford, Ill., 1 per cent, common.

ELECTRIC RAILWAY MONTHLY EARNINGS

BANGOR RAILWAY & ELECTRIC COMPANY, BANGOR, MAINE.						
Period.	Gross Earnings.	Operating Expenses.	Net Earnings.	Fixed Charges.	Net Surplus.	
1m., Nov. '12	\$61,681	*\$27,368	\$34,313	\$17,239	\$17,074	
1 " " '11	50,234	*21,068	29,166	12,682	16,484	
5 " " '12	325,536	*137,916	187,620	84,108	103,512	
5 " " '11	277,082	*119,509	157,573	64,672	92,901	
CHATTANOOGA RAILWAY & LIGHT COMPANY, CHATTANOOGA TENN.						
1m., Nov. '12	\$91,293	*\$55,362	\$35,931	\$22,678	\$13,253	
1 " " '11	78,711	*47,512	31,199	20,552	10,647	
11 " " '12	969,220	*577,531	391,689	242,066	149,623	
11 " " '11	859,645	*503,514	356,131	218,684	137,447	
COMMONWEALTH POWER, RAILWAY & LIGHT COMPANY, GRAND RAPIDS, MICH.						
1m., Nov. '12	\$584,515	*\$325,588	\$263,027	\$131,396	\$132,531	
1 " " '11	506,309	*277,410	228,899	106,506	122,393	
11 " " '12	5,739,477	*3,335,492	2,403,985	1,377,146	1,026,839	
11 " " '11	4,969,118	*2,857,770	2,111,348	1,152,875	958,473	
CUMBERLAND COUNTY POWER & LIGHT COMPANY, PORTLAND, MAINE.						
1m., Nov. '12	\$176,866	*\$98,068	\$78,798	\$56,510	\$23,288	
1 " " '11	163,105	*98,168	64,937	49,866	15,071	
5 " " '12	993,636	*517,287	476,349	276,391	199,958	
5 " " '11	950,567	*538,687	411,880	249,111	162,769	
CLEVELAND, PAINESVILLE & EASTERN RAILROAD, WILLOUGHBY, OHIO.						
1m., Nov. '12	\$29,542	*\$15,706	\$13,836	\$9,993	\$3,843	
1 " " '11	27,403	*16,466	10,938	8,541	2,397	
11 " " '12	356,570	*193,752	162,818	109,222	54,596	
11 " " '11	337,970	*186,202	151,679	91,608	60,071	
EAST ST. LOUIS & SUBURBAN RAILWAY, EAST ST. LOUIS, ILL.						
1m., Nov. '12	\$224,023	*\$118,852	\$105,171	\$48,598	\$56,573	
1 " " '11	198,966	*110,856	87,110	46,058	41,052	
11 " " '12	2,224,246	*1,242,730	981,516	530,452	451,064	
11 " " '11	2,076,445	*1,185,333	891,112	501,910	389,202	
GRAND RAPIDS (MICH.) RAILWAY.						
1m., Nov. '12	\$100,776	*\$58,883	\$41,893	\$14,363	\$27,530	
1 " " '11	94,323	*53,144	41,179	14,490	26,689	
11 " " '12	1,126,610	*634,622	491,988	160,973	331,015	
11 " " '11	1,060,784	*600,111	460,673	164,831	295,842	
LAKE SHORE ELECTRIC RAILWAY, CLEVELAND, OHIO.						
1m., Nov. '12	\$104,789	*\$60,867	\$43,923	\$35,083	\$8,840	
1 " " '11	95,828	*67,103	38,726	34,625	4,101	
11 " " '12	1,213,814	*691,236	522,578	384,584	137,994	
11 " " '11	1,156,685	*622,207	534,478	381,651	161,827	

*Include taxes.

Traffic and Transportation

Traffic Problems at Springfield, Mass.

In a recent interview E. J. Dickson, superintendent of the Springfield (Mass.) Street Railway, outlined the traffic conditions now facing the municipality and urged early action by the authorities in relation to the location of the proposed new union station and suggested bridge improvements on the Connecticut River. Mr. Dickson said that the company desires the union station plans settled so that car schedules in the downtown district of the city can be rearranged in the interests of better and more economical service. During the rush hours of the day 200 cars per hour pass through the most congested section of Main Street, making 1800 stops. In case a new bridge is built to replace the old Connecticut River toll structure from twenty to thirty cars per hour can be diverted from Main Street, including interurban service to and from Hartford via the West Side line, Holyoke, Feeding Hills, Agawam, Riverside Park summer service and possibly Westfield. At present some of the interurban runs are abnormally long in order to remedy the traffic congestion on Main Street. The Chicopee-Longmeadow and Dickinson-Worthington Street services are operated through the city between suburban centers on either side in order to save four cars per hour in each direction on Main Street during the period of heaviest travel. Regarding the popular demand for a waiting station in the heart of the city at Court Square, Mr. Dickson said that the company's action would depend upon the finding of the Massachusetts Railroad Commission, following a hearing on the subject. The United States authorities have recently conferred with the company on behalf of the establishment of electric railway express and freight service in and out of the Springfield Arsenal grounds.

Change from Zone to Mileage Basis Recommended in Pennsylvania

Among the principal recommendations in the annual report made to the Governor of Pennsylvania by the State Railroad Commission on Jan. 14, 1913, is that fares on interurban electric railways be placed on a mileage basis instead of the present fare zone basis. The report treats this subject as follows:

"What are known as fare zones on our suburban and interurban electric railways have been a source of constant friction between these carriers and their patrons. This contention will continue as long as the attempt is made to base the rate of fare collected upon divisions or zones that are made of varying lengths according to the density of the population of the adjacent territory, or in any way modified in length or extent to meet peculiar local conditions. The commission is of the opinion that some statutory provision should be made which would require all electric railways which operate outside of our larger centers of population to place the fare charged upon a measured mileage basis, with respect to which there can be no difference of opinion. This could be done very readily by dividing the road into blocks or sections of uniform length and fixing a uniform rate as the legal fare for each such block, or fraction thereof, thus putting the whole system of fares upon our rural lines on practically a mileage basis."

Traffic Agreement Between Pennsylvania Lines.—A traffic agreement has been arranged between the Northern Cambria Street Railway, Johnstown, Pa., and the Altoona & Logan Valley Electric Railway, running out of Altoona. Several miles of connecting line remain to be built.

Inquiry Into Rates of New Haven Railroad Out of New York.—The Interstate Commerce Commission on Jan. 8, 1913, decided to inquire into the action of the New York, New Haven & Hartford Railroad in increasing rates on passenger commutation fares between Connecticut points and New York City. The commission proposes to hold a hearing in New York at an early date and one in Washington later.

Wages Increased on Warren, Brookfield & Spencer Street Railway.—Thomas T. Robinson, receiver for the Warren, Brookfield & Spencer Street Railway, Brookfield, Mass., has granted an increase of wages to car service men dating from Jan. 1, 1913. For regular work 22.5 cents per hour is to be paid, spare men receiving 21.25 cents per hour. New men will be given 20 cents per hour at the beginning of their service.

Fishing Time Along the Interurban Line.—The *Tangent*, published by the Galveston-Houston Electric Railway, Galveston, Tex., contains an announcement in its issue for January, 1913, of the formation of the Anglers' Club by members of the Houston Electric Company and the Galveston-Houston Electric Railway. The announcement was made in the form of a full-page advertisement headed "It's Fishing Time Along the Interurban Line."

Change in Fare Zones Requested.—The Public Service Commission of Maryland has been asked to order the United Railways & Electric Company, Baltimore, Md., to readjust the fare zones on its Sparrow's Point line. No objection has been raised in regard to the first fare zone out of Baltimore, but the complainants have asked that the second zone be established at the Highlandtown carhouse instead of ending at Dundalk. The commission has held a hearing on the application and has taken the matter under advisement.

Changes in the Legal Staff of the Louisville Railway.—Changes in the legal staff of the Louisville (Ky.) Railway were announced recently following the resignation of Attorney Fred Focht. W. W. Crawford has resigned and will devote his attention to the work of Gibson & Crawford. Huston Quin, formerly first assistant city attorney of Louisville, and Eugene R. Atkinson have become members of the staff, associated with Frank P. Straus, Alfred Selligman and Howard Lee. These five men will handle the legal business of the company in the future under the direction of Alexander P. Humphrey.

Newspaper Men on Tour of Inspection in Richmond.—C. C. Johnson, assistant general manager of the Virginia Railway & Power Company, Richmond, Va., entertained a party of newspaper men as his guests recently. He took the members of the party over the lines of the company, and pointed out to them the work which the company is carrying on to make the cars clean and sanitary and to better conditions of their use during the rush hours. Mr. Johnson told the representatives of the press about the means which the company is taking to meet the peculiar traffic conditions which are encountered in Richmond and referred to similar problems in other cities.

Commutation Rates Asked on Road in New York State.—The Public Service Commission of the Second District of New York has received a complaint from commuters traveling daily over the lines of the New Paltz, Highland & Poughkeepsie Traction Company, New Paltz, N. Y., asking for the establishment of commutation rates for daily riders. The complaint alleges that the rates, running in some instances to 40 cents a day with an additional 10-cent ferry fare, are prohibitive. Others are obliged to pay 30 cents and 20 cents per day, which complainants allege are out of proportion to the distance traveled. The complaint has been served on the company and an answer required within twenty days.

Service Complaints in Pennsylvania.—The Valley Traction Company, Lemoyne, Pa., has answered complaints made against it before the Railroad Commission of Pennsylvania. Citizens of Lemoyne asked that transfers be granted by the company in the various towns along the west shore. The company states that transfers cannot be given on account of the exceptionally low rate of fare to Enola, allowed to promote the growth of that town. The Wilkes-Barre Railway denies that its train service is insufficient and contends that a station near the Wilkes-Barre hospital is not necessary for the convenience of the traveling public. Complaint against the service of the Bucks County Electric Railway at Langhorne has been filed with the Railroad Commission by residents of that borough who contend that the schedule of the company does not fit in with the schedules of the steam railroads and that the traveling public is seriously inconvenienced thereby.

Nashville Company Distributes Prizes.—The Nashville Railway & Light Company, Nashville, Tenn., distributed \$1,800 in cash prizes to conductors, motormen, division superintendents and gatemen at a meeting held on Christmas Eve. The prizes were awarded according to the number of hours worked and based on term of service with the company. In computing the hours of service deductions were made for accidents in which the men were involved. Additional prizes were given men long in the service of the company. Each man who had served more than five years received \$5. The list shows that four conductors and ten motormen have been in the employ of the company more than ten years—one of the motormen having been in the service for twenty years and one month. These awards were in addition to the turkey which was presented to every employee at Christmas.

Modification of Subway Service Order.—The Public Service Commission for the First District of New York has modified its orders of December, 1910, covering train service in the subway. The order of 1910 provided that the company during the rush hours should operate as many trains as is physically possible, and during the non-rush hours enough trains to provide during every fifteen-minute period as many seats as there are passengers offering during such period. The modified order is along the same lines, but makes the period twenty minutes instead of fifteen minutes. This will allow the company a little more leeway in obeying the order, it having complained that the previous order compelled it to operate trains with many empty cars for long distances outside of the congested district in order to comply with the terms of the order in that district. The modified order was adopted by a divided vote, Chairman William R. Willcox and Commissioners John E. Eustis and George V. S. Williams voting for it and Commissioners Milo R. Maltbie and J. Sergeant Cram voting against it.

Milk Service on New York Road.—The Public Service Commission of the Second District of New York has required the Wallkill Transit Company to provide a so-called freight service on milk and cream between Goshen and Middletown and intermediate points leaving Goshen on each week day at 6.30 a. m., and that the rate charged on milk and cream for such service shall not exceed 10 cents per can of forty quarts. The order further provides that during the busy milk shipping season beginning April 15 and ending Oct. 1 one or more freight cars shall be placed in this service. Complaints were filed with the commission as to the increase of rates on milk and cream between Goshen and Middletown from 15 to 20 cents per forty-quart can and the discontinuance of the freight service previously provided by the company, on which service a rate of 10 cents per can was charged. The company has agreed to restore the freight car service during the busy season and will raise no further objection if a gross revenue of \$7 per day is derived from such service. If the revenue does not reach a satisfactory point it will have leave to file an application for amendment to the order.

Near-Side Stops in Toledo.—The Toledo Railways & Light Company, Toledo, Ohio, has issued the following statement in regard to the plan of the company to stop its cars on the near side of the street commencing Jan. 20, 1913, in accordance with the ordinance passed recently by the City Council: "Any time there is an interference in the established customs there is bound to be complaint, so the company is giving long notice beforehand in order to prepare people for the change. The company believes the ordinance will help in reducing the danger of accidents, will add to the speed of the cars and will give more general satisfaction to the patrons. To help work it out and to pave the way for the introduction of the pay-as-you-enter system which must soon be put in vogue, the company is asking everyone to enter only at rear door and leave by the front. If this were generally done, it would do away with long stops at street intersections, eliminate much confusion in crowded cars and make traveling much more comfortable for passengers. Such a thing can be accomplished only by co-operation between the company and its patrons, and the company hopes by street car posters and newspaper advertisements to show its patrons that they will greatly benefit by the plan."

Personal Mention

Mr. J. W. Warren has been appointed superintendent of transportation of the Waco (Tex.) Street Railway.

Mr. F. W. Insull has resigned as general auditor of the Arkansas Valley, Railway, Light & Power Company, Pueblo, Col., to accept another position.

Mr. W. D. Skinner has been appointed traffic manager of the Oregon Electric Railway, United Railways of Portland, the Oregon Trunk Railway and the Spokane, Portland & Seattle Railway, Portland, Ore., to succeed Mr. W. E. Coman, resigned.

Mr. T. A. Pitcher, formerly assistant claim agent of the Dallas (Tex.) Electric Corporation and prior to that purchasing agent of the local companies at Dallas controlled by Stone & Webster, has resigned to engage in real estate business in Dallas.

Mr. E. A. Burrill, who resigned as vice-president and general manager of the Peoria Railway Terminal Company Sept. 1, has been appointed vice-president and general manager of the Toledo, Port Clinton & Lakeside Railway, Toledo, Ohio.

Mr. Harvey B. Ross, who has been acting superintendent of the Waco (Tex.) Street Railway since the resignation of Mr. A. D. Brinckerhoff last July, has been appointed superintendent of the company. Mr. Ross was formerly claim agent of the company.

Mr. J. E. Mahaney has been appointed purchasing agent of the Oregon Electric Railway, the United Railways, the Spokane, Portland & Seattle Railway and the Oregon Trunk Railway, with headquarters in Portland, Ore., to succeed Mr. F. A. Bushnell, resigned to accept service with another company.

Mr. A. M. Lupfer has been appointed chief engineer of the Spokane & Inland Empire Railroad, with headquarters in Portland, Ore., vice Mr. R. Budd, resigned. Mr. Lupfer has also been appointed chief engineer of the Spokane, Portland & Seattle Railway and the Oregon Trunk Railway to succeed Mr. Budd.

Mr. Oscar T. Crosby has disposed of his interest in the Wilmington & Philadelphia Traction Company, Wilmington, Del., to the National Properties Company, as noted elsewhere in this issue, and has resigned as president of the company and expects at an early date to travel in Asia and Africa.

Mr. Van Horn Ely, president of the National Properties Company, Pittsburgh and New York, has been elected president of the Wilmington & Philadelphia Traction Company, Wilmington, Del., to succeed Mr. Oscar T. Crosby, who has disposed of his interest in the company to the National Properties Company.

Mr. J. H. Pardee, who as vice-president of J. G. White & Company, Inc., New York, N. Y., has been in charge of the operating department of that company, has been elected president of The J. G. White Management Corporation, which has been organized in accordance with the plan to conduct the engineering-construction department and the operating departments of J. G. White & Company, Inc., separately.

Mr. J. M. Wakeman, formerly general manager of the McGraw Publishing Company, has been appointed general manager of the Society for Electrical Development, Inc., New York. The object of the Society for Electrical Development is to promote the use of electrical energy and to further the interests of lighting companies, manufacturers, jobbers, contractors and dealers through a vigorous co-operative campaign of publicity, etc., to guide which Mr. Wakeman is eminently fitted.

Mr. F. W. Abbot, construction manager of the Electric Bond & Share Company, New York, N. Y., and vice-president and general manager of the Yadkin River Power Company, has resigned both positions to become construction manager of the Ebro Irrigation & Power Company, incorporated by the F. S. Pearson Engineering Corporation to construct two hydroelectric plants, one of 30,000-hp and one of 80,000-hp capacity, on the Ebro River, in Spain.

As noted in the *ELECTRIC RAILWAY JOURNAL* of Jan. 11, 1913, Mr. Abbot has been succeeded as construction manager of the Electric Bond & Share Company by Mr. Joseph D. Evans.

Mr. Frank R. Brosius, whose resignation as supervising engineer of the Columbus Railway & Light Company, Columbus, Ohio, was noted in the *ELECTRIC RAILWAY JOURNAL* recently, has been appointed supervising engineer of the power stations of the Cincinnati and Covington traction interests of A. B. Leach & Company, New York, N. Y. Mr. Brosius is a graduate of the State School for Soldiers and Sailors' Orphans at Xenia. He has been active in the organization of the local branch of the National Association of Stationary Engineers, and at its last meeting that organization adopted resolutions expressing the esteem of its members for Mr. Brosius and their regret that he is now to withdraw from the local organization.

Mr. J. M. Dewberry, who has been vice-president of the Birmingham, Ensley & Bessemer Railway, Birmingham, Ala., the first section of which was placed in operation recently, has severed all his official relations with the company, which is commonly known as the Tidewater line, but has not resigned from the Tidewater Power Company or retired from participation in the development of the other features of the general Tidewater enterprises, which include the construction of a power plant on the Warrior River to furnish electricity for light and power purposes in Birmingham and the construction of a railway from Birmingham to the Warrior River. Mr. Dewberry will hereafter devote his time largely to the affairs of the J. M. Dewberry Company, banker.

Mr. T. W. Wilson, who has been assistant to the president of the Wilmington & Philadelphia Traction Company, Wilmington, Del., has been elected vice-president and general manager of the company, the property of which has been taken over by the National Properties Company, Pittsburgh and New York. Mr. Wilson was formerly general manager of the International Railway, Buffalo, N. Y. He was born in New York City in 1872 and was graduated from Lehigh University in 1894. He was formerly connected with the Pennsylvania Steel Company and the Charleston (S. C.) Street Railway, of which latter he became chief engineer. He entered the service of the International Railway in 1897 as assistant engineer. He is a past-president of the New York Electric Railway Association. Mr. Wilson is a director of both the Wilmington & Philadelphia Traction Company and the National Properties Company.

OBITUARY

Henry De Forest Hubbard, aged fifty-two years, for a number of years general manager and chief engineer of the Manchester Traction Company, Pittsburgh, Pa., died in his home in Avalon, Pa., on Jan. 11, 1913. After the consolidation of the Manchester Traction Company with the Pittsburgh Railways, Mr. Hubbard entered other business as a consulting engineer.

Joseph P. Ord, a director of the General Electric Company, Schenectady, N. Y., and formerly comptroller of that company, died at his apartment in the St. Regis Hotel, New York, on Jan. 9, 1913. Mr. Ord was born in Pasadena, Cal., in 1852 and was graduated from Yale with the class of 1873. He was admitted to the bar and entered the firm of Alexander Green, New York, and became an assistant to Mr. Ashabel Green in the receivership of the West Shore Railroad. Mr. Ord was for a time connected with J. P. Morgan & Company, New York, N. Y.

S. D. Coykendall, who was president of the Kingston (N. Y.) City Railroad, now a part of the Kingston Consolidated Railroad, died at Kingston on Jan. 14 at the age of seventy-five years. Mr. Coykendall was president of the Ulster & Delaware Railroad, the First National Bank of Kingston, the Cornell Steamboat Company, the Rhinebeck & Kingston Ferry Company, the Kingston Coal Company and a number of other companies. He retired from the Kingston City Railroad following the consolidation of that company with the Colonial City Traction Company, Kingston, in December, 1901, as the Kingston Consolidated Railroad.

Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

RECENT INCORPORATIONS

Jacksonville & St. Augustine Public Service Corporation, St. Augustine, Fla.—Application for a charter has been made by this company in Florida to build a 55-mile electric railway to connect South Jacksonville, Pablo and St. Augustine. Capital stock, \$2,000,000. Officers: A. W. Corbett, president; John Andreu, vice-president; D. L. Dunham, secretary; A. E. Baya, treasurer, and Joseph Lynn. The other directors are C. J. Perry and R. L. Campbell. [E. R. J., Jan. 11, '13.]

***Universal Traction Company, Indianapolis, Ind.**—Incorporated in Indiana with a capital stock of \$50,000. Incorporators: Truman B. Funk, William D. Myers and James E. Kepperly.

***Moberly, Huntsville & Randolph Springs Railway, Moberly, Mo.**—Incorporated in Missouri to build a 12-mile interurban railway between Moberly, Huntsville and Randolph Springs. Capital stock, \$500,000. Directors: C. H. Dameron, W. T. Dameron, G. P. Dameron, W. M. Evans and others, all of Huntsville, Mo.

***Flathead Valley Interurban Railway, Kalispell, Mont.**—Incorporated in Montana to build an electric railway to connect Kalispell, Whitefish, Somers and Bigfork. Capital stock, \$50,000. Incorporators: Robert P. Austin, Walter H. Griffin and Robert J. Benn.

***General Elevated Railway, Philadelphia, Pa.**—Incorporated in Pennsylvania to apply for any and all rights, inventions, improvements, etc., for elevated railways. Capital stock, \$1,000,000. Incorporators: Frank A. Butler, Henry N. Montgomery, W. H. Doeble, J. George Schemff, Frank K. Stahl, U. G. Yoder, George B. Young and C. U. Martin.

***South Carolina Light, Power & Railways Company, Spartanburg, S. C.**—Incorporated in Massachusetts to acquire the properties of the Spartanburg Railway, Gas & Electric Company and the Electric Manufacturing & Power Company, Spartanburg.

***Welsh Colony Railroad, Buckhannon, W. Va.**—Chartered in West Virginia to build an interurban railway from Avondale to Pendro. Headquarters, Buckhannon. Capital stock, \$5,000. Incorporators: Matthew Perkins, Samuel Davies, John P. Williams, Davil S. Thomas, Shenandoah, Pa.

FRANCHISES

Birmingham, Ala.—The Birmingham, Ensley & Bessemer Railroad has asked the Council for a franchise to extend its lines in Birmingham.

Birmingham, Ala.—The Birmingham Railway, Light & Power Company has received a thirty-year franchise from the Council to extend its Owenton line in Birmingham to Tuxedo.

Edmonton, Alta.—The City Council has approved of plans submitted by the Edmonton Radial Railway for radial railways having a total length of 120 miles. The plan provides for lines all over the city limits of Edmonton. It is intended to begin working out this plan early this year, during which it is proposed to add 18 miles to the existing lines and to begin making permanent improvements upon all the streets on which it is proposed to build lines.

Little Rock, Ark.—The Little Rock & Hot Springs Electric Railway has asked the Council for a franchise in Little Rock.

Los Angeles, Cal.—The Los Angeles Railway has asked the Council for a franchise for a double-track line on Mission Road from Keith Street northeasterly in Los Angeles.

Bridgeport, Conn.—The Connecticut Company has received the approval of the Public Utilities Commission for location of tracks on Park, North, Brooklawn, Seaview, Stratford and Noble Avenues and East Main Street in Bridgeport.

Lewiston, Idaho.—F. L. Sturm, representing the Lewiston Electric Railway, has received a franchise from the Council in Lewiston. Work will be begun at once by the company on the line to connect Lewiston, Clarkston and Asotin. [E. R. J., Jan. 4, '13.]

Baton Rouge, La.—The Baton Rouge Electric Company has accepted the franchise offered by the city for the extension along Florida Street and down East Boulevard to Railroad Avenue in Baton Rouge.

Bangor, Maine.—The Bangor Railway & Electric Company has asked the City Council for a franchise to extend its line across the Bangor bridge to Brewer.

***Fort Garry, Man.**—Application is being made to the Manitoba Legislature for an act authorizing the Fort Garry municipality to build an electric railway with terminals in Winnipeg. R. A. C. Manning is interested.

Butte, Mont.—The Butte Electric Railway has received a franchise from the Council for an extension in the southwestern section of Butte.

Cicero, N. Y.—The Public Service Commission, Second District, has authorized the Syracuse, Watertown & St. Lawrence River Railroad to exercise a franchise granted by the town of Cicero for the operation of its railroad through Cicero.

California, Pa.—The Pittsburgh Railways has asked the Council for a franchise in California. The company has also asked the Council in Coal Center for a franchise for a line through Coal Center.

Centralia, Wash.—The Washington Electric Railway has asked the Council for a franchise for a right-of-way along the county road from the fair grounds to Centralia. This line will connect Vancouver and Tacoma via Chehalis, Centralia and Olympia. [E. R. J., Nov. 23, '12.]

Port Angeles, Wash.—The City Council has been asked to grant two fifty-year franchises to two different concerns to build electric railways in Port Angeles. John H. Dalton, Chicago, et al. were petitioners in one case and the Olympia Power Company in the other.

TRACK AND ROADWAY

Birmingham Railway, Light & Power Company, Birmingham, Ala.—During 1913 this company plans to spend over \$1,300,000 for betterments. The improvements will include four extensions. The Owenton line is to be extended from Owenton to Tuxedo, the East Lake line is to be extended to Roebuck Springs and beyond, while the Avenue F line will be extended to Elmwood Cemetery if the City Commissioners give the company a right to use that avenue as requested. The Gate City line is also to be extended to Irondale.

Arkansas Interurban Construction Company, Little Rock, Ark.—This company will soon be in the market for rails, bridges, etc., for the construction of its 56-mile electric line between Little Rock and Hot Springs. L. Garrett, 321 Main Street, Little Rock, general manager. [E. R. J., Dec. 28, '12.]

British Columbia Electric Railway, Vancouver, B. C.—This company has been asked to extend its lines to Sydney.

Los Angeles (Cal.) Railway.—This company has placed in operation its new Vernon Avenue crosstown line in Los Angeles.

Pacific Electric Railways, Los Angeles, Cal.—This company has received permission to construct twenty-eight grade crossings and one under-grade crossing on public highways on its proposed extension between Highgrove and San Bernardino; to cross at grade nine streets intersecting Mendocino Street, near Pasadena; to construct an under-grade crossing under the tracks of the Atchison, Topeka & Santa Fe Railroad near the south line of San Bernardino County, and to construct three crossings in Hermosillo, Los Angeles County. The Southern Pacific Company was granted permission to construct a passing track at grade across Clearwater Road, Downey, Los Angeles County.

***San Francisco, Cal.**—Preliminary steps for a municipal railway in Van Ness Avenue from Market Street to Bay Street to furnish transportation facilities to the Panama Pacific Exposition and act as a crosstown line for the Geary

Street Municipal Railway were taken by the Board of Supervisors recently.

Central California Traction Company, San Francisco, Cal.—Positive plans for the extension of its line to Hollister from San Juan have been made by this company. Plans are being considered to extend its line into the San Joaquin Valley, with Fresno as a terminal point.

Santa Barbara (Cal.) Consolidated Railway.—Work has been begun by this company on the reconstruction of its lines in Santa Barbara. It is planned to expend \$250,000 on reconstruction work and \$250,000 on extensions and improvements to its lines. One of the extensions will be from the old Mission to the site of the new Normal School in Santa Barbara.

Vallejo & Northern Electric Railway, Vallejo, Cal.—The roadbed from Boynton Junction south to Vallejo is being completed by this company.

***Athens, Ga.**—A company is being organized by local capitalists in Athens to build an electric railway through Athens.

Fairburn & Atlanta Railway & Electric Company, Fairburn, Ga.—It is announced that this company will convert its 10-mile gasoline railway to an electric line at once.

Waycross Street & Suburban Railway, Waycross, Ga.—An extension will be built by this company to Hebardville after its line to Gilchrist Park is completed.

***Pekin, Ill.**—W. A. Ebbert and associates are considering plans to build an electric railway in Pekin.

Illinois Traction System, Peoria, Ill.—This company is negotiating to make connections with the Alton, Granite & St. Louis Traction Company and the East St. Louis & Suburban Railways at Edwardsville.

Springfield (Ill.) Consolidated Railways.—This company plans to build a double track on Monroe Street, from Eighth Street to Tenth Street, in Springfield.

Union Traction Company, Coffeyville, Kan.—This company has placed in operation its line between Parsons, Cherryvale, Dennis and other nearby towns.

Owensboro (Ky.) City Railway.—This company has completed an extension to the new plant of the Universal Stenotype Company, in Owensboro.

Kentucky Southwestern Electric Railway, Light & Power Company, Paducah, Ky.—This company will begin the construction of its line from Paducah to Fancy Farm in the spring.

***Assiniboia, Man.**—At a meeting of the Council of this municipality a resolution was passed favoring the building of a municipally owned electric railway in Assiniboia.

Winnipeg (Man.) Electric Railway.—This company has been asked to consider plans to build a line to Portage la Prairie.

Fitchburg & Leominster Street Railway, Fitchburg, Mass.—An 11½-mile extension to Ashby and Ashburnham will soon be built by this company. Other extensions planned are a line from Clinton to Ayer, a distance of 14 miles; from Clinton to Sterling, 5 miles, and from West Boylston via Oakdale, West Sterling and East Princeton to South Westminster, a distance of 13½ miles.

Benton Harbor-St. Joe Electric Railway, Benton Harbor, Mich.—Surveys are being made by this company for an extension from Coloma to Hartford. Work will be begun in the spring on the extension to Watervliet.

Laurel Light & Railway Company, Ellisville, Miss.—A contract has been awarded by this company for the ties for its line between Laurel and Ellisville. Guy M. Walker is interested. [E. R. J., Nov. 30, '12.]

Manchester Traction, Light & Power Company, Manchester, N. H.—This company has placed in operation its McGregorville and Bridge Street line in Manchester.

Liberty & Callicoon Railroad Corporation, Liberty, N. Y.—The Public Service Commission, Second District, has granted to this company a certificate of public convenience and necessity. The company proposes to build a railroad from a point near the New York, Ontario & Western Railroad station in Liberty to Jeffersonville. The line will pass through Liberty, Loomis, White Sulphur Springs, Youngsville, Jeffersonville and Callicoon, all within Sullivan County.

The length of the line will be approximately 14 miles. The commission has also authorized the company to issue its common capital stock to the amount of \$200,000 and its first mortgage twenty-five-year 5 per cent gold bonds to the amount of \$250,000, the latter to be sold at not less than 85. The proceeds of the stock and bonds are to be used for the construction of the railroad. The charter of the railroad provides that it may be operated either by steam or electric power. [E. R. J., Oct. 26, '12.]

Yadkin River Railway, Raleigh, N. C.—It is reported that this company has completed 4 miles of track from North Wilkesboro toward Elkville. About 13 miles of the line is graded. W. J. Grandin, Boone, N. C., president. [E. R. J., March 2, '12.]

***New Hanover Transit Company, Wilmington, N. C.**—This company is having surveys made by Walter G. MacRae for the construction of an electric railway from Wilmington to Carolina Beach, a distance of about 13 miles. A. W. Fate, president.

Rainy River Radial Railway, Ottawa, Ont.—Engineers are at work making surveys for a line from Fort Frances to the Lake of the Woods as the first section of this projected railway. [E. R. J., Sept. 11, '09.]

Portland, Eugene & Eastern Railway, Portland, Ore.—Work will be begun in the spring by this company on its line from Portland south for 40 miles.

Lebanon & Campbelltown Electric Street Railway, Lebanon, Pa.—This company has completed and will soon place in operation its 10-mile line between Lebanon and Campbelltown.

Hagerstown, Greencastle & Mercersburg Railway, Middleburg, Pa.—This company will begin construction about March 1 on its 22-mile line to connect Hagerstown, Morgansville, Md., State Line, Greencastle, Upton and Mercersburg, Pa. The company's repair shops will be located at Greencastle and power will be purchased from the Security plant in Hagerstown. The company will operate eighteen cars. Capital stock authorized, \$600,000. Bonds authorized, \$600,000. Capital stock issued, \$100,000. Officers: John E. Ensign, Greencastle, president; A. H. Hamill, vice-president and treasurer; C. M. Hoffman, Greencastle, secretary, and J. B. Ferguson, Hagerstown, chief engineer. [E. R. J., Jan. 4, '13.]

Phoenixville, Valley Forge & Strafford Street Railway, Phoenixville, Pa.—Among the extensions planned by this company during 1913 will be an addition to the line in Phoenixville, over the Gay Street bridge, through the North Side to Cromby, from there to Black Rock to Royersford and to Collegeville, completing the line at Pottstown and Valley Forge.

Pittsburgh (Pa.) Railways.—This company plans to extend its Charlevoix branch to Roscoe, the present terminus being at California, Pa. Ordinances have been presented in the Councils of Coal Center and California, asking for extensions to the present grants. It is said that the line will be extended to Brownsville as soon as possible.

Sunbury & Susquehanna Railway, Sunbury, Pa.—New lines planned by this company will extend into Snyder County and from Northumberland to Lewisburg, Milton, Watsonville and Williamsport.

***Saraguay Electric & Water Company, Saraguay, Que.**—This company has asked the Quebec Legislature for authority to change its title to the Light & Power Company of Montreal, or the Montreal Public Service Corporation, and for power to acquire franchises for electric railways, etc.

***Lynchburg, Tenn.**—W. G. Cummings, manager of the Stone Fort Power Company, Manchester, Tenn., is preparing plans for an electric railway from Tullahoma to Lynchburg. Preliminary surveys will soon be made.

Nashville & Gallatin Railway, Nashville, Tenn.—This company plans an extension of the line which it has in course of construction at present between Nashville and Gallatin. The Gallatin division is to be extended into Kentucky and further plans for new lines into Illinois and as far north as Indiana are in hand with the company.

Eastern Texas Traction Company, Dallas, Tex.—This company, which is building an electric railway between

Dallas and Greenville, has filed for record a first mortgage securing an issue of \$2,000,000 of 5 per cent bonds with the Guaranty State & Trust Company, Dallas, as trustee. The plan is to issue \$1,300,000 of the bonds at once. The bonds are dated Dec. 1, 1912, and are due on Dec. 1, 1942.

Rio Grande Valley Traction Company, El Paso, Tex.—Preliminary arrangements are being made by this company for the construction of a 16-mile electric line between El Paso and Socorro. The Stone & Webster Engineering Corporation has received the contract for the entire work, and bids will be asked from the local contractors for grading and right-of-way work, which will be sublet. C. W. Kellogg, El Paso, general manager. [E. R. J., Aug. 3, '12.]

SHOPS AND BUILDINGS

Los Angeles (Cal) Railway.—This company has opened its new earhouse, division No. 5, in Los Angeles, in which it will house about 350 cars.

Pacific Electric Railway, Los Angeles, Cal.—A passenger station will soon be built by this company in El Segundo.

Central California Traction Company, San Francisco, Cal.—Work has been begun by this company to enlarge its office building in Stockton. The addition will be 18 ft. x 30 ft.

Kankakee & Urbana Traction Company, Urbana, Ill.—This company has purchased a site in Rantoul on which it plans to build a new station in the spring.

Kentucky Traction & Terminal Company, Lexington, Ky.—This company has leased a three-story building at Main Street and Limestone Street in Lexington and will remodel it for a passenger and freight station.

United Railways & Electric Company, Baltimore, Md.—This company has awarded a contract to John Cowan, Inc., 106 West Madison Street, Baltimore, to reconstruct its station at Fairmont Avenue in Baltimore.

Ottawa (Ont.) Electric Company.—This company is building a new addition to its earhouse in Ottawa, which will add four to the six tracks already there and give accommodation for thirty more cars.

Bryan & College Interurban Railway, Bryan, Tex.—This company will build a new earhouse on Regent Street and Anderson Street in Bryan.

POWER HOUSES AND SUBSTATIONS

Pacific Electric Railway, Los Angeles, Cal.—This company has been asked to consider plans to build a new depot on Los Angeles Street, in the rear of the company's station, in order that traffic congestion on Main Street may be relieved.

Denver (Col.) City Tramway.—This company has awarded a contract for the construction of a new substation at Delaware Street and Courtland Street in Denver. The capacity of the plant will be 2500 hp.

Ottumwa Railway & Light Company, Ottumwa, Ia.—The installation of mechanical stokers under the boilers has been completed at this company's power house in Ottumwa, also the construction of ash pits and ash tunnels.

Berkshire Street Railway, Pittsfield, Mass.—This company is now building a new substation south of Great Barrington.

Tri-State Railway & Electric Company, East Liverpool, Ohio.—This company will make improvements to the plant of the Beaver County Light Company, the estimated cost of which will be \$60,000. Orders for a new 1850-kw turbo-generator and other material for the Fallston power plant between New Brighton and Rochester, Pa., have been placed with the Westinghouse Electric & Manufacturing Company. It is hoped to have the machinery installed by April 1.

Grand Valley Railway, Brantford, Ont.—This company plans to use power secured from the Hydro-Electric Commission for its line between Galt and Paris.

Tennessee Eastern Electric Company, Greenville, Tenn.—This company is rushing work of construction upon a \$500,000 power house which it is erecting on the Nolachucky River near that city and is preparing plans for an interurban railway system to connect Greenville, Newport, Johnson City and Sevierville.

Manufactures and Supplies

ROLLING STOCK

United Traction Company, Albany, N. Y., has prepared specifications for the purchase of fifteen double-truck cars.

Denver (Col.) City Tramway has ordered twenty-four trail cars from the Woeber Car & Manufacturing Company.

Monongahela Valley Traction Company, Fairmont, W. Va., is reported to be in the market for four interurban cars.

Stone & Webster, Boston, Mass., is reported to be considering the purchase of sixty cars for use on its various properties.

Ohio Valley Electric Railway, Huntington, W. Va., it is reported, will purchase several new cars at once to replace the equipment which was burned last week.

Valley Traction Company, Lemoyne, Pa., has ordered from The J. G. Brill Company four 30-ft. 8-in. prepayment car bodies mounted on Brill 27-MCB-2-X trucks.

Omaha, Lincoln & Beatrice Railway, Lincoln, Neb., has indicated in an application which it has made to the Railroad Commission of Nebraska for permission to issue securities to complete the line from Lincoln to Omaha that it will require six high-speed interurban cars, eight city cars, four express cars, one construction car and two snow plows.

TRADE NOTES

Dearborn Chemical Company, Chicago, Ill., has changed the address of its office at Indianapolis, Ind., to 919 Hume Mansur Building.

International Acheson Graphite Company, Niagara Falls, N. Y., has appointed Richard Cary sales manager of its lubricant department, which handles the lubricants known as oiltag, aquadag and gredag.

St. Louis Car Company, St. Louis, Mo., has appointed Nie Le Grand its general sales manager, effective Jan. 1, 1913. Mr. Le Grand has been manager of the supply department of the company for several years.

Southern Wheel Company, Atlanta, Ga., has been organized with a capital stock of \$2,500,000 to manufacture iron and steel castings, car wheels, etc. Application has been made for a charter. The company proposes to build a factory or factories in the South.

Bay State Car Wheel Company, Boston, Mass., noted in the *ELECTRIC RAILWAY JOURNAL* of Jan. 11, 1913, as having been incorporated with a capital stock of \$21,000,000, will take over the assets and the business of the Griffin Wheel Company. When this has been effected the name of the Bay State Car Wheel Company will be changed to the Griffin Wheel Company.

Galena Signal Company, Franklin, Pa., has called a special stockholders' meeting for March 19 for the purpose of authorizing an increase of \$4,000,000 in the common stock, of which there is now \$8,000,000. The company proposes to issue the new common stock against the surplus and undivided earnings out of which a 50 per cent stock dividend is to be paid.

Edward J. Hunt, Newark, N. J., has received from the following companies among others orders for Hunt oil drying and purifying outfits: Public Service Corporation, Newark, N. J.; Indiana & Michigan Electric Company, South Bend, Ind.; Toronto Power Company, Niagara Falls, Ont.; Pearson Engineering Corporation, New York, N. Y.; York Haven Water & Power Company, York Haven, Pa.; Savannah River Power Company, Anderson, S. C.

Stonehouse Enameled Steel Mine Signal Company, Denver, Col., has placed on the market the Universal danger sign for crossing warnings, cattle passes, third-rails waterways, bridges and culverts. This sign is made of charcoal rolled steel, the lettering of enamel being fused thereon under 1600 deg. of heat. The word "Danger" appears in white letters on a cardinal-red oval surrounded by a jet-black background. The company is also prepared to furnish enameled signs for span wire suspension, station or ear signs.

Vulcan Engineering Sales Company, Chicago, Ill., selling agent of the QMS Company's products, reports several recent sales and shipments of QMS car wheel grinders. A grinding machine has just been shipped to the Virginia Railway & Power Company, Richmond, Va., and a similar machine is now under construction for the Ottawa (Ont.) Electric Railway. The Public Service Railway, Newark, N. J., and the British Columbia Electric Railway, Vancouver, B. C., have just ordered additional grinders.

General Electric Company, Schenectady, N. Y., at a recent meeting of the board of directors elected J. R. McKee and O. D. Young vice-presidents of the company. Mr. McKee was chairman of the sales committee of the General Electric Company for several years, and Mr. Young was formerly connected with Stone & Webster, Boston, Mass. At a previous meeting of the board Anson W. Burchard, of New York, was elected a vice-president of the company. Mr. Burchard was for many years assistant to the president of the General Electric Company.

General Pipe, Bending & Erecting Compay, Pittsburgh, Pa., has been incorporated under the laws of Pennsylvania by James W. Prenter, W. L. James and Walter McMinn, who were formerly connected with the Best Manufacturing Company. The company is prepared to manufacture and fabricate piping materials of every description, including pipe bends, welded headers, Van Stone joints, valve fittings and flanges, and as piping engineer is prepared to furnish and install complete high and low pressure piping systems for every purpose. James W. Prenter, president and sales manager of the General Pipe, Bending & Erecting Company, has been connected with the sales department of the Best Manufacturing Company for several years. W. L. James has been erecting engineer for the same company for the past ten years. Walter McMinn was formerly shop superintendent of the Pittsburgh Piping Equipment Company, and was connected with that company for years. During the past year he was connected with the Best Manufacturing Company. The new company's plant is located at No. 3020-3026 Liberty Street, Pittsburgh.

Westinghouse Electric & Manufacturing Company, Pittsburgh, Pa., has developed a new product known as Westinghouse commutator cement, particularly for repairing pitted commutators and for filling slots of undercut commutators. The cement is composed of a liquid and a powder furnished in separate containers to be mixed as used. It contains no phosphoric acid or sodium silicate or other material deleterious to mica plate. The cement is easy and quickly applied and sets without baking in one hour. It is durable under the most severe conditions of expansion and contraction due to the heating of the commutators, and it possesses high insulating qualities. The Westinghouse Electric & Manufacturing Company has received the following orders for railway motors: St. Petersburg (Fla.) Investment Company, five double equipments of No. 306 motors and K-36-J control; Santa Barbara (Cal.) Consolidated Railway, ten double equipments of No. 337-C-3 motors and HLF control; Brunswick & Yarmouth Street Railway, Portland, Maine, three double equipments of No. 101-E-2 motors and double-end K-28-E control; Long Island Railroad, New York, N. Y., twenty-seven equipments of No. 308 motors and type AB control; Davenport & Muscatine Railway, Davenport, Ia., eight Westinghouse double equipments, consisting of No. 323-A motors and double-end K-36-J control; Oakland, Antioch & Eastern Railway, San Francisco, Cal., one quadruple equipment of No. 308-B-6 motors and type HL control for use on an electric locomotive.

ADVERTISING LITERATURE

Electric Railway Equipment Company, Cincinnati, Ohio, has issued Catalog D, which illustrates its combination railway and lighting poles, mast arms and brackets.

Vulcan Engineering Sales Company, Chicago, Ill., has published several leaflets in binder form describing and illustrating the various types of QMS cold-metal sawing machines.

Chicago Pneumatic Tool Company, Chicago, Ill., has issued Bulletin No. 34F, which contains a mechanical de-

scription of the design and construction of class G Chicago pneumatic compressors.

Carbo Steel Post Company, Chicago Heights, Ill., has printed a thirty-two-page booklet which describes and illustrates its complete line of carbo steel posts for every kind of fencing. A post card issued by the company calls attention to carbo steel transmission poles.

Westinghouse Electric & Manufacturing Company, Pittsburgh, Pa., has issued Leaflet No. 3540, which covers Westinghouse type G synchronous motors for sixty cycles, two-phase and three-phase circuits at various voltages and from 30-hp to 250-hp capacity. Thorough descriptions of the various parts, together with illustrations, are given.

General Fire Extinguisher Company, Providence, R. I., has issued the *Grinnell Automatic Sprinkler Bulletin* for January, 1913, which discusses the necessity of installing automatic sprinklers and cites numerous instances in which the Grinnell automatic sprinkler operated successfully. Particular attention is called to two carhouse fires, one of which occurred at the Broad Street carhouse of the Rhode Island Company, and the other at the State Street carhouse of the New York State Railways.

N. W. Halsey & Company, New York, N. Y., announce the publication of a revised edition of their copyright booklet, "The Most Satisfactory Bonds." This booklet will prove of considerable value to the investor who wishes to secure accurate information concerning the desirability of the various standard types of bonds. The pamphlet also contains an exhaustive treatise upon the development of public utility bonds, citing as an example the records made by representative properties. The progress of these properties from year to year is graphically shown by charts. Copies of this book are distributed gratis.

NEW PUBLICATIONS

Fortschritte der Elektrotechnik, 1912 (Electrotechnical Progress, 1912). By Dr. Karl Strecker, Berlin. Julius Springer. Paper, 1410 pages. Price, 14 marks (\$3.50).

This is the fourth quarterly issue for 1912 of this well-known review and covers all important articles within its scope to the end of the year 1911. The value of this publication for electric railway research is indicated by the fact that this issue contains the following numbers of references on the railway topics named: Twenty-one on general operation, six on management and legal, five on electrolysis and other troubles, one on causes of the grade accidents, forty-one on lines under construction in Europe and 133 on details of line, track and car equipment construction.

Extension of the Dewey Decimal System of Classification Applied to the Engineering Industries. By L. P. Breckenridge and G. A. Goodenough, University of Illinois, Urbana, Ill. 117 pages. Price 50 cents.

Some years ago the University of Illinois published an extension of the Dewey decimal system of classification applied to the engineering industries. Four editions of this classification have been published and exhausted, and the university has taken this opportunity to revise the classification again when publishing a new edition. Since the establishment of the Dewey system extensions have been prepared on the application of the system to a number of different branches of literature, but only two, so far as we knew, have been published of its application to railway literature. One of these was by the International Railway Congress and the other by the University of Illinois. The former, which was devoted almost entirely to steam railroad engineering, was incorporated with some slight modification in the third edition of the classification published by the university. The different entries covering electric railway engineering in the book under review occupy about a page. We should have been glad to see them expanded in view of the small amount of space given to this subject in the international railway list, but this is a work which can be taken up later. The classification has been revised in accordance with the 1911 edition of the decimal classification by Melvil Dewey.